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THE

CYCLOPÆDIA;

OR,

Universal Dictionary

OF

ARTS, SCIENCES, AND LITERATURE.

VOL. XVI.

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THE

CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

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OF

ARTS and SCIENCES.

GENERATION.

GENERATION is that function of the animal economy by which the ſpecies is perpetuated. Inanimate matter and unorganized bodies are ſubject to no alterations, and would never change their condition, did not external forces deſtroy or modify them. On the contrary, organized bodies, very different from theſe inert maſſes, are active media of new combinations and changes; they undergo alterations, and are even deſtroyed by the exerciſe of their own powers, the entire ceſſation of which delivers up their ſpoils to the grand circle of changes, which organized matter is conſtantly undergoing. Although ſome of theſe bodies may laſt for a century, while the greater number live only for a few years, days, or even hours, this unequal duration, theſe moments or ages of exiſtence, are nothing with reſpect to nature, and the death which ſhe allots to man, to the plant or the inſect, is not the leſs neceſſary and certain. But, if individuals are ſacrificed and periſh, the ſpecies ſurvive and are immortal; by a conſtant and general law, animated bodies never die altogether, but are renewed and perpetuated by various modes of re-production. Some terminate their vital courſe while others are beginning it; and never, ſays Lucretius, does morning or night viſit the globe, without having funeral lamentations round a bier, and the plaintive cries of an infant in the cradle. There is a conſtant alternation of deaths and births, of loſſes and reparations; and the torch of life is rapidly tranſmitted in the ſeries of ſucceeding generations; "quaſi currentes vitai lampada tradunt." At a certain point of elevation in the ſcale of animal exiſtence, this object is accompliſhed by a double ſeries of organs, executing very different functions; and re-production is effected by a true proceſs of generation, under the influence of that phyſical feeling, the Venus, whoſe univerſal empire and irreſiſtible attractions are ſo beautifully delineated by the Roman poet.

"Æneadum genetrix, hominum divumque voluptas,
Alma Venus! cœli ſubter labentia ſigna
Quæ mare navigerum, quæ terras frugiferenteis
Concelebras; per Te quoniam genus omne animantum
Concipitur, viſitque exortum lumina ſolis:
Te, Dea, te fugiunt venti, te nubila cœli,
Adventumque tuum: tibi ſuaves dædala tellus
Submittit flores; tibi rident æquora ponti,
Placatumque nitet diffuſo lumine cœlum.
Nam, ſimul ac ſpecies patefacta eſt verna diei,
Et reſerata viget genitabilis aura Favonii;
Aëriæ primum volucres, te, Diva, tuumque
Significant initum, perculſæ corda tuâ vi.
Inde feræ pecudes perſaltant pabula læta,
Et rapidos tranant amnes; ita, capta lepore,
Illecebriſque tuis omnis natura animantum
Te ſequitur cupide, quo quamque inducere pergis.
Denique, per maria, ac montes, fluvioſque rapaces,
Frondiferaſque domos avium, campoſque virentes,
Omnibus incutiens blandum per pectora amorem,
Efficis, ut cupide generatim ſecla propagent.

Generation is the greateſt myſtery preſented to our view in the economy of living bodies; and its real nature is ſtill involved in the moſt complete obſcurity. Hitherto no obſervation authorizes us to admit the ſimultaneous formation of a living body in all its parts; that is to ſay, by the union of particles ſuddenly brought together. The compariſon of generation with cryſtallization is ſupported by no juſt analogy: cryſtals are made up of homogeneous particles, attracting each other indiſtinctly, and agglutinated by their

Strahan and Preſton,
New-ſtreet Square, London.

faces, which determine the order of arrangement; while living bodies are compoſed of numerous fibres or plates, heterogeneous in their compoſition, diverſified in their configurations, and deſtined to particular ſituations, ſo that they can only be in one place, and between other determined fibres or lamellæ. Moreover, living bodies, however ſmall they may be, poſſeſs all their parts from the firſt moment of their exiſtence; they grow, not by the addition of new layers, but by the ſometimes uniform, and ſometimes irregular developement of parts, all of which exiſted previouſly to any ſenſible growth. The only circumſtance belonging to all kinds of generation, and conſequently the only eſſential circumſtance in the proceſs is, that every living body, at the firſt periods of its ſenſible exiſtence, is attached to a larger body, of the ſame ſpecies with itſelf, that it makes a part of this larger body, and is nouriſhed by its juices for a certain length of time. Its ſubſequent ſeparation conſtitutes its *birth;* which may be produced ſimply from the life of the larger body, and the conſequent developement of the ſmaller, without the aid of any occaſional cauſe. Thus, in its eſſence, *generation*, as far as we can underſtand it, is only the appearance of a ſmall organized body upon or in ſome part of another and larger one, from which it will be ſeparated, at the expiration of a certain period, in order to aſſume an independent and iſolated exiſtence. All the acts or organs, which co-operate in the proceſs, in a certain claſſes of organized bodies, are only acceſſary to this primary function. When the function is thus reduced to its moſt ſimple ſtate, it conſtitutes the *gemmiparous*, or generation by ſhoots. In this way buds are formed on trees, and developed into branches, which will form future trees, by means of ſlips or cuttings. The polype (hydra) and the ſea anemone (actinia) multiply in this manner; ſome worms are propagated by a diviſion of their body, and muſt therefore be arranged in the ſame diviſion. This mode of generation requires no diſtinction of ſex, no copulation, nor any particular organ. Other modes of generation are accompliſhed in appropriate organs: the germs appear in a definite ſituation of the body, and the aſſiſtance of certain operations is required for their further developement. Theſe operations conſtitute *fecundation*, and ſuppoſe the exiſtence of ſexual parts; which may either be ſeparate or united in the ſame individual. The fecundated or fecundable ſex, in which the germ is found, is the female; and the fecundating ſex, the aſſiſtance of which is neceſſary for the complete developement of the germ, is the male. The office of the latter is that of furniſhing the fecundating or ſeminal fluid: but the manner in which that contributes to the developement of the germ, is not yet ſettled by phyſiologiſts. Some, forming their opinions from the human ſubject and the mammalia, where the germs are imperceptible before fecundation, ſuppoſe that theſe are created by the mixture of the male fluid, with that which they ſuppoſe to exiſt in the female; or that they pre-exiſt in the male ſemen, and that the female only furniſhes them with an abode. Others conſult the analogy of the other claſſes of animals, and of plants. In ſeveral inſtances, particularly in the frog, the germ may be clearly recognized in the ovum of the female before fecundation: its pre-exiſtence may be inferred, in other caſes, from the manner in which it is organically connected to the ovum, when it is firſt viſible. For it is agreed on all ſides, that the ovum exiſts in the female before fecundation, ſince virgin hens lay eggs, &c. From this analogy, theſe phyſiologiſts conclude, that the germ pre-exiſts in all females; and that the fecundating liquor is a ſtimulus which beſtows on it an independent life, by awakening it, in a manner, from the ſpecies of lethargy, in which it would have otherwiſe conſtantly remained.

The origin of the germs, and the mode of their exiſtence in the female; whether they are originally formed in all their parts in each individual by any vital proceſs, or are all pre-exiſtent, being incloſed in each other, or whether they are diſſeminated through the body, and require a concourſe of circumſtances to bring them into a ſituation favourable for their developement, are queſtions, which it is utterly impoſſible for us to decide in the preſent ſtate of our knowledge. Theſe points have for a long time been agitated by phyſiologiſts; but the diſcuſſion ſeems now to be abandoned by univerſal conſent.

The combination of the ſexes, and the mode of fecundation, are ſubject to great variety. In ſome inſtances, the two ſexes are united in the ſame individual, and fecundation is accompliſhed without any extraneous aid; ſuch are the hermaphrodite and monoïcous plants, the acephalous molluſca, and the echinodermatous animals. In others, each individual poſſeſſes both ſexes, but requires the aſſiſtance of another, which it fecundates, and by which it is fecundated. This is the caſe with the gaſteropodous molluſca, and with ſeveral worms. There are diſtinct individuals, male and female, in other claſſes; as, for inſtance, in the dioïcous plants, in all animals, which have a vertebral column, in the cephalopodous and ſome gaſteropodous molluſca, in ſome worms, in the cruſtacea, and in inſects; in ſhort, in the far largeſt portion of the animal kingdom.

Fecundation is accompliſhed in plants by means of a liquor contained in ſmall capſules, which reſemble a fine powder in appearance, lodge on the female organs, and, burſting, depoſit their contents. In animals, the liquor is always applied immediately upon or about the germs; and in many caſes it is not brought in contact with the ova, until they have been laid, as in the bony and oviparous fiſhes, and the cephalopodous molluſca: here the males and females have no commerce. Sometimes, as in the frog and toad, copulation is neceſſary in order to determine the diſcharge of the ova and ſemen, but fecundation is ſtill performed out of the body. Laſtly, in the great majority of inſtances, the ſeminal liquor, introduced by the male into the body of the female, fecundates the ova before they are laid. This is the caſe in the mammalia, birds, moſt reptiles, and ſome fiſhes, in the hermaphrodite gaſteropodous molluſca, in the cruſtacea and inſects. The union of the two ſexes, or the act by which this is accompliſhed, is called *copulation.* In all the laſt-mentioned orders ova may be diſcharged without previous copulation, as in the preceding ones. But they receive no further developement; nor can they be fecundated when thus voided. The effect of a ſingle copulation varies in its degree; it uſually fecundates one generation only, and produces one pregnancy; but ſometimes, as in poultry, ſeveral eggs are fecundated, and afterwards diſcharged ſucceſſively: ſtill, however, they only form one generation. In a very few inſtances, one act of copulation fecundates ſeveral generations, which can propagate their ſpecies without the aid of the male. In the plant-louſe (aphis) the ſpecies has been continued through eight generations from one copulation; and in ſome monoculi, through twelve or fifteen.

When the germ is detached from the ovary, its means of exiſtence may be more or leſs complete. In moſt animals it is accompanied by an organized maſs, to which it is connected by means of veſſels. The abſorption of this ſerves for its nutrition and developement, until the period of its independent exiſtence. It derives nothing therefore from the body of the mother, from which it is ſeparated by coverings, varying in number and ſolidity. The germ, together with its maſs of nouriſhment, and the ſurrounding membranes, conſtitutes an egg, or *ovum;* and the animals, which produce their young in this ſtate, are denominated *oviparous.* In moſt of theſe the germ contained in the egg is not developed, or hatched, until that part has quitted the body of the mother, or has been *laid;* whether it be neceſſary that it ſhould be afterwards fecundated, as in many fiſhes, or that it requires only the application of artificial heat for its incubation, as in birds; or that the natural heat of the climate is ſufficient, as in reptiles, inſects, &c. Theſe are ſtrictly *oviparous* animals.

The ovum, after being fecundated, and detached from the ovarium, remains in ſome animals within the body of the mother, until the contained germ be developed and hatched. Theſe are *falſe viviparous* animals, or *ovo-viviparous.* The viper and ſome fiſhes afford inſtances of this proceſs.

The mammalia alone are truly viviparous animals. Their germ poſſeſſes no proviſion of nouriſhment, but grows by what it derives from the juices of the mother. For this purpoſe it is attached to the internal ſurface of the uterus, and ſometimes by accident to other parts, by a kind of root, or infinite ramification of veſſels, called a *placenta.* It is not therefore completely ſeparated from the mother by its coverings: and it does not come into the world until it can enjoy an independent organic exiſtence. The mammalia cannot therefore be ſaid to poſſeſs an ovum, in the ſenſe which we have aſſigned to that term.

According to this ſketch of the ſubject, generation may be ſaid to conſiſt of four functions, differing in their importance, and in the number of animals, to which they belong, *viz:* 1ſt. The *production of the germ,* which is a conſtant circumſtance: 2dly. *Fecundation,* which belongs only to thoſe inſtances where there is a diſtinction of ſexes: 3dly. *Copulation,* which is confined to thoſe kinds of ſexual generation in which fecundation is accompliſhed within the body: laſtly, *Utero-geſtation,* which belongs excluſively to viviparous generation. The generative organs may be moſt naturally arranged according to this diſtribution of the partial functions, which they execute. The ſimple production of a germ, or gemmiparous generation, may be accompliſhed at any point of the body, and has, therefore, no peculiar organ. Sexual generation demands an organ for the production of germs, and another for that of the fecundating liquor. Modes of union are neceſſary when copulation takes place: and geſtation requires a receptacle adapted to the abode of the fœtus. Thus we have preparatory and preſerving organs; inſtruments of copulation; and organs of education. Thoſe of the two firſt claſſes are divided into male and female; the laſt belong to the latter ſex only. The preparatory and preſerving organs of the males ſecrete the ſemen, and the other fluids which are to be mingled with it, and retain theſe ſecretions. They conſiſt, in their moſt complicated form, 1ſt. Of the *teſticles,* which prepare the ſeminal fluid, and conduct it, either into a particular reſervoir, or into a canal, from which it is conveyed out of the body, or into a cloaca, from which it is in like manner ejected: 2dly. Of the *veſiculæ ſeminales,* ſuppoſed to be reſervoirs for the ſemen: 3dly. Of the *proſtate* glands; and, 4thly. Of *Cowper's glands,* which ſeparate a peculiar fluid, mixed with the ſemen at the time of coition. The teſticles are abſent in the laſt claſſes only of the animal kingdom, where generation is performed by a ſimple diviſion of the animal, or by ſhoots. They exiſt in all the claſſes of vertebral animal; and of the invertebral diviſion, in the molluſca, cruſtacea, inſects, and moſt vermes. Their number, ſtructure, &c. differ very much in theſe various claſſes. The veſiculæ, proſtates, and Cowper's glands, being leſs eſſential in their functions, are much leſs generally found, and are chiefly confined to the firſt claſſes of the animal kingdom. The preparatory female organs ſerve the purpoſe of developing and preſerving the germs. Their exiſtence is as general as that of the parts juſt mentioned; but they are much more ſimple in the firſt claſs of the animal kingdom. They conſiſt of two bodies ſimilar in form, ſize, and ſtructure, and named by modern phyſiologiſts *ovaria,* in order to expreſs more accurately, than by their old name of teſtes, the function to which they are deſtined. In fact, if their ſtructure, conſidered ſimply in man, and moſt of the mammalia, leave any doubt concerning their office, its nature is ſo evident in the other claſſes, that their function cannot fail to be recognized. In all the claſſes which ſucceed the mammalia, the ovary or ovaries ſerve evidently for the production and preſervation of the germs or ova, which are formed in theſe bodies previouſly to the approaches of the male. Analogy leads us to conclude that the ſame circumſtance holds good in the mammalia; and this concluſion is one of the moſt important reſults from the ſtudy of comparative anatomy and phyſiology.

The organs of copulation, in the male ſex, conſiſt of one or more projecting bodies, called penes, generally perforated by a canal, named the urethra, capable of being introduced into the female organs, in order to convey to them the fecundating liquor, or for the ſimple purpoſe of producing an irritation neceſſary for conception; or they are ſupernumerary members, enabling the male to graſp and hold the female. In the latter ſex, the copulating organs conſiſt of canals, particularly deſigned to receive the male penis, or give paſſage to the products of conception: or of cavities, which ſerve alſo for other purpoſes, but which, at the time of copulation, receive the penis, and tranſmit the fecundating liquor to the educating organs.

The educating organs receive the germ or ovum, after its detachment, from the ovarium, retain it for a greater or leſs length of time, contribute in a more or leſs direct manner to its growth, and convey it out of the body: or they furniſh nouriſhment to the young, when born, or afford it a temporary lodging. They are, therefore, divided into external and internal parts. The latter may be again diſtinguiſhed into two kinds. The firſt of theſe are ſimple canals, through which the germ or ovum is to paſs, either in order to be conveyed out of the body (as in the egg), or to be tranſmitted into the parts of the ſecond deſcription. The latter are very dilatable bags, to the parietes of which the germ is attached by means of veſſels conveying the materials of its nutrition, and preſerving it in this way until it has acquired a certain degree of growth. Organs of the firſt kind are formed in the four claſſes of vertebral animals; and are called *Fallopian tubes* in the mammalia, *oviducts* in the birds, reptiles, and fiſhes. Parts of the latter deſcription belong to the mammalia only, and are the *uterus.* The external educating organs are, in the mammalia, the mammary glands ſecreting the milk by which the young are nouriſhed; or receptacles, in which they are retained for a time, in a few genera. One kind of reptiles only poſſeſſes analogous pouches.

To fill up the outline which we have preſented to our readers in the preceding ſketch, would require a detailed deſcription of organs varying almoſt infinitely in form and ſtructure in the different claſſes of organized bodies. Theſe details will be found in the proper articles of the Cyclopædia, relating to vegetable and comparative anatomy: this general view has been thought neceſſary, as introductory and explanatory. The remainder of this article will be devoted to the anatomy and phyſiology of the generative organs in the human ſubject. The growth and developement of the ovum in the uterus have been conſidered under the article Embryo, and the anatomy of the mammary gland will be found under Breast.

The preceding account will ſhew what various methods are employed by nature for the perpetuation of the races of organized beings; this ſeems to have been a very leading object, and one accordingly, in which ſhe has developed all the fertility of her reſources. Scarcely can ſuch diverſified phenomena be reduced, by artificial claſſifications, to any common and conſtant laws: new facts ſpeedily modify or overturn the previous generalizations; and imagination can ſcarcely conceive any poſſible forms of propagation which obſervation does not ſoon realize. The generative functions ſhould be particularly attended to by thoſe who are employed in delineating the manners of animals. They will probably find that the propenſities and habits of each are intimately connected with the mode of propagation; and that the character of its wants, pleaſures, and labours, its ſociability and perfectibility, and the extent or importance of its relations either to other ſpecies or to the various external bodies or agents, particularly depend on the circumſtances or conditions to which its reproduction is ſubjected, and on the diſpoſition of the organs employed for this purpoſe. This is certainly very much the caſe with man, which is the object of our preſent inveſtigation.

Man belongs to one of thoſe claſſes of the more complicated and perfect animals, where propagation is effected by the concurrence of two beings, whoſe organization, poſſeſſing moſt circumſtances in common, is diſtinguiſhed by certain particular traits. He quits the womb of his mother with organs capable of reſiſting the impreſſions of the atmoſphere, and of aſſimilating food to his own ſubſtance: he can already live by his own independent powers. He is not deſtined to remain, like the oviparous animal, included in a foreign envelop, and to continue for an indeterminate length of time in a ſtate of inaction which hardly differs from non-exiſtence: he does not wait until creative warmth beſtows on him motion and life, amid the nutritive fluids prepared beforehand by nature, like thoſe in which the embryo of the ſerpent, the tortoiſe, or the bird ſwims for a long time as an inviſible point. The human fœtus has been ſupported in the uterus by fluids animalized in the veſſels of the mother: it ſubſiſts, immediately after birth, on milk, prepared in organs ſet apart for that office. The duration of geſtation, that of infancy, during which the aid of the parents is indiſpenſible, and the epoch of puberty, or the moment at which the generative faculty is manifeſted by ſenſible ſigns, differ greatly in the different ſpecies of animals; theſe circumſtances are not connected together by uniform or conſtant relations.

Man, like all the more perfect animals, is not born with the power of reproducing the ſpecies. The organs, which are at a future period to exerciſe this function, are now completely inactive, and the appetites which ſolicit their action do not exiſt. The time of puberty;—the epocha at which the frame and powers of the being receive their full developement, is alſo the period at which the generative organs, recovered from their lethargy, aſſume an active ſtate, and become capable of exerciſing their functions. The duration of infancy is longer, and the age of puberty is later in man than in any animals; although the term of geſtation is ſhorter than in ſome other ſpecies. Theſe circumſtances muſt have a very marked influence on the wants, the faculties, and the habits of the human race.

The characters of the generative functions partake of thoſe which belong to the animal and organic lives. Thus, on one ſide, all that precedes the union of the ſexes, all the impreſſions made on one by the charms which nature has beſtowed on the other, belong to the ſenſes; this very union is an act of the external life, to which animals are impelled by inſtinct, over which reaſon preſides to a certain degree in man. The influence of habit is alſo perceived here; but inſtead of blunting the enjoyment, it renders it rather more acute, and often gives riſe to factitious wants. On the other hand, the ſecretion of the fluid, by the emiſſion of which man contributes to the reproductive proceſs, the myſterious work of conception, the developement of the new being, &c. all belong to the organic life.

Sexual Diſtinctions.—Some ancient philoſophers have held on this ſubject opinions very injurious to the fair ſex, and indeed ſo manifeſtly whimſical and ridiculous, that a ſimple ſtatement of them will ſhew their abſurdity. Woman, in the opinion of Ariſtotle, is an imperfect man, an ill-formed and imbecile individual; while man is characterized by the attributes of ſtrength and power. Galen goes even further, and confounding the ſexes in thoſe very parts, where their diſtinguiſhing characters are the moſt unequivocally marked, admits no other differences between the male and female generative organs than ſuch as may be deduced from developement and ſituation. He does not regard even the addition of the uterus in the female as an objection to this opinion, but, bending nature to his hypotheſis, he repreſents this organ as being turned inſide outwards in man to envelope the glands in which the ſeminal fluid is elaborated. This ſtrange paradox has been adopted by numerous writers, and is hardly yet completely abandoned. Daubenton calls the clitoris a penis in miniature; Buffon turns the ovaries into teſticles, and endeavours to prove that the addition of the uterus alone conſtitutes any eſſential diſtinction between the male and female parts.

Some reſemblance in the unimportant points of form and arrangement gave riſe to theſe unfounded analogies: pride and ſexual prejudices, joined to the reſults of ſuperficial obſervation, ſeem to have ſo far miſled true philoſophers, whoſe ſtrange opinions we have juſt alluded to, as to make them diſcover, in one of the firſt productions of nature, a feeble ſketch, and a timid production. Woman has appeared to them as a degradation and imperfect copy of the conſtitution of man, while, in fact, ſhe is the moſt eſſential part of the ſpecies, as contributing by far the greateſt ſhare to the buſineſs of reproduction. A more accurate examination will deſtroy theſe ſuppoſed analogies, and prove that man and woman do not differ in the relations of more or leſs, but that the ſtructure and functions of their generative organs are different in their kind; that their whole conſtitution has in each its peculiar type, the diſtinctive traits of which offer to our view a long chain of phyſical and moral effects more or leſs immediately dependent on the functions of the organs concerned in the buſineſs of generation.

The characters of ſex do not therefore ſhew themſelves in any ſingle point; it is not merely a particular organic apparatus, nor thoſe external forms which delight us, that conſtitute woman: and if ſhe is principally characterized in ſome parts, where the ſexual phyſiognomy is the moſt decidedly expreſſed, if the ſuperficial traits, and the ſweetly rounded contours, which conſtitute her charms, form her moſt agreeable diſtinction, ſhe is woman in the eyes of the naturaliſt and phyſician, in all her modes of exiſtence, in her moral affections as well as in her phyſical ſyſtem, in her enjoyments and pains; in a word, all parts of her exiſtence bear the character of ſex, and preſent a ſeries of contraſts and oppoſitions with the correſponding points in man.

It is however only at the epocha of puberty, at that period of life called by Buffon " le printemps de la nature, la ſaiſon des plaiſirs," that the aſſemblage of all the ſexual traits is exhibited to our obſervation; and that man and woman, attracted to each other the more forcibly in proportion as they differ, become connected by various relations, which enlarge an exiſtence hitherto perſonal, ſolitary and iſolated. Woman may be diſtinguiſhed from man by general and particular differences: the latter are ſo decided as to be eaſily diſcernible at all times, while the former, which are our preſent object, are not always equally remarkable, and at one time cannot be diſtinctly traced. In the firſt years of life, the individuals of the two ſexes do not differ from each other at the firſt view; they have nearly the ſame general air, the ſame delicacy of organization, the ſame gait, and the ſame voice. Experiencing the ſame wants, exerciſing the ſame functions, and often partaking together of the ſame infantile ſports, they excite in the mind of the ſpectator who watches them with pleaſure, no ideas of diſtinguiſhing characters; they both appear to him only as awakening that tender emotion which we always feel at the contemplation of innocence joined to weakneſs. Indifferent and iſolated, each as yet lives only for himſelf; their exiſtence, purely individual and independent, exhibits hitherto none of the relations which conſtitute in the ſequel a ſource of mutual dependence. However, this equivocal ſtate does not laſt long: man ſpeedily aſſumes the features and character which mark his deſtination; his limbs loſe the ſoftneſs and the gentle forms which he partook with the female; the muſcles, the chief inſtruments of animal force, condenſe, by their reiterated contractions, which are conſequent on more violent and long continued exerciſe, the cellular ſubſtance, which filled their interſtices and gave a roundneſs to their form; hence they become more prominent, and give to the limbs more rough and decided outlines. It is no longer the ſame individual: the deeper tint of the countenance, the increaſed depth and ſtrength of the tone of voice announce an acceſs of vigour neceſſary for the purpoſes of his future character. The timidity of infancy has given way to an inſtinct which makes him deſpiſe danger; he fears nothing, becauſe the impetuous current of his blood makes him diſregard all obſtacles. His ſuperior ſtature, his determined gait, his new taſtes and ideas all conſpire to mark in him the image of ſtrength, and to give the characters of that ſex which is to protect the other.

Woman, in advancing towards the age of puberty, departs from her primitive conſtitution leſs ſenſibly than man. Delicate and tender, ſhe even retains ſomething of the temperament belonging to children. The texture of her organs does not loſe all its original ſoftneſs. The developement, produced by age in all the parts of her body, never beſtows on them the ſame degree of conſiſtence which they acquire in man: yet, in proportion as the traits of the female are fixed, her figure, form and proportions exhibit differences, ſome of which did not exiſt before, while others were ſcarcely ſenſible. Although ſhe ſets off from the ſame point as man, ſhe is developed in a manner peculiar to herſelf, and arrives ſooner at the term of her developement. Every where puberty arrives earlier in the female than in the male ſex. Has nature a greater taſk to perform in the latter than in the former? Does it coſt her greater efforts to bring man to perfection than woman? Or does the eaſe which characterizes female motions and actions exhibit itſelf already in the firſt developements of her phyſical conſtitution? Perhaps nature terminates her work the ſooner from the female organs being of leſs volume than the male, as her operations are conducted within a more limited ſphere. However we may explain it, man is ſtill ſubject to the laws which govern him in infancy, while woman experiences already a new mode of exiſtence, and finds herſelf, perhaps with aſtoniſhment, provided with new attributes and ſubject to a claſs of functions not obſerved in man, and hitherto unknown to herſelf. From this inſtant there is unfolded in her a new chain of phyſical and moral relations, on which depends that new and attractive intereſt with which ſhe inſpires man, and which has already become a ſource of new wants and affections.

In running through a more detailed ſketch of the differences obſervable in the two ſexes, we find them differing in the firſt place in ſtature, and in the ſize and proportions of parts. The height is leſs in the female, by about one-ſixth. The middle of the body in man is at the ſeparation of the lower limbs at the pubes: in woman it is higher, and hence the lower limbs are ſhorter, while the lumbar region is longer. This gives to the female ſex in general, and to the Americans and Negreſſes in particular, that elegant ſlenderneſs which diſtinguiſhes them. The arm or leg of a woman could be immediately diſtinguiſhed from thoſe of a man: the form of theſe parts is much more delicate, and leſs marked by decided prominences. The buſt is not ſo broad, but more rounded, and particularly diſtinguiſhed by the ſize and elegant formation of the breaſt, which is commonly but little developed in man, where its greater developement would be regarded as a deformity. The thighs are much larger, more rounded, and further apart; they approach each other below, ſo that the knees are ſlightly turned in. The latter circumſtance is ſeen in the Venus, and the whole formation of theſe parts is attended with advantages in geſtation and parturition, although the peculiarity in queſtion is not ſeen in theſe females which in common opinion are the beſt formed. The convexities deſcribed by the lower limbs at their upper part, and uniting them by ſuch happily rounded forms with the trunk, have a very obvious peculiarity of character in the ſofter ſex. They are more prominent, and approach in their contour more to the hemiſpherical form. All other parts of the lower limbs are diſtinguiſhed by their ſoftly rounded outlines. The foot is ſmaller, and the baſe of ſupport for the body is proportionally narrow. The leg gradually diminiſhes from above downwards, inſtead of ſwelling out abruptly at the calf. The outlines of the upper limbs are equally flowing and ſoft; thus the arm of woman is fatter and more rounded; the whole upper extremity correſponds in its comparative ſhortneſs and ſmallneſs to the general difference in ſtature; and is terminated by a ſmall hand, and ſhort, delicate and flexible fingers.

We may obſerve further that the head is ſmaller, the face ſhorter, and the neck longer in woman. The cheſt is not ſo long, but deeper; the abdomen more prominent and rounded; the ſhoulders are carried more backwards, and ſtand out leſs from the trunk. Hence the breadth of this part is much leſs conſiderable than in man, where the ſhoulders are more fully developed and more widely ſet off, and conſtitute, in their comparatively greater ſize, a very impreſſive feature of the ſuperior ſtrength, which is the attribute of the male ſex. In the female trunk, on the contrary, the broadeſt part is below: the pelvis, holding the organs of generation, being principally concerned in the functions of utero-geſtation and parturition, being, in ſhort, the ſeat of thoſe attributes which eſpecially diſtinguiſh the female, is much more capacious than in the male. Hence the ſuperior breadth of the female hips: hence the oppoſite characters of the trunk in the two ſexes, in reſpect to ſize. The trunk of the female is a pyramid, with the broadeſt part below; that of the male is juſt the reverſe. Camper has ſhewn, that if the body of a well-formed man be delineated on an elliptical area, the ſhoulders paſs out of the ellipſe, while the pelvis falls within it; on the contrary, that the hips exceed, and the ſhoulders fall within the line in woman. (Mémoire ſur le beau Phyſique). In thoſe ſpecimens of ancient art, which may be regarded as models of the moſt characteriſtic formation, the difference of breadth in theſe parts amounts to one-third: the ſhoulders being ſo much broader in the male, and the hips in the female. The greater breadth of the pelvis gives a broader baſe of ſupport to the female trunk; and, as it throws the thigh-bones further apart at their upper ends, produces the increaſed wideneſs of the hips. Hence in progreſſion the centre of gravity is more ſenſibly changed at each ſtep; and there is a perceptible rolling of the pelvis, which characterizes the female gait. The inconvenience of this arrangement counterbalances the advantages which the broader baſe of ſupport might otherwiſe have beſtowed on the female organization; and the latter is, in truth, an imaginary ſuperiority, ſince the feet, which are always ſmall in women, offer ultimately a narrow ſurface for the body to reſt on.

The various pieces of the ſkeleton, by their reſpective diſpoſition and junctions, determine the eſſential form of the body, its poſition and attitudes, and the extent and variety of its motions. The characters of the general form, which we have already conſidered, are therefore to be retraced in the bones; and in this point of view a parallel of the male and female organization leads to very important reſults. It is difficult to meet with a well-formed female ſkeleton, where the ſtructure can exhibit or recal the leading traits of the female form. After much trouble and obſervation, Soemmerring met with a ſpecimen of what he conſidered the beſt and moſt natural form in a young girl of Mentz, whoſe form had not been impaired by abſurd modes of dreſſing, and who had been ſucceſsfully delivered a ſhort time before her death. A beautiful plate of this ſkeleton, with its deſcription, is exhibited in his "Tabula ſceleti feminini, juncta deſcriptione," folio, 1797. The female ſkeleton, on the whole, is ſmaller in all its dimenſions, and more ſlender than the male. The individual bones have fewer inequalities, their prominences are leſs ſtrongly marked, the grooves or impreſſions more ſuperficial, all the cavities leſs deeply hollowed out: hence the ſurface ſeems more finely turned, and is diſtinguiſhed by its ſmoothneſs. They are often actually ſofter, and have on the whole a peculiarly feminine character, which cannot be eaſily conveyed in deſcription. The head, with the teeth, bears a greater ratio to the weight of the ſkeleton, on account of the individual bones being in general more ſlender: the proportions are 1 : 6 in the female, 1 : 8 or 1 : 10 in the male. The cranium is larger in proportion to the face. The thorax is ſhorter, more convex in front, and more diſtant from the pelvis, the ſpace between the laſt rib and the criſta ilii being greater. It is leſs prominent in front; ſo that while this part projects the furtheſt in the erect or ſupine poſition of the male, the ſymphyſis pubis does the ſame in the female. The loins are longer, and the angle between them and the ſacrum more acute. The diſpoſition of the pelvis is particularly characteriſtic, as being ſo immediately connected with the ſexual functions. It is larger in all its dimenſions. The ſacrum is turned more backwards, is broader, and more concave; the oſſa coccygis, more moveable and ſlender, project leſs into the cavity of the pelvis. The hip-bones (oſſa innominata) are broader, ſmoother, and expanded further in the lateral direction: hence their criſtæ and tuberoſities are more diſtant, hence the ſpace between the oſſa pubis is greater. The angle formed between the ramus and ſymphyſis pubis is larger: that between the two bones of the pubes is acute in man, while it is of 80 or 90 degrees in woman; and approaches more nearly to the form of an arch. That the ſexual functions are favoured by all theſe circumſtances is very evident; but the advocates of final cauſes point out more particularly the reaſon for the wider ſpace under the oſſa pubis: "Ad virum admittendum intercapedine majore crurum inferiorum oſſium pubis." (Albinus de ſceleto, p. 475.) The tuberoſities of the iſchia are more diſtant, larger and ſmoother. The clavicles are leſs curved, and the ſhoulder joints are leſs diſtant. The acetabula are further apart, and the thigh-bones more oblique in their poſition: the latter are alſo more curved forwards, and have longer internal condyles.

The muſcles of the female are more ſlender and delicate, they are, in fact, leſs denſe, ſofter and moiſter. Theſe organs are leſs prominent, and their ſwellings, partaking of the general ſoftneſs of the female conſtitution, have not that character of vigour which their rough prominences and ſtrongly marked interſtices impreſs on the frame of a muſcular man, in whom the exterior traits of ſex have not been deſtroyed by effeminate manners or ſedentary habits. The cellular and adipous tiſſue is more abundant in the female; and this, joined to the ſmaller prominence of the muſcular bellies, gives to the limbs that ſoft roundneſs and delicate contour which characterize female beauty, as expreſſed in the moſt celebrated productions of great artiſts.

The differences juſt deſcribed, the comparative weakneſs of the muſcles, the elegance and beauty of the external forms, belong to the very nature of woman. Education and habits may add to theſe characters; may increaſe the delicacy of organization; but their influence is not ſufficiently powerful to induce us to overlook the exiſtence of a radical innate difference in the phyſical ſtructure of the ſexes, occurring in all ages and amongſt every people. That ſuch differences of organization will produce correſponding varieties of function may be readily allowed: but our facts are not quite ſo indiſputable on this point. We could undoubtedly point out many peculiarities in the ſenſibility of women, taking the term in its moſt extenſive ſenſe, in their perceptions, their mental operations, and the reactions of the nervous ſyſtem on the reſt of the frame. We could trace many circumſtances to the influence of the generative organs, and particularly of the uterus. But the influence of education, habits and cuſtoms, is ſo extenſive, that it is difficult to diſtinguiſh between the reſults of theſe cauſes, and of the ſuppoſed original diſtinctions in organization. The reader may refer on this ſubject to the Hiſtoire naturelle de la Femme, by Moreau, tome 1, p. 112, &c.

We cannot draw any very ſtrong line of diſtinction between the ſexes in the vital and natural functions. We may apply, indeed, to this ſubject, the philoſophical remark of Buffon concerning animals; *viz.* that they differ from each other more ſtrikingly in proportion as we compare them together in ſuperficial points, which do not affect the nature of their exiſtence ſo much as its exterior development. Yet the characters of ſex are ſo deeply impreſſed, that we find traces of them even in theſe functions, when ſubmitted to a rigorous examination. The pulſe, ceteris paribus, is more frequent; the lungs are ſmaller, and the cheſt narrower. The appetite is leſs; the body grows more rapidly, and the periods of dentition, puberty, and adult ſtature are more early. See, for more detailed obſervation on this head, the work above quoted.

The voice is marked by very characteriſtic diſtinctions in the two ſexes. In man it is ſtrong, deep, leſs ſoft and flexible. In the female it is ſharper, and the organs are more flexible, ſo that articulation can be performed more rapidly. It has alſo a peculiar quality or tone, which, in many inſtances, conſtitutes an inexpreſſibly attractive charm. "Of all acute voices," ſays Rouſſeau, "it muſt be allowed, in ſpite of the prejudices entertained by the Italians in favour of the caſtrati, that none are equal to thoſe of women, either in the extent or beauty of the tone." The anatomiſt, perhaps, will attempt to explain theſe circumſtances by obſerving, that the glottis is not enlarged at the age of puberty in females, as it is in males; that the larynx is conſiderably ſmaller; that the tongue, the muſcles, and the organs of ſpeech being leſs rigid, like all the other parts of the female, young girls ought to ſpeak ſooner than boys, &c. Among the ſeveral diſtinctions belonging to this head, we muſt notice the greater prominence of the thyroid cartilage in the male.

The texture of the ſkin is more denſe and compact in men, whiter and more expanded in women. In brunettes, particularly, it has a ſoftneſs and poliſh, which convey the moſt voluptuous impreſſions to the organs of touch. "Perſons," ſays Winckelmann, "who prefer ſuch females, are captivated through the medium of feeling, rather than of viſion." The ſkin in woman poſſeſſes alſo a tranſparency, which allows the colour of the blood to be diſcerned in the ſuperficial veins, and produces the beautiful azure tint, which contraſts ſo charmingly with the clear whiteneſs of other parts. The cutaneous ſecretion has been conſidered to differ in the two ſexes. "La tranſpiration parait beaucoup moins abondante chez les femmes ; elle a ſurtout, dans certaines parties, une odeur, qu'il ſerait difficile d'exprimer, mais qu'un odorat exercé parvient aiſément à diſtinguer chez les femmes qui jouiſſent avec plénitude de tous les attributs de leur ſexe, et qui ſont femmes juſque dans leur atmoſphere." Moreau, t. 1. p. 171.

The ſkin of man is always, comparatively, more deeply tinted ; it is thicker, rougher, and covered with more numerous hairs. In our account of this organ, too, we have to mention a very characteriſtic attribute of the male ſex, the beard.

This production, which adorns the figure of the male, in the human ſpecies, is more or leſs abundant in different ſubjects. It does not begin to appear until the age of puberty, and is not completely developed until after ſome years. Its great thickneſs depends, perhaps, on the habit of cutting it. In old age a ſimilar production appears in ſome women ; here, however, it is diſperſed irregularly, and has not the thickneſs which it poſſeſſes in man ; nor does it ever acquire the ſame length. Yet rare examples have been known of women with long beards. A caſe of this kind is mentioned in the Anatomie Deſcriptive of Bichat, tom. 5. p. 165, as having been ſeen at the hoſpital of the Ecole de Médecine. The woman was forty years of age ; her breaſts were well-formed, and ſhe had had a child. Her beard was as ſtrong as that of a man, and numerous hairs covered the lobuli of the ears.

The characters of ſex in thoſe organs which are immediately employed in the generative functions, will be exhibited in the courſe of this article. We have only to obſerve further, that the circumference of the anus, which is covered with hair in the male, is ſmooth in the female ſubject.

The reader may refer, on ſexual diſtinctions, to Rouſſel, Syſteme phyſique et moral de la Femme ; to the works of Moreau and Cabanis ; to the French Encyclopedie, Yverdun edition, art. *Femme* and *Viril* ; to Ackermann, De diſcrimine ſexuum præter genitalia, Mogunto 1788, 8vo. ; to A. F. Nolte, Diſſ. ſiſtens momenta quædam circa ſexus differentiam. Getting. 8vo. The differences in the general habit and appearance of the body, the ſoftneſs, delicacy, and inferior ſtature of the female, as contraſted with the ſtrong ſinewy frame of the male, may be ſeen in the two figures, ſuppoſed to have been drawn by Titian, contained in Veſalius, De Corp. hum. Anat. Baſil. 1542 : alſo in the 1ſt, 2d, and 3d plates of Bidloo's work ; and in the Cours complete d'Anatomie gravé par M. A. E. Gautier, et expliqué par M. Jadelot ; Nanc. 1773, folio. The unrivalled artiſts of Greece could not fail to perceive the ſame diſtinctions, which they have expreſſed moſt admirably in ſome of the fineſt monuments of their art, as in the Venus, the Apollo, and Hercules.

The differences which we have enumerated are not very diſtinctly perceivable, until the two ſexes have reached the epocha of their reſpective perfect development. They are concealed, in the early periods of infancy, under external forms which are nearly the ſame in both ſexes. It is true, indeed, that we can diſtinguiſh a male from a female embryo (ſee EMBRYO) ; but the leading ſexual diſtinctions are by no means fully developed until the age we have mentioned. The muſcles have not yet produced any remarkable change in the direction of the bones ; the glandular and fleſhy parts hardly differ either in form or volume ; and the ſkeletons can ſcarcely be diſtinguiſhed by the breadth of the hips and pelvis. The like confuſion prevails in the moral diſpoſition of the two ſexes : boys are not diſtinguiſhable in this reſpect from girls. The appetites, ideas, and paſſions of both are the ſame. We cannot at preſent, nor perhaps ſhall we ever be able to determine, by what particular action the organs of generation influence the other parts of the body, direct their operations, and modify the character and order of the phenomena relating to them. The fact, however, is evident ; and the influence is inconteſtable. For, when the natural developement or actions of the generative organs is impeded, the ſecondary characters, by which the ſexes are diſtinguiſhed, do not take place.

To illuſtrate this ſubject, let us obſerve, that the ſeveral differences of animals may be divided into primary and ſecondary ; the former include the differences in the parts of generation themſelves, which are originally formed differences, and belong equally to both ſexes ; the latter are all the other variations depending on theſe, not taking place until the parts of the firſt claſs are coming into uſe, and being principally, though not entirely, in the male. One of the moſt remarkable ſecondary characters in animals, generally ſpeaking, is the ſuperior ſtrength of make in the male ; and this ſtrength is generally directed particularly to the organs employed in fighting. Hence it is eſpecially noticeable in the animals whoſe females are of a peaceable nature ; *e. g.* the legs of the cock and neck of the bull. But in carnivorous animals, where ſtrength is required by both ſexes to kill the prey, the differences in the form of the male and female are not ſo ſtriking, yet the ſexes are ſtill diſtinguiſhed by ſome differences in their external covering, as the male lion by his mane, and the cock and hen of many birds by the plumage. The general ſtrength of make, the hairy covering, and the voice diſtinguiſh the male from the female of the human ſpecies. Now in all animals, which are not of any diſtinct ſex, no ſuch alteration takes place in the form at the time of puberty. Thus, the free martin, which poſſeſſes a mixture of the generative organs of both ſexes, does not exhibit in form a reſemblance of either the cow or bull. It is very much like the ox or ſpayed heifer, being conſiderably larger than either the bull or the cow, and having horns very ſimilar to thoſe of the ox. The voice is ſimilar to that of the ox, and more like that of the cow than of the bull. The fleſh, like that of the ox or ſpayed heifer, is generally much finer in the fibre, than that of either the bull or cow ; it is ſuppoſed to exceed that of the ox and heifer in delicacy of flavour, and bears a higher price at market. (See "Account of the Free Martin" in Mr. Hunter's obſervations on the animal economy, p. 55.) A ſimilar effect is produced, when the ſexual parts are removed after birth ; the caſtrated male and the ſpayed female have both the ſame common properties, and are very much like the free martin ; the artificial removal of the generative organs preventing the occurrence of thoſe changes, which would naturally have occurred at the time of puberty. Thus, by depriving either ſex of the true parts of generation, they ſeem to approach each other in appearances, and acquire a reſemblance to the hermaphrodite. Reſpecting the changes, which occur at puberty, Mr. Hunter ſays, "It is evidently the male, which at this time in ſuch reſpects recedes from the female; every female being at the age of maturity more like the young of the ſame ſpecies than the male is obſerved to be: and if the male is deprived of his teſtes when young, he retains more of the original youthful form, and therefore more reſembles the female. From hence it might be ſuppoſed, that the female character contains more truly the ſpecific properties of the animal than the male; but the character of every animal is that which is marked by the properties common to both ſexes, which are found in a natural hermaphrodite, as in a ſnail, or in animals of neither ſex, as the caſtrated male or ſpayed female. But, where the ſexes are ſeparate, and the animals have two characters; the one cannot more than the other be called the true; as the real diſtinguiſhing marks of each particular ſpecies, as has been mentioned above, are thoſe common to both ſexes; and which are likewiſe in the unnatural hermaphrodite. That theſe properties give the diſtinct character of ſuch animals is evident, for the caſtrated male and ſpayed female have both the ſame common properties; and when I treated of the free martin, which is a monſtrous hermaphrodite, I obſerved that it was more like the ox than the cow or bull; ſo that the marks characteriſtic of the ſpecies, which are found in the animal of a double ſex, are imitated by depriving the individual of certain ſexual parts, in conſequence of which it retains only the true properties of the ſpecies." (See "Account of an extraordinary Pheaſant," in Mr. Hunter's obſervations on the animal economy, p. 75.)

The influence of the generative organs in the developement of the body at puberty, and in the modifications which conſtitute the ſexual character, is clearly evinced in the ſtag, whoſe amours are conducted in ſo ſplendid a ſtyle, and evince ſo remarkable an exuberance of vitality. When he is deprived, at an early age, of the ſexual attributes, none of the vigour of the rutting ſeaſon is diſplayed; the muſcular fleſh is ſofter, and the horns are either arreſted in their growth entirely, or are imperfectly formed. Ruſſel caſtrated a very young ſtag, and no horns appeared; he operated on an older one, and the horn was partially developed. When he removed one teſtis at a more advanced age, the oppoſite horn was the moſt completely formed; the removal of both glands from two adult ſtags did not prevent the appearance of the horns; but they were ſhorter, and neither the inveſting membrane, nor the horn itſelf, were afterwards ſeparated. (On the Economy of Nature in glandular Diſeaſes.)

Facts very analogous to theſe may be obſerved in the human ſubject. An imperfect original formation of the ſexual organs, or the removal of ſome of them modifies the whole character of the individual, changes the phyſical conſtitution in a very remarkable manner, and influences in a no leſs ſtriking degree the moral habits and diſpoſitions. Obſervers in all ages have remarked, that mutilated or imperfect animals poſſeſs an aſſemblage of peculiar characters, all of which have not a very direct relation to the functions of the generative organs. Not only are the ſexual deſires entirely loſt in theſe degraded individuals, but the whole of their organization is affected in a very ſingular way. The cellular texture becomes more abundant and lax, and is more loaded with fat; the muſcles are weaker; the voice more acute; and the developement of the beard is impeded. The change in the moral diſpoſitions is not leſs worthy of attention. It was the opinion of the ancients, that mutilation degrades man, and brings animals to perfection; the truth is, that it equally degrades both, ſince it alters their nature. But, by weakening an animal, it renders him more docile, and better ſuited to the purpoſes of man; by deſtroying the tie, which connects him the moſt powerfully to his ſpecies, it aſſiſts in developing thoſe habits of obedience and attention, and thoſe feelings of gratitude and attachment which make him ſo ſerviceable to us. A ſimilar effect is produced in man; mutilation ſeparates him in a manner from his ſpecies; and the fatal event, which deprives him of the moſt agreeable relations eſtabliſhed by nature, between beings of the ſame kind, almoſt extinguiſhes in his breaſt the peculiar feelings of humanity.

In thoſe young perſons, to whom nature has denied either wholly or in part, the diſtinguiſhing powers of the male ſex, puberty does not produce its ordinary effects. And moreover, at this time the bony and muſcular organs are conſtantly aſſuming more and more of the external forms, and general character belonging to the female. Theſe equivocal individuals have an acute voice, weak muſcles, a ſoftneſs and laxity in the general organization. The pelvis, too, has that greater proportional breadth which characterizes this part in women. This circumſtance, as well as the conſequent breadth, and great roundneſs of the hips, may be particularly noticed in the caſtrati. The phyſical condition is generally accompanied in theſe individuals with a perfectly correſponding moral ſtate. All theſe points are fully ſubſtantiated in the following account of a marine ſoldier, aged 23, by Mr. Home, (Obſervations on Hermaphrodites, Philoſ. Tranſact. 1799.) "He had no beard; his breaſts were fully as large as thoſe of a woman at that age; he was inclined to be corpulent; his ſkin uncommonly ſoft for a man; his hands fat and ſhort; his thighs and legs very much like thoſe of a woman; the quantity of fat on the os pubis reſembled the mons veneris; the penis was unuſually ſmall, as well as ſhort, and not liable to erections; the teſticles not larger in ſize than we commonly find them in the fœtal ſtate; and he had never felt any paſſion for women. He was weak in his intellects, and his bodily ſtrength." Mr. Home mentions, in the ſame place, two other ſtill more ſtriking examples. A woman had three children, of which the firſt and third were ſuppoſed to be hermaphrodites; the ſecond was a perfect female. The eldeſt, when Mr. H. ſaw him, was thirteen years of age, "of a moſt uncommon bulk, which appeared to be almoſt wholly compoſed of fat; his body, round the waiſt, was equal to that of a fat man, and his thighs and legs in proportion; he was four feet high; his breaſts as large as thoſe of a fat woman; the mons veneris loaded with fat; no penis; a preputium $\frac{1}{6}$th of an inch long; and under it the meatus urinarius, but no vagina. There was an imperfect ſcrotum, with a ſmooth ſurface, without a raphe in the middle, but in its place an indented line; it contained two teſticles of the ſize they are met with in the fœtus. He was very dull and heavy, almoſt an idiot, but could walk and talk. The younger one was ſix years old, uncommonly fat, and large for his age; more an idiot than the other, not having ſenſe enough to learn to walk, though his limbs were not defective. The external parts of generation differed in nothing from thoſe juſt deſcribed, except in the prepuce being an inch long."

An intereſting caſe is mentioned in the Mémoires de la Société médicale d'Emulation, t. 3, p. 293, which tends to confirm the preceding obſervations. A young man, aged 23, has no teſtes in the ſcrotum, which is only indicated by a ſlight corrugation of the integuments; a very ſmall penis, which never changes its ſize, and two folds of ſkin, extending from the latter organ to the anus, and very much reſembling the female labia. His ſtature is below the middle ſize. The ſkin is ſoft, ſmooth, and entirely free from hair;

the place of the beard ſupplied by a ſlight down. The voice habitually hoarſe. The muſcles not well marked, and the pelvis and cheſt reſembling thoſe of the female. The intellectual faculties are very dull, and the ſexual appetite entirely wanting.

The period, and the manner of mutilation, have conſiderable influence on the effects of the proceſs. The complete removal of all the external organs is a much more deciſive method of annihilating the propenſities connected with them, than any partial amputation, or compreſſion, or ligature of the ſpermatic cords. The operation is alſo more effectual, when performed in early infancy, than after the period of puberty. Venereal deſires have been known to ſubſiſt in conſiderable force, and with the uſual external ſigns, after the removal of the teſtes in the adult. The moral effects of this mutilation have been ſtrongly depicted by Cabanis. "Eunuchs are the vileſt claſs of the human ſpecies: cowardly and knaviſh becauſe they are weak; envious and malignant, becauſe they are unfortunate. Their underſtanding ſhews the abſence of thoſe impreſſions, which give to the brain ſo much activity, which infuſe into it an extraordinary proportion of vital energy, which cheriſh all the expanſive and generous feelings of the ſoul, elevate and direct all the thoughts. Narſes is almoſt the only very impoſing exception to this rule; he is almoſt the only eunuch whoſe name appears with glory in the page of hiſtory. Solomon, one of the lieutenants of Beliſarius, is another rare example; he exhibited great courage and talents in the war with the Vandals in Africa. How immoral then, how cruel and fatal to ſociety, is the practice of thus degrading and corrupting at pleaſure the human ſpecies!"

A curious caſe in the Philoſophical Tranſactions for 1805, pt. 2, in which the ovaria were deficient, ſhews that ſuch a deficiency occaſions the female to approach in ſome points to the male formation. The ſubject of this narrative died at the age of twenty-nine. "Having ceaſed to grow at ten years of age, ſhe was in ſtature not more than four feet ſix inches high. Her breadth acroſs the ſhoulders was as much as fourteen inches, but her pelvis (contrary to what is uſually obſerved in the proportions of the female ſkeleton) meaſured only nine inches from the oſſa ilia acroſs the ſacrum. Her breaſts and nipples never enlarged more than in the male ſubject; ſhe never menſtruated: there was no appearance of hair on the pubes, nor were there any indications of puberty, either in mind or body, even at twenty-nine years of age." The removal of the ovaries has been moſt rarely practiſed in the human ſubject: probably the only caſe in which it has ever been done is that recorded by Mr. Pott, where theſe bodies were contained in inguinal herniæ. A healthy young woman, aged twenty-three, large breaſted, ſtout, and menſtruating regularly, had a painful tumour in each groin, near the abdominal muſcles. The ovaria were removed from theſe tumours by a ſurgical operation. "She has enjoyed good health ever ſince, but is become thinner and more apparently muſcular; her breaſts, which were large, are gone; nor has ſhe ever menſtruated ſince the operation, which is now ſome years." (Pott's Works, vol. iii. p. 329.) The changes which took place in the latter caſe ſeem analogous to what has been obſerved in ſome birds. After they have done laying, hen pheaſants have been obſerved to acquire the plumage of the cock in ſome inſtances. This has been noticed in wild individuals; but Mr. Hunter had three opportunities of aſcertaining the fact by his own examination. He further mentions a pea-hen, which had produced chickens eight times, and which, after moulting at eleven years old, diſplayed the feathers peculiar to the other ſex. The tail of the cock appeared at the ſame time. This was repeated for three years, and the ſpurs of the cock appeared alſo in the third year. The animal never bred after this change of plumage. The ſame fact has been noticed in the duck, ſee Home on Hermaphrodites, in the Philoſ. Tranſact. 1799. "We may conclude," ſays Mr. Hunter, "that this change is merely the effect of age, and obtains to a certain degree in every claſs of animals. We find ſomething ſimilar taking place even in the human ſpecies; for that increaſe of hair obſervable on the faces of many women in advanced life, is an approach towards the beard, which is one of the moſt diſtinguiſhing ſecondary properties of man. Thus we ſee the ſexes, which, at an early period, had little to diſtinguiſh them from each other, acquiring, about the time of puberty, ſecondary properties, which clearly characterize the male and female; the male at this time receding from the female, and aſſuming the ſecondary properties of his ſex. The female, at a much later time of life, when the powers of propagation ceaſe, loſes many of her peculiar properties; and may be ſaid, except from the mere ſtructure of parts, to be of no ſex; even receding from the original character of the animal, and approaching in appearance towards the male, or perhaps more properly towards the hermaphrodite." Obſervations on the Animal Economy, p. 80.

Nothing can be more abſurd than to ſeek for any mechanical explanation of theſe accidental phenomena, or even of the more regular phenomena, of which they interrupt the courſe, at the ſame time that they elucidate the laws. They cannot ſurely be derived from the ſtructure of the organs to which they belong, nor from the known nature of the liquors ſecreted in thoſe organs. But the conſideration of ſome phyſiological circumſtances, which are very ſimple in themſelves, may enable us to eſcape from this dark abode of occult cauſes, to which the theories of the ancients were confined, and which have been little changed, except in name, by the moderns. The latter indeed, by ſubſtituting, for the opinions of the ancients, other more dogmatical explanations, have given riſe to more important and dangerous errors: they have inured men's minds to the pernicious habit of attempting to determine the nature of cauſes, where we can only obſerve effects; and in determining theſe cauſes they have often perſonified mere abſtractions. In the firſt place, it is a certain fact, however it may be explained, that the muſcular fibres are weaker, and the cellular tiſſue more abundant, in women than in men. Secondly, we cannot doubt that this difference is produced by the preſence and influence of the uterus and ovaria; it takes place infallibly when theſe organs are originally well formed, and are developed in the natural order. This weakneſs of the muſcles imparts an inſtinctive diſtaſte for violent exerciſes; it inclines the individual to amuſements, and, when the age admits of it, to ſedentary occupations. The greater ſeparation of the hips renders progreſſion leſs eaſy in the female, on account of the more extenſive change of the centre of gravity. The mode of life in the female is thus indicated à priori by a circumſtance in their organization, which might be regarded as trifling, and which can hardly be diſtinctly obſerved at an early age. Again, the habitual ſenſe of weakneſs inſpires leſs confidence. Not poſſeſſing the means of acting on ſurrounding objects by direct force, woman ſeeks for more indirect methods; in proportion as ſhe finds herſelf leſs calculated to exiſt alone, does ſhe attempt to attract the attention of others, and to fortify her own exiſtence by that of thoſe ſurrounding beings, whom ſhe judges moſt able to protect her. Theſe obſervations would be almoſt ſufficient to explain the diſpoſitions, taſtes, and general habits of women. They will naturally prefer thoſe employments which require delicate addreſs rather than muſcular force:

they will employ themſelves on little objects: and their minds will conſequently acquire acuteneſs and penetration rather than extent and depth. Thus, as they lead a ſedentary life, to which the nature of their employments confines them as ſtrongly as the immediate propenſities depending on their organization, we ſee in a manner a new phyſical and moral ſyſtem developed in them. They perceive their own weakneſs; hence the neceſſity of pleaſing: from the latter circumſtance ariſes the continual obſervation of all that is paſſing around them, alſo their diſſimulation, their artifices, their manners, their graces, in a word their coquetry, which, in the preſent ſyſtem of ſociety, muſt be regarded as the aſſemblage or reſult of their good and bad qualities.

For reaſons exactly contrary to thoſe which have been juſt explained, boys acquire the oppoſite original and characteriſtic propenſities: hence they naturally contract oppoſite manners and habits. Full of the feeling of their growing ſtrength, and of the wiſh to exerciſe it, repoſe is diſagreeable and irkſome to them: they want lively motion, and they indulge in it with impetuoſity. Thus, without entering into further details, we ſee that the bent of their ideas and the character of their paſſions are formed directly by their original diſpoſitions, and the kind of amuſements or occupations which theſe determine them to prefer. Now, the paſſions and ideas of the grown man are only thoſe of the child developed and completed by the maturity of the organs, and the perſonal experience of the individual. See Cabanis, Rapports du phyſique et moral de l'Homme, memoire cinquieme.

But nothing hitherto explains to us how modifications of ſo general a nature can depend on the conditions of certain peculiar organs. We muſt then aſcend a little higher, and inquire whether the remarkable influence exerted by the organs of generation can be at all elucidated by their ſtructure, their functions, or their phyſiological relations to the other branches of the ſyſtem. We ſee, in the firſt place, that parts ſupplied by nerves which come from different trunks, or are formed by different nerves united together, are either more ſenſible or more irritable, and almoſt always both at once. Nature ſeems to have placed the ganglia and plexuſes in the neighbourhood of the viſcera, where the nervous influence muſt be the moſt conſiderable. The epigaſtric and hypochondriac regions abound with them; conſequently their ſenſibility is very acute, their ſympathies very extenſive, and the correſponding portions of the inteſtinal canal enjoy a degree of irritability hardly equalled by that of the heart. Now the nerves of the generative organs in both ſexes, without being apparently very important by their ſize or number, come from various ſources, are connected with thoſe of all the abdominal viſcera, and by them, or rather by the great ſympathetic, which ſerves as a general medium of connection, with the moſt eſſential diviſions of the nervous ſyſtem.

Secondly, obſervation ſhews us that the nervous ſyſtem (of which the original organization and mode of acting determine the general ſenſibility of all the organs taken together, and the particular ſenſibility of each conſidered ſeparately) may in its turn be powerfully modified by the character of thoſe functions, which perform the moſt important part in the animal economy; that is to ſay, in other words, by the habitual impreſſions conveyed to it from ſome of its moſt ſenſible extremities. The loſs of one ſenſe does not produce merely an increaſe of energy or attention in thoſe which remain, and which ſeem to redouble their efforts in order to ſupply its place; but it changes the manner in which the nervous ſyſtem feels and re-acts, and hence ariſe new habits evidently connected with the unuſual impreſſions which theſe ſenſes then begin to receive. The practice of medicine proves to us, by daily examples, that the affections of various organs have the moſt marked influence on the taſtes, ideas, and paſſions. The moral diſpoſitions are by no means the ſame in diſeaſes of the cheſt, as in thoſe of the ſpleen or liver. A greater or leſs propenſity towards a particular train of ideas or feelings (as for inſtance towards thoſe connected with religious belief) is experienced in particular ſtates of languor than in others; and the greateſt aptitude to thoſe avocations, which demand either conſiderable ſtrength and activity in the imagination, or long continued and profound meditation, is often experienced in a ſtate of diſeaſe cauſed by the deranged functions of ſome of the abdominal viſcera. Thus, then, nothing is more conformable to the laws of the animal economy, than that organs, endowed with a ſingular degree of ſenſibility, ſhould exerciſe a very extenſive influence on the machine in general; and we perceive immediately that the preſent is one of the moſt remarkable phenomena referrible to theſe laws.

In the work laſt quoted, Cabanis endeavours to explain this ſubject further, by obſerving that thoſe organs, which ſeem to be the principal ſeats (foyers) of the peculiar ſenſibility of the generative apparatus, *viz.* the ovaries and teſticles, are of a glandular ſtructure, that the various parts of the glandular ſyſtem affect each other very powerfully; and that the condition of this ſyſtem altogether has a moſt important influence on the ſtate of the brain, augmenting or diminiſhing its energy. The latter circumſtance will apply with ſo much the greater force to a caſe, where the glands are diſtinguiſhed by their great ſenſibility.

Again, it has been alleged that the ſeminal fluid formed in the teſticles, when abſorbed and conveyed into the circulation, affects the general maſs of blood. At all events the commencement of this ſecretion is marked by important changes in the voice, the muſcular motions, and the phyſiognomy, by the appearance of the beard, &c. And we have ſeen, that in animals, the development of particular parts is materially modified by the preſence and action of the teſtes. That an analogous fluid forms in the ovaries, and either furniſhes the materials of the embryo, or contributes to their formation, and that its abſorption produces analogous effects in the female, to thoſe which we obſerve in the male, is in truth a mere hypotheſis. But the influence of the ovaries in the changes at the time of puberty, whether produced in this way or not, is inconteſtible. Laſtly, in explaining the different influence of theſe parts in the two ſexes, we muſt aſſume peculiar diſpoſitions in the original formations of the nervous ſyſtem, as well as in the cellular organ, the muſcles, and bones. Theſe muſt depend on thoſe unknown circumſtances which influence the formation, life, and development of the embryo; their explanation muſt be referred to that of the differences of ſex, they muſt be regarded as ſimple facts, and be admitted as ſuch, without attempting to trace them any higher.

Hermaphrodiſm.—Having compared together the two ſexes, and mentioned the moſt remarkable circumſtances which diſtinguiſh the organization of each, we have to examine further whether nature has in any inſtances united the attributes of the male and female in the ſame individuals, ſo as to form a true hermaphrodite. The reſolution of this queſtion, which is not to be conſidered as ſatisfying idle curioſity, is equally intereſting to the naturaliſt and the philoſopher, and may influence the deciſions of judicial tribunals on the important queſtions of impotence and ſterility. The Grecian artiſts have endeavoured to combine the beauties and properties of the two ſexes in the ſame ſubject, and have exerted the magic powers of their chiſſel on figures of hermaphrodites.

maphrodites. Among theſe ideal productions, we may mention two beautiful ſtatues in a recumbent poſition in the Florentine gallery. A ſmall hermaphrodite ſtatue is ſeen in the villa Albani, a very fine one in the villa Borgheſe, and there is another in an obſcene attitude, pointing out that it partakes of the two ſexes. All theſe are males in the external appearance of their generative organs, females in the form of the breaſt, in the features, in the elegance of the figure, and the ſoftneſs of the contours. (Winckelmann, Hiſtoire de l'Art, 4to. tome 1. p. 364.) Theſe monuments furniſh no proof on the ſubject; they are to be regarded as creations of art, derived from the imagination of the ſculptor, and not as the repreſentatives of any real exiſtence. Winckelmann himſelf, who, in other reſpects, believes in hermaphrodiſm, claſſes the chef-d'œuvres we have juſt alluded to among the ideal productions. They exhibit an attempt to form a more perfect being, by uniting together the peculiar excellencies of the male and female, without attending very particularly to the genital organs. The word hermaphrodite then, as applied to theſe works of art, includes the notion of a very high degree of beauty and elegance, in which all that is moſt admirable in either ſex is combined in one individual; and the works, in which ſuch are repreſented, may be regarded as the inventions of the greateſt maſters. (See Caylus's Recueil d'Antiquités, tome 3.) The fabulous account of the transformation of Hermaphroditus and the nymph Salmacis into a moſt lovely being, combining the attraction and the powers of both ſexes, may be regarded as an expreſſion of the common opinions on the ſubject.

The vaſt multitude of obſervations and hiſtories of hermaphrodites, recorded in various medical works, renders it neceſſary for us to claſs them under certain heads. 1ſt. The true hermaphrodite? There is much reaſon to believe, that no inſtance of an hermaphrodite, in the ſtrict ſenſe of the word, has ever occurred in the more perfect quadrupeds, or in the human ſpecies. For, when we conſider the bones of the pelvis, to which the organs of generation are connected, it is difficult to conceive in what way the complete parts of the male and female could be placed, diſtinct from each other; and no inſtance of its having happened is to be found, in any record, which can be depended on. To conſtitute an hermaphrodite, in the ſenſe we are now conſidering, it would be neceſſary that the male organs of copulation and impregnation, ſuch as the teſtes and their ducts, the veſiculæ ſeminales, proſtate, urethra, and penis, ſhould exiſt in the ſame individual with the organs employed for the purpoſes of conception, of receiving, nouriſhing, and expelling the fœtus, ſuch as a well-formed vagina, uterus, ovaries, and Fallopian tubes. The difficulty, and even impoſſibility of ſuch an union, has been already recognized by Haller and Pietſch. Medical authors have indeed related caſes of women, who, after having many children, had impregnated other females; (ſee Mollerus, Tractat. de Hermaphrodit. cap. 2.: Blancard, Collect. Medico-Phyſ. cent. 3, obſ. 80.) but ſuch narratives are too obviouſly fabulous to require ſerious refutation.

The neareſt approach to ſuch an occurrence, as we have juſt alluded to, conſiſts in a partial mixture of the female and male organs. This has been obſerved, not very rarely, in ſome animals. Mr. Hunter has given ſeveral inſtances of it in neat cattle; and it has alſo been ſeen in the dog, the aſs, and the goat. The individuals, in whom ſuch appearances have been noticed, are ſo far from having had the properties of both ſexes, that they were obviouſly incapable of executing any ſexual function at all. Even in this reſtricted ſenſe, we believe that no caſe has occurred in the human ſpecies, and that all the ſuppoſed hermaphrodites among men have been individuals with imperfect or monſtrous formations of ſome parts. The caſe mentioned by Petit, in the Memoirs of the Academy of Sciences for 1720, as exhibiting a mixture of organs, was clearly a male: and that related by Maret in the Memoires de Dijon, t. 2, p. 157, belongs to the ſame claſs. The following caſe, diſſected by Giraud of the Hotel Dieu, ſhews us how careful we ſhould be in drawing concluſions from external appearances, and will convince us that no accounts of hermaphrodites can be received, except on the faith of diſſection performed by experienced anatomiſts. The individual was eſſentially a male, and offered ſome appearances of the other ſex, not from the addition of any organs, but from an unuſual diſtribution of ſome parts of the male apparatus. He was received in ſociety as a woman, and was connected by a voluntary aſſociation with a man, who had for a long time performed the duties of a huſband towards him. This ſingular character died in the Hotel Dieu. He exhibited, externally, an aſſemblage of the male and female properties. The buſt has a completely maſculine appearance; the chin was covered with firm hairs, very analogous to a beard; the neck was thick, the cheſt broad, the boſom ſlightly ſwoln, and the nipples exactly like thoſe of a man. The lower half of the body preſented a contraſt to theſe characters. The ſoft and delicate contours of the lower limbs, the rounded hips, the broad pelvis, and the greater ſeparation of the thighs, approximated decidedly to the female form. An imperforate penis, two teſticles, and an appearance of vulva, were the external generative organs. The teſtes were well formed, the veſiculæ ſeminales imperfect, and the urethra opened at the cul-de-ſac, which repreſented the vagina. Thus, inſtead of a double ſex, the individual was an ill-formed male, entirely incapable of any ſexual function. See Journal de Médecine par Sédillot, tome 2, p. 319.

The laſt inſtance of mixed organs, which we ſhall quote, is mentioned by Dr. Baillie, to whom it was communicated by Dr. Storer of Nottingham. "The perſon bears a woman's name, and wears the apparel of a woman. She has a remarkably maſculine look, with plain features, but no beard. She had never menſtruated; and on this account ſhe was deſired by the lady, with whom ſhe lived as ſervant, to become an out-patient at the Nottingham hoſpital. At this time ſhe was twenty-four years of age, and had not been ſenſible of any bad health, but only came to the hoſpital, in order to comply with the wiſhes of her miſtreſs. Various medicines were tried without effect, which led to the ſuſpicion of the hymen being imperforated, and the menſtrual blood having accumulated behind it. She was therefore examined by Mr. Wright, one of the ſurgeons to the hoſpital, and by Dr. Storer. The vagina was found to terminate in a cul-de-ſac, two inches from the external ſurface of the labia. The head of the clitoris, and the external orifice of the meatus urinæ, appeared as in the natural ſtructure of a female, but there were no nymphæ. The labia were more pendulous than uſual, and contained each of them a body reſembling a teſticle of a moderate ſize, with its cord. The mammæ reſembled thoſe of a woman. The perſon had no deſire or partiality whatever for either ſex." (Morbid Anatomy of ſome of the moſt important Parts of the human Body, 2d ed. p. 410.) This narrative leaves very little doubt that the individual was a male, with the generative organs ſo imperfect as not to have exerted their uſual influence on the frame in general: there is no evidence of any female organ being preſent here.

We repeat then, that there is not only no inſtance recorded, of perfect male and female organs ſo united in the human ſpecies, as to conſtitute an individual capable of exerciſing the generative functions of both ſexes—of impregnating or being impregnated—but alſo, that there is no clearly deſcribed inſtance of the ſmalleſt mixture of organs in any human perſon, aſcertained by actual diſſection, and teſtified by perſons of competent anatomical ſkill. All the ſuppoſed inſtances of hermaphrodites muſt then be referred to one of the following claſſes; in which unuſual ſituations of certain organs, vicious conformations, various monſtroſities, imperfectly developed male organs, or a greater prominence than uſual of ſome female parts, occaſion a deviation from the accuſtomed type, ſuppoſed to conſtitute hermaphrodiſm, very capable, when aſſiſted by lies and fraud, of impoſing on thoſe who know nothing of natural appearances, and often miſtaken by thoſe who ought to have known better. Hence have ariſen the numerous ſtatements, contained even in the writings of anatomiſts and phyſicians, and tending to prove the exiſtence of the prodigy, of which no well authenticated fact has hitherto determined the reality. A ſound ſpirit of criticiſm, founded on a more accurate knowledge of natural appearances, reduces to their juſt ſtandard thoſe ſingular deviations from the ordinary type, from which ignorance, credulity, and a love of the marvellous, have drawn ſuch extravagant and ridiculous conſequences.

2d Claſs.—Male individuals, with unuſual formations of the urinary and generative organs; (androgynus.) Where the ordinary type is conſiderably changed, an appearance is ſometimes produced, very capable of deceiving ſuperficial obſervers: there is a kind of ſketch, or imperfect attempt, at a double apparatus of organs. But the male ſex generally predominates very clearly in theſe caſes, and the ambiguity depends commonly on the teſtes being contained in ſeparate parallel folds of the ſkin; the penis being imperforate; and the urethra opening in the perineum, on the ſurface of a blind pouch, having a red and tender appearance, and eaſily miſtaken for the vagina. In ſuch an individual the penis, being imperforate, and probably ſmaller than uſual, is conſidered as a large clitoris; the folds of ſkin holding the teſtes very much reſemble the female labia, and the red ſlit, behind which the urethra ends, is tolerably analogous to the vagina. The imperforation of the penis, and the opening of the ejaculatory ducts near the perineum, at which their contents eſcape, deprives theſe individuals of the power of procreation; and the ſterility of their marriages, if they enter into that ſtate, in ſpite of their imperfect formation, ariſes entirely from this cauſe. The teſtes and veſiculæ ſeminales appear to be perfect in theſe caſes. The individuals experience the ordinary ſexual deſires, and the ſeminal fluids are expelled at the unnatural opening in the perineum. A ſimilar deformity occurs not unfrequently in the goat and ſheep; Ariſtotle having obſerved it in the former. The reader will find examples in Haller's Commentarius de Hermaphroditis, where a vaſt number of inſtances is quoted; in Wriſberg's Commentatio de Singulari genitalium Deformitate in puero Hermaphroditium Mentiente; § 7, note *b*: in Moreau Hiſtoire Naturelle de la Femme, tom. 1. p. 224: in Mertrud, Diſſertation ſur la fameuſe Hermaphrodite, qui paroit aux yeux du publique, Paris 1749, folio: Agoty, Obſervations ſur l'Hiſtoire Naturelle, la phyſique, &c. avec des planches imprimées en couleur, Paris 4to. 1752

An inſtance, ſimilar to the kind juſt deſcribed, is related and drawn by Wriſberg in the memoir above quoted: but there was this difference, that the rectum, as well as the urethra, opened in the unnatural ſituation in the perineum; this male child had been chriſtened by a female name.

Other leſs eſſential deviations from the accuſtomed organization have given riſe to the opinion that the individuals were hermaphrodites. A fiſſure, of various depths, has exiſted in the perineum; covered with a ſecretion from numerous ſebaceous glands; when all the other organs were perfect in every reſpect. Wriſberg knew an inſtance of this kind at Gottingen: the individual was always deemed an hermaphrodite, but he had the natural deſires and powers of a male. The abſence of the teſtes from the ſcrotum has given riſe to the ſame opinions. A confinement of the penis to the ſcrotum, by a particular formation of the integuments, has occaſioned perſons to be reputed hermaphrodites. In theſe the urine is in the direction downwards, and the confinement of the organ will not allow of its performing the ſexual functions. The parts may be ſet free by a ſurgical operation.

The laſt deſcription of males, ſuppoſed to be hermaphrodites, are thoſe in whom the urinary bladder is deficient, together with the lower and anterior portion of the abdominal muſcles and integuments, and the ſymphyſis pubis, a red and ſenſible maſs of an irregular and fungous-like ſurface, with the ureters opening on it, is placed at the lower part of the abdomen. Conſiderable alterations take place in the generative organs, in conſequence of this deformity. The urethra is deficient, and the penis conſequently imperforate. The ſeminal ducts open near the fungous maſs above-mentioned, or on the open ſurface of the urethra, or even terminate in blind extremities. As the tuberoſities of the iſchia are at an unuſual diſtance from each other, the crura penis are concealed within the body for a greater length, and the pendulous part of the organ is extremely ſhort, ſeldom exceeding two inches in length, even in the adult. The urethra appears as if it had been ſlit open, forming a band or groove, inſtead of a perfect canal, and rendering the glans penis bifid. The ſituation of the urethra is alſo very remarkable; for, inſtead of running, as it naturally does, in the lower angle formed by the junction of the corpora cavernoſa, it has commonly paſſed along the upper angle, giving the penis and glands the appearance of being inverted. That the part now deſcribed is really the urethra, is evident from its vaſcular ſurface, with lacunæ opening upon it, from the preſence of the caput gallinaginis, and of the openings of the ſeminal ducts. In conſequence of the glands being bifid at its upper ſurface, the prepuce is attached only to the lower half, and is connected by a frænum, as uſual. The teſticles, in ſome inſtances, are contained in the ſcrotum, in others in folds of integument reſembling the labia of the female; and in ſome do not deſcend. The ſcrotum is rarely pendulous, being increaſed in breadth in conſequence of the ſeparation of the oſſa pubis. The ſexual appetite, in ſome of theſe individuals, has been weak, in others ſtrong, in others altogether wanting. It is evident that they are not capable of procreating the ſpecies, in conſequence of the ſhortneſs and imperforation of the penis, and the ſeminal ducts opening externally. See Dr. Duncan, jun. on this ſubject, in the Edinburgh Medical and Surgical Journal, vol. 1. pp. 43 and 132: where he has collected together a vaſt number of caſes.

3d Claſs.—Female individuals; (androgynæ). An unuſually large ſize of the clitoris, is one of thoſe cauſes which have led to miſtakes concerning the ſex. This is not a common occurrence in theſe countries, but is ſaid to be much more frequent in warm climates; inſomuch that a ſurgical operation for removing the part is deſcribed by the Arabians. Theſe individuals are perfect females in all other circumſtances of their organization, and the menſtrual diſcharge ſufficiently characterizes them. In many of the recorded inſtances of this deſcription, there is probably exaggeration, as any enlargement of the clitoris can hardly make it ſufficiently

ciently like a penis to give riſe to miſtakes. A gipſey applied to Columbus for the removal of a clitoris which incommoded her. The famous hermaphrodite negreſs of Angola, exhibited in London, was in the ſame caſe with the gipſey mentioned by Columbus. Parſons has collected many facts of this kind. Mr. Home relates an inſtance in a negreſs. "She was of the Mandingo nation, 24 years of age; her breaſts were very flat; ſhe had a rough voice, and maſculine countenance. The clitoris was two inches long, and in thickneſs reſembled a common-ſized thumb; when viewed at ſome diſtance, the end appeared round, and of a red colour; but, on a cloſer examination, was found to be more pointed than that of a penis, not flat below, and having neither prepuce nor perforation; when handled it became half erected, and was then fully three inches long, and much larger than before: when ſhe voided her urine, ſhe was obliged to lift it up, as it completely covered the orifice of the urethra. The other parts of the female organs were found to be in a natural ſtate." A gentleman, who had practiſed midwifery among the negro women, ſtated that an enlarged condition of the clitoris was common amongſt them. Parſons and ſome others, in conſequence of the ſtructure juſt deſcribed, have aſcribed all hermaphrodites to the female ſex. Whether this unuſual ſize of the organ can be produced, "per ſceleratum abuſum clitoridis" is very doubtful. In order to avoid all miſtake concerning ſex in newly born children, it muſt be remembered that the clitoris is proportionally very large at that age.

A prolapſus of the uterus is another circumſtance which has occaſioned females to be deemed hermaphrodites, and even to be publicly exhibited as ſuch. A perſon of this kind came to Paris in 1693, dreſſed as a man, and wearing a ſword. She pretended to have the organs of both ſexes, and to be able to employ both, and exhibited her perſon to the curious for a ſmall gratification. Beſides the numbers who took up the common opinion of her being an hermaphrodite, and who could not be ſuppoſed ſufficiently well-informed to judge of ſuch a ſubject, ſeveral phyſicians and ſurgeons fell in with the vulgar ſentiment, and gave certificates which prove inconteſtibly, that a great reputation may be acquired in the profeſſion, without any real talents, or any large ſtock of ſolid information. Saviard, after inſpecting the parts cloſely, found that the caſe was a prolapſus uteri, which he reduced. When the female had recovered, ſhe preſented a requeſt to the king for permiſſion to take again the female dreſs, in ſpite of the magiſtrates of Toulouſe, who had ordered her to clothe herſelf as a man. See Saviard, Recueil d'Obſervations, obſ. 15.

An inſtance of the ſame kind is related by Mr. Home. "A French woman had a prolapſus uteri at an early age, which increaſed as ſhe grew up; the cervix uteri was uncommonly narrow, and at the time I ſaw her, when ſhe was about 25 years old, projected ſeveral inches beyond the external opening of the vagina; the ſurface of the internal parts, from conſtant expoſure, had loſt its natural appearance, and reſembled the ſkin of the penis: the orifice of the os tincæ was miſtaken for the orifice of the urethra. This woman was ſhewn as a curioſity, and in the courſe of a few weeks made 400*l.* I was induced by curioſity to viſit her, and on the firſt inſpection diſcovered the deception; which, though very complete to a common obſerver, muſt have been readily detected by any perſon intimately acquainted with anatomy. To render herſelf ſtill more an object of curioſity, ſhe pretended to have the powers of a male." Philoſ. Tranſact. 1799.

We have already mentioned ſome inſtances where the generative organs, although belonging clearly to one ſex, had been imperfectly developed, and conſequently had not produced their uſual effect in modifying the form of the body, and impreſſing it with the ſexual character. There are other caſes, in which men or women, having their organs apparently of the accuſtomed magnitude, partake reſpectively of the characters of the other ſex, probably from the cauſe juſt alluded to, of the ſexual parts not exerting their full influence on the frame. Such individuals may be accounted neuters; and ſeem, in the human ſubject, to reſemble the free martin in neat cattle, where there is a true mixture of organs, but they are ſo imperfect that organization is not influenced by them, and the form of the individual differs both from that of the bull and cow. The perſons thus circumſtanced are often deemed by the vulgar hermaphrodites.

All the caſes of ſuppoſed hermaphrodites may be referred to one or the other of the heads now deſcribed: they will be found to be either males, with ſome unuſual organization or poſition of the urinary or generative apparatus; or females, with a long clitoris, or prolapſed uterus; or individuals, in whom the generative organs have not produced their uſual effect in influencing the development of the body. Thus, it is evident, that inſtead of combining the powers of the two ſexes, they are, for the moſt part, incapable of exerting any ſexual function. Yet ignorance and ſuperſtition have marked out theſe individuals, already ſufficiently unfortunate from their defective organization, as the objects of perſecution, and have ſubjected them to the operation of the moſt abſurd and cruel laws. The ancients, regarding them as an impure and ominous kind of monſters, diſpatched them by the moſt barbarous deaths. It appears from Diodorus that they had been burned by the Athenians and Romans. By the edicts of Conſtantine and other princes, they were beheaded, drowned, or baniſhed to deſert iſlands. Livy informs us that a newly born child, of which the ſex could not be aſcertained, was thrown into the ſea. (L. 31.) Further information on this ſubject may be derived from Gaſpar Bauhin, De Hermaphroditorum monſtroſorumque partuum natura, ex Theologorum, Jureconſultorum, Philoſophorum, et Rabbinorum ſententia; libri duo, Francof. 1629, 8vo. Theſe abſurd notions and practices have at preſent diſappeared; but the ſubject is important on many accounts, as theſe unuſual deviations render the ſex of an individual often doubtful, and impoſe even on profeſſional perſons. The deciſion may be important in deciding the employment in life of an individual, the deſcent of property, the fitneſs for religious functions, particularly for the male or female religion in the Romiſh church, and the judicial deciſions concerning impotence or ſterility. We therefore add a few obſervations on the grounds of diſtinction in ſuch circumſtances. The greateſt difficulty is experienced with reſpect to newly born children; for many things aſſiſt our determinations in the adult. The beard, the hair ſurrounding the anus, the deſires excited by the preſence of women, the teſtes and their cords, and the comparatively greater breadth of the ſhoulders than of the pelvis and hips, ſhew us that the individual is a man. The ſmoothneſs and ſoftneſs of the body in general, the increaſe of the beard, and of the hair from the anus, the menſtrual diſcharge, the want of teſtes, and the ſuperior breadth of the hips, prove the individual to be a woman.

A male, with a fiſſure in the perineum and an imperforate penis, may be aſcertained by the ſize of the penis, by the different organization of the preputium from that which covers the clitoris; the abſence of nymphæ and hymen, and probably the preſence of teſtes. The different relation of the fiſſure in the perineum to the penis, from that of the meatus urinarius to the clitoris in the female, will aſſiſt the deciſion, as alſo the want of power to paſs an inſtrument towards the ſituation of the uterus.

The ſmaller ſize of the clitoris, and its different ſhape; the connection of its preputium to the nymphæ, and the preſence of the latter parts; the ſeparate opening of the vagina and meatus urinarius, and the preſence of the hymen; the abſence of teſticles, all prove the individual to be a woman.

An adheſion of the labia to each other at their convexities may cauſe a difficulty in deciding: but here the abſence of the penis and teſticles, the diſcharge of the urine at the upper end of the labia, and the line of union between thoſe folds, ſhew us the nature of the caſe.

Much information on the ſubject of hermaphrodites may be gained from the following works. Parſons' Mechanical and Critical Enquiry into the nature of Hermaphrodites: London, 8vo. 1741. Ambroſe Paré's Works, book 24. Pietſch, Gedanken von den Zwittern, in the Old Hamburg Magazine, vol. iv. p. 538, et ſeq. Arnaud, in Mémoires de Chirurgie. Haller, num dentur Hermaphroditi, commentarius, in the Commentarii ſoc. reg. ſcient. Gottingen, tom. i.; or in his Opera Minora, vol. ii. Hunter on the Free Martin, in his Obſ. on the Animal Economy. Home, Diſſection of an Hermaphrodite Dog, with Obſervations on Hermaphrodites in general, Philoſ. Tranſact. 1799. Moreau Hiſtoire Naturelle de la Femme, tom. 1. p. 211, et ſeq. Wriſberg, Commentatio de ſingulari genitalium deformitate in puero, hermaphroditium mentiente, in his Commentat. vol i. p. 504, et ſeq.

Male Organs of Generation.—In the human ſubject theſe conſiſt of the teſticles, veſiculæ ſeminales, proſtate, Cowper's glands, urethra, and penis; making up a ſecretory apparatus, which is double, conſiſting of a right and left organ, in the two former parts, and ſingle in the latter. The peculiarities of the apparatus conſiſt in the ſmall quantity of fluid which it furniſhes, in the long periods for which this fluid is retained in its reſervoirs; in the particular condition of the organ deſtined for its emiſſion, eſſentially neceſſary to that act; and in the phyſical feeling which accompanies the act.

The Teſticles.—Theſe organs, placed externally to the cavity of the abdomen, and leſs protected againſt external injury than moſt other important viſcera, are ſuſpended, each of them by a conſiderable vaſcular bundle, called the *ſpermatic cord*, and contained in a kind of bag or cavity formed of ſeveral membranous layers. A middle ſeptum divides the interior of the bag, and ſeparates from each other the right and left teſtis, with their coverings, which are double with the exception of the outer one. The latter, formed by the integuments, and called the ſcrotum or purſe (in French les bourſes) conſtitutes a ſingle bag, which envelopes all the others. The ſcrotum is attached to the upper and front part of the pelvis, unconnected in every other ſituation, contiguous laterally to the inſide of the thighs, in front to the penis, and ſeparated behind from the anus by an interval of two or three inches, called the *perineum*. A ſmall fold of the ſkin under the penis, a ſlight groove below, and a prominent line behind, continued into the raphe of the perineum, mark out ſucceſſively, on the external ſurface, the ſymmetrical diviſion of the organ. Yet the right ſide of the ſcrotum is almoſt conſtantly more elevated than the left, in conſequence of the correſponding ſpermatic cord being ſhorter, and the teſtis nearer to the ring. The ſcrotum is ſoft to the feel, and elongated, ſo that the teſtes appear looſe and hang low, in warm weather, in old perſons, after coition, and under the action of any cauſes which have a debilitating influence on the frame in general. It is rough and harder on the ſurface, and ſhorter in cold weather, in young ſubjects, at the time of erection, and in a ſtrong, vigorous ſtate of the body: conſequently, at ſuch times, it is applied more exactly to the teſtes, and, drawing theſe organs gently upwards, ſhortens the cords. The ſudden action of cold, and even of fear, will produce the latter ſtate of the organ. The wrinkles which it exhibits at ſuch times are effaced by extending it.

The coverings of the teſtes ſucceed each other in the following order: 1ſt. The cutaneous inveſtment, or ſcrotum; 2dly. The cellular layer; 3dly. Membrane of a fibrous appearance, common to the teſtis and cord; 4thly. The ſerous membrane. The reaſon why the dartos is not enumerated among theſe coverings will appear preſently.

The ſcrotum is continuous with the integuments of the inſide of the thighs, the perineum, and penis. It is diſtinguiſhed by a browniſh hue from the reſt of the integuments, but follows in general the tints of the latter, being always darker in colour. A few ſhort hairs are ſcattered over its ſurface, and their bulbs, obliquely implanted, form ſenſible prominences from the thinneſs of the ſkin, which are not effaced by extenſion of the organ. In its general organization the ſcrotum reſembles the ſkin; but it is very thin, ſo that the veins of the ſubjacent cellular tiſſue are viſible through it. The vital properties of the ſcrotum are the ſame with thoſe of the ſkin in general; but the contraction produced by cold is more manifeſt in the former than in the latter. The phenomenon ſeems to be the ſame in both inſtances. It conſtitutes the cutis anſerina of the ſurface in general. This corrugation of the part has given riſe to the opinion that a muſcular expanſion is found under the ſkin in this ſituation; and hence have ariſen the deſcriptions of the dartos. We can, however, clearly diſtinguiſh that the contraction is in the integuments, and not in any more deeply-ſeated part; they feel denſe and firm at this time, inſtead of being ſoft and looſe, as in their ordinary ſtate.

The teſtis and cord are ſurrounded in their ſituation by a copious and looſe layer of cellular ſubſtance, placed immediately under the ſkin, and conſtituting, where it divides the two teſtes from each other, the ſeptum ſcroti. This is rather more denſe immediately under the cutaneous integument, and looſer at the ſurface of the teſtis. Several blood-veſſels ramify through it, particularly veins; and hence ariſes an appearance which may have authorized the opinion concerning a muſcular covering on a ſuperficial examination: but accurate inſpection can diſcover no muſcular fibres. Many nervous filaments are alſo ſeen in this ſubſtance, and enable us to explain the acute ſenſibility obſerved on the removal of the teſtis in ſurgical operations, a little fat is ſeen near the ring and the urethra; but it is completely abſent from all other ſituations. Here, as in the penis, the eye-lids and ſome other parts, the abundant depoſition of fat would interfere with the functions of the organ; and its abſence in theſe ſituations ſeems to indicate the deſign and foreſight employed in the conſtruction of the body as fully as the particular conſtruction of any parts can do. However the ſize of the body in general may be increaſed in corpulent perſons, the ſcrotum, penis, &c. always retain the ſame dimenſions. The abſence of fat renders theſe parts more eſpecially ſubject to the watery depoſitions of anaſarca: ſuch effuſions often manifeſt themſelves firſt in the ſcrotum, and that organ is generally very much increaſed in bulk when the anaſarca is conſiderable. The impulſion of air through an opening in the ſcrotum demonſtrates very well the nature and extent of this cellular layer; by diſtenſion of this kind it reſembles cotton in appearance. Maceration in water may be employed for the ſame purpoſe; as the fluid penetrates very minutely into the cellular interſtices. It is continuous with the ſimilar covering of the penis, and with the cellular ſubſtance of the perineum and groins; ſo that air paſſes from it into theſe ſituations.

The cord and teſtis are cloſely enveloped by a condenſed cellular covering, which deſcends from the neighbourhood of the abdominal ring, and includes the organs juſt mentioned, together with the membranous coverings of the latter; it conſtitutes the elythroid or erythroid coat of ſome writers. The cremaſter muſcle is ſtrongly connected with this, and contributes to the formation of the cellular ſheath. This part has been deſcribed as the tunica vaginalis of the ſpermatic cord, but it is entirely overlooked by many writers. Its thickneſs differs conſiderably in different ſubjects. It is connected to the cellular ſubſtance of the ſcrotum externally; and adheres, by cellular connections, to the ſpermatic veſſels, and to the tunica vaginalis teſtis, on the inſide. If air be impelled through a ſmall opening, it is ſeparated from theſe parts, and may be divided ſo as to ſhew that it is a diſtinct membrane. It then appears ſemi-tranſparent and thin, and ſeems to conſiſt of fibres variouſly interwoven. Its thickneſs is much increaſed in ſcrotal ruptures, to which it gives a complete external covering. Camper has delineated it very well in his poſthumous plates edited by Soemmerring, and he deſcribes it in the following paragraph; "Cremaſteres igitur muſculi ſunt, ab obliquo interno et tranſverſo abdominis orti, per involucrum membranaceum ſub cute ſcroti diſperſi, quocum velamentum efformant, funiculum ſpermaticum et teſtem undequaque cingens, quodque in hernioſis craſſius tenaxque fit, et ex multis ſibi invicem impoſitis lamellis conſtare videtur, cum chirurgia hernias attingimus. Velamentum illud facile a ſacco herniæ digiti ſeparatur; formius autem adheret vaſis ſpermatices." Icones herniarum, p. 13.

The ſerous membrane of the teſtis is called the *tunica vaginalis*, and the name ſhould be confined entirely to it, as moſt of the anatomical deſcriptions apply to this part only. Like all other ſerous membranes, this forms an entire and unperforated bag. Its arrangement is ſimple. It forms a pouch-covering, and appearing to include the teſtis and epididymis, as the heart is included in the pericardium. When an opening is made into it, and air impelled, it is elevated into a bag on the front and ſides of the teſtis. At the poſterior edge of the organ it is reflected over its ſurface, covering the epididymis, a ſmall portion of the ſpermatic veſſels, and the whole teſtis; and giving to theſe parts a ſmooth external coat. The tunica vaginalis therefore may be ſaid to conſiſt of two parts; *viz.* an exterior portion, forming the bag, which includes the teſtis; and an internal, reflected over the ſurface of the organ. The two are continuous at the back edge, and at the upper and lower ends of the teſtis. The bag-like portion of the membrane is covered by the fibrous inveſtment already deſcribed: the reflected part adheres very cloſely to the epididymis and teſticle. The tunica vaginalis is very thin, and every where cellular on its external ſurface; internally it is ſmooth, poliſhed, and moiſtened by a ſerous ſecretion, which, in an increaſed quantity, conſtitutes hydrocele. There is hardly any ſenſible fluid in the ordinary ſtate of the parts. Sometimes there are partial adheſions between the oppoſed ſurfaces of the two portions of the membrane; and ſometimes a general adheſion, by which the cavity is entirely deſtroyed, is produced by the operation for the radical cure of hydrocele.

In man and quadrupeds the teſticle conſiſts of two parts; *viz.* the proper teſtis, and the epididymis, which adheres to it behind. Ordinarily the ſcrotum contains two of theſe glands, a right and a left one: but this number is not invariable. We ſhall explain hereafter how it may happen that the ſcrotum ſhould contain no teſtis, or only one; and, if authors could be credited, we might cite examples, in which there have been three, four, or even five. We believe that the number never exceeds two, that the ſtatements now alluded to have ariſen from the ſwellings incidental to theſe parts, being miſtaken for teſtes, and that there is no obſervation deſerving of credit by which this aſſertion can be contradicted. The ordinary ſize of the gland in the adult is an anatomical fact known to each individual; but there are ſome varieties in this reſpect. Long continued chaſtity probably cauſes a ſhrinking of the organ; and a ſimilar diminution, to a much greater degree, may be occaſionally obſerved in old ſubjects, when the function of the part has ceaſed, without any diſeaſe. On the contrary, when venereal enjoyment has been habitually indulged, temporary abſtinence will cauſe a ſwelling of the organ, with ſome pain; and this may be relieved by a ſpontaneous diſcharge of the ſecretion. Again, there are differences of volume from original formation. The right and left glands are not always of the ſame ſize, nor is the right particularly obſerved to exceed the left, as ſome have aſſerted. The figure of the part is pretty exactly oval, with the two ends placed perpendicularly, and the ſurface flattened in the direction of the ſmall diameter. The extremities, which are diſtinguiſhed by the epithets ſuperior and inferior, are not in the ſame perpendicular line; the former is inclined forwards and outwards; the latter backwards and inwards. The two ends are ſometimes almoſt anterior and poſterior. The flat ſides, which are external and internal, are turned, the former towards the thigh of the ſame ſide, and the latter towards the correſponding ſurface of the oppoſite gland. The edges of the teſtes, which are anterior and poſterior, are placed obliquely, ſo as to ſlant from above backwards and downwards. The anterior edge is ſometimes deſcribed as the interior, and the poſterior as ſuperior. The epididymis is a thin and elongated organ, placed along the back edge of the teſtis, to which it adheres by means of the tunica vaginalis and blood-veſſels, ſmaller in the middle and enlarged at its upper and lower ends, and reflected at the latter, to form the vas deferens. Its upper extremity is called the caput epididymidis or globus major (tête de l'epididyme); and this adheres very firmly to the upper end of the teſtis, being placed rather above, as well as behind it. From this point the organ deſcends in a thin and flattened form, diſtinctly ſeen as a ſeparate part in the ſide of the teſtis, which is turned towards the thigh, but not on the oppoſite ſurface. It ſwells again at the lower end into the globus minor (queue de l'epididyme) and then turns up to form the vas deferens. The ſpermatic cord is attached along the poſterior edge of the gland, and the greater or leſs obliquity of the teſtis depends on the mode of its connection. A cord, compoſed of the ſame parts, ſuſpends each teſtis in its place, but it is rather longer on the left ſide; a circumſtance which has been noticed by painters and ſtatuaries. The pathologiſt aſcribes to this circumſtance the more frequent occurrence of varico-cele on the left ſide of the body. The diſtance of both organs from the ring is variable, and depends on the ſtate of the ſcrotum, and the cremaſter muſcle. Theſe two parts generally contract together. The conſiſtence of the gland is ſoft to the feel. As it is covered almoſt entirely by the ſerous membrane already deſcribed, it acquires from this circumſtance a ſmooth and poliſhed ſurface; its whiteneſs ariſes from the tunica albuginea.

Structure of the Teſticle.—The glandular part of the organ, in which the ſeminal ſecretion is immediately effected, is a light-brown pulpy maſs, conſiderably ſofter than the parenchyma of the other glandular organs, contained in a ſtrong fibrous membrane, which determines the exterior configuration of the part, and the conſiſtence which it preſents on examination. This membrane is named the tunica albuginea. It is ſeen through the reflection of the tunica vaginalis, which envelopes the teſticle, and adheres to it very cloſely. Yet, notwithſtanding the ſtrength of this adheſion, the ſerous layer may be partially ſeparated by diſſecting from the epididymis forwards. But, over the general ſurface the union is too intimate to admit of ſeparation; and conſequently the ſerous layer and the true albuginea are deſcribed ordinarily as compoſing one membrane under the latter name. It is from analogy, rather than the direct teſtimony of anatomical obſervation, that we deſcribe them as diſtinct parts. Along the poſterior edge of the teſtis, the albuginea is perforated by numerous openings for the paſſage of the ſeminal and blood-veſſels. From the inner ſurface of this membrane are detached numerous delicate proceſſes penetrating the ſubſtance of the teſtis, and forming partial ſepta, by which the glandular maſs is ſlightly ſubdivided into ſmaller portions. Some of theſe productions ſeem to conſiſt of blood-veſſels. The ſtructure of this part claſſes it amongſt the fibrous membranes: it is denſe, very firm, of a peculiar white colour, and poſſeſſing ſome blood-veſſels. Its external ſurface is every where covered by the reflected tunica vaginalis, except at the back of the teſtis, and its inner ſurface is in contact with the glandular ſubſtance of the organ. The great cloſeneſs and firmneſs of its texture explain to us the peculiarly hard feel of the inflamed teſtis, as the membrane yields with difficulty to the diſtention produced by the ſwelling of the contained vaſcular parts. It is manifeſtly thicker where the ſeminal tubes penetrate it; and in this ſituation we obſerve the corpus Highmori, concerning which we have further obſervations to make below. The albuginea poſſeſſes extenſibility, and the correſponding contractility: the ſwellings of the teſticle, from various cauſes, ſhew the former, and its ſubſequent return to the natural ſize, as well as the ſhrinking of the part from age demonſtrate the latter. It is very ſubject to converſion into cartilage. Little excreſcences are ſometimes obſerved on the ſurfaces of the gland, about the ſize of a pin's head.

The tunica albuginea is filled with a ſoft pulpy matter, of a light browniſh-yellow hue, and divided into ſmall portions or lobuli. Imperfect cellular ſepta, along which the ſmall arteries and veins run, divide theſe portions; but the partitions are not merely vaſcular. They are attached, as we have already obſerved, to the internal ſurface of the albuginea. Behind, they unite together in a white cellular hue, running along the back edge of the teſticle, from above downwards. Such are the appearances exhibited in the recent organ, without any diſſection or preparation. Its ſubſtance is very ſoft, ſo that when dried it loſes more than eight-tenths of its weight. A more accurate examination, particularly with the aſſiſtance of maceration and putrefaction, diſcover that all this pulpy maſs is made up of convoluted ſerpentine threads poſſeſſing ſome firmneſs and connected together by a very ſoft cellular ſubſtance. Theſe, which are called the tubuli or ductus ſeminiferi teſtis, ſeem about the ſize of an ordinary ſewing thread, and can eaſily be drawn out with a needle, after maceration, to the length of an inch and even more. Theſe threads are tubular, cylindrical thick in their coats with ſmall calibre, plentifully ſupplied with minute vaſcular ramifications, from which however injected liquors do not paſs into the ducts. They do not ramify, but paſs in a tolerably ſtraight direction to the cellular line at the back of the teſtis. That they are tubular is proved by the poſſibility of injecting them with quickſilver from the vas deferens: this indeed often fails, but in ſome caſes the tubuli are filled in this way through the whole teſtis. The diameter of one of theſe ducts, according to Monro, is 1-200dth of an inch; or 1-120th when injected with quickſilver. By the calculations of the ſame anatomiſt, the teſtis ſhould appear to conſiſt of 62,500 tubes, ſuppoſing each to be one inch in length: and conſequently, if they were joined into one tube, it would be 5208 feet and 4 inches in length. The convolutions and turns of the ducts are ſo numerous, that they do not continue their courſe, in the ſame ſtraight line, for more than 1-40th of an inch.

The white and firm cellular line at the back of the teſtis, juſt at the adheſion of the epididymis, is called the corpus Highmori. Many anatomiſts have deſcribed it as tubular, and have aſſigned to it the office of conveying the ſemen to the epididymis. Such a part obviouſly exiſts in the teſtis, and is ſtill more manifeſt in animals, as in the boar, than in the human ſubject. Haller, who has given the moſt accurate account of this ſubject, ſays, "After I had accurately filled the vas deferens with quickſilver, I obſerved in the corpus Highmori numerous veſſels, larger than the tube of the epididymis, running according to the length of the gland, ſerpentine, eaſily torn, and communicating with each other." Elem. Phyſiol. v. 7. p. 445. In theſe the tubuli ſeminiferi teſtis terminate; and they conſtitute the rete vaſculoſum of the organ. The ducts contained in each part of the tubuli ſeminiferi end in one ſtraight tube, which terminates in the rete teſtis. A certain number of tubes, called the vaſa efferentia, convey the ſemen from the rete vaſculoſum to the commencement of the epididymis. Obſcure notices of theſe veſſels may be found in various writers, and De Graaf in particular has deſcribed them. But the labours of Haller have thrown the greateſt light on the ſubject. "When, after various unſucceſsful attempts, the continued labour of an hour or more had enabled me to fill completely the vas deferens, I obſerved the head of the epididymis to be made up of vaſcular cones, amounting in number to twenty or thirty, and connected together by cellular ſubſtance before any diſſection had been uſed. Each of theſe cones is made up of a ſingle ſmall veſſel, larger however than the tube of the epididymis, convoluted into innumerable folds. The baſis of the cone is turned towards the epididymis; its apex is a veſſel proceeding downwards to the teſtis, perforating the albuginea, and communicating with the rete teſtis." Ibid. p. 447.

The epididymis, of which we have already deſcribed the poſition and figure, is diſtinguiſhed by its greyiſh colour from the ſhining whiteneſs of the teſtis. Being placed at the point where the cord is attached to the teſticle, it is ſurrounded by blood-veſſels, of which ſeveral are diſtributed to itſelf: its ſurface is partially covered by the reflection of the tunica vaginalis, which adheres to it cloſely, except at the angle of reflection, where the connection is looſer. Its ſtructure is much more eaſily unravelled than that of the teſtis, for, when filled with quickſilver from the vas deferens, it is proved to conſiſt of a ſingle tube, almoſt infinitely convoluted upon itſelf, excepting only a ſmall part of the caput, which is made up of the vaſcular cones. The latter uniting together form one very ſmall tube, which by its ſerpentine courſe and turns, connected to each other by cellular ſubſtance, containing the ramifications of blood-veſſels, forms the body of the epididymis. As it deſcends along the back of the teſtis, it increaſes in diameter, and at the ſame time is proportionally leſs convoluted. In a conſiderably enlarged ſtate, it is reflected from the lower end of the teſtis, ſtill a little convoluted at firſt, but ſoon forming a ſtraight tube, called the vas deferens. By carefully deſtroying the cellular ſubſtance, which connects together the convolutions of this tube, we can demonſtrate the facts now mentioned concerning the ſtructure of this organ. In ſuch a proceſs the tube can be drawn out to a ſurpriſing length, to five ells, according to De Graaf, to 400 times the length of the epididymis in its natural ſtate, according to Heuermann. Monro has taken great pains in meaſuring and calculating the dimenſions of this part: he finds the diameter of the tube, on an average, to be 1-80th of an inch, its length 31 feet, and the number of its turns, as it does not go in a ſtraight direction at any part, for more than 1-30th of an inch, 11,100. (De ſemine et teſtibus in variis animalibus, p. 31 and 32). As a further proof, that the organ is made up of a ſingle tube, we may obſerve, that if we cut it acroſs while we continue to inject quickſilver from the vas deferens, the fluid eſcapes from one orifice only, and when that is tied, no more runs out.

Thus, the ſemen, firſt formed in the ſmall ſerpentine veſſels *(tubuli teſtis)* which make up the pulpy maſs of the teſtis, is depoſited from theſe in the ſtraight ſeminiferous tubes, which convey it into the rete vaſculoſum, placed at the back of the teſtis, and connected to the albuginea, where it forms the corpus Highmori. Hence it paſſes through the vaſa efferentia, or excretoria teſtis, about twelve in number, which perforate the albuginea, at the upper end of the teſtis, and then form, in a convoluted ſtate, the ſerpentine vaſcular cones, which make up the caput epididymidis. Theſe unite into a ſingle ſmall tube, which, by its numerous turns, firſt forms the epididymis, and then ends in the vas deferens. Haller, Programma de vaſis ſeminalibus, Gotting. 1745; and in Oper. minor t. 2. p. 5.

From the origin of the convoluted tubuli ſeminiferi, to the termination of the epididymis in the vas deferens, the ſemen goes through a ſeries of veſſels, which are folded 16,860 times, and, if extended in a ſtraight line, would exceed 42 feet in length. Monro, lib. cit.

The ſmallneſs of theſe tubes prevents us from aſcertaining their texture, or the nature of their ſides. The tubuli teſtis poſſeſs conſiderable firmneſs, as we may aſcertain by extending them until they break, and by obſerving the column of quickſilver which they ſupport, when we inject them. The tube of the epididymis poſſeſſes firm and ſtrong ſides, in compariſon to its cavity.

A ſmall tube, either ſtraight, or ſlightly convoluted, is ſometimes obſerved to ariſe from the epididymis, and after paſſing to various diſtances on the cord, to terminate in a cul-de-ſac. Its ſize is equal to that of the tube of the epididymis itſelf. This circumſtance was firſt noticed by Haller, who called the veſſel *vaſculum aberrans.* (Progr. de vas. ſeminal.) He did not undertake to determine its termination or nature, obſerving that it proceeded along the cord, "incerto fine: an lymphaticum?" The exiſtence of the vaſculum aberrans has been confirmed by Monro, who injected it in four out of ſixteen teſticles; and he adopts the opinion ſuggeſted by Haller, of its being a lymphatic. Mr. Cruikſhank takes a different view of the matter. "It is," ſays he, "a luſus naturæ, and either forms a cul-de-ſac, or, after many convolutions, returns back again upon itſelf, and terminates where it began. It ſometimes mounts four inches upon the cord, and then terminates in a cœcum, or blind end. Sometimes it is not a quarter of an inch in length. I have ſeen it convolute, like the epididymis itſelf; from which it could not be diſtinguiſhed, till, by maceration and diſſection, the cellular membrane had been removed. It may be compared with the diverticulum ilii, ſo frequently met with in the human inteſtines." Anatomy of the abſorbing Veſſels, p. 141.

Veſſels of the Teſticle: Spermatic cord.—Under the inferior extremity of the kidney, and about the middle of the pſoas magnus muſcle, we obſerve a faſciculus of blood-veſſels, lymphatics, and nerves, placed behind the peritoneum, and connected to that membrane by a cellular ſubſtance: this is the commencement of the ſpermatic cord. It deſcends over the pſoas muſcle, paſſing at the ſame time rather outwards, croſſes the ureter, continues its courſe over the iliacus internus, and arrives at the upper opening of the abdominal ring. Here it is increaſed by the acceſſion of the vas deferens, from the ſide of the bladder. It now penetrates the upper aperture of the ring, going under the inferior edge of the obliquus internus, and tranſverſus abdominis: then it turns downwards and forwards in the canal placed between the two openings of the ring, covered in front by the aponeuroſis of the obliquus externus, and lying behind on the faſcia tranſverſalis. In this part of its courſe, it is further increaſed by the acceſſion of the cremaſter muſcle. The cord finally emerges through the opening in the tendon of the obliquus externus, and then turns ſuddenly downwards; lying not ſo much on the bone between the two columns of the ring, as on the outer column itſelf, ſo as to cover its inſertion into the pubes. Juſt at the point, where the cord enters the abdominal canal, it lies on the root of the epigaſtric artery. As it is placed behind the peritoneum, in the whole of its deſcent from the loins to the abdominal ring, that membrane is not perforated at the point where the cord leaves the abdomen. Nor is there any ſheath continued from the peritoneum, along the cord, to the tunica vaginalis; although ſuch a ſtructure has been aſcribed to the human ſubject from the obſervation of animals, in which it is really found. In bubonocele, indeed, a membranous cavity, produced by a continuation of the peritoneum, lies over the cord; but this is diſeaſe: and in a particular period of fœtal exiſtence, there is a canal leading from the abdomen to the tunica vaginalis, but this is ordinarily cloſed before birth. Neither is there any foundation for the deſcription of two layers of the peritoneum, of which the ureter is ſaid to accompany the cord. Eſcaping through the opening in the tendon of the obliquus externus abdominis, the cord deſcends in a ſtraight courſe to the teſtis, covered externally by the fibrous ſheaths already deſcribed, and growing rather larger as it approaches the organ. Copious ſoft cellular ſubſtance, with very little fat, connects together the component parts of the cord.

The ſpermatic are the chief arteries for ſupplying the teſtes and their coverings. Theſe veſſels are the longeſt in their courſe, compared to their diameter, of any in the body; they were known to the ancient phyſicians, and called by them the *ſeminal* veſſels. They would probably have eſcaped the diligence of the diſſector, had not the importance of the part, which they ſupply, been more attended to, than the ſize of the tube. They ariſe, moſt commonly, from the front of the aorta, between the origins of the renal and inferior meſenteric veſſels; either near together, or at a ſmall diſtance from each other. This is the caſe in twenty-two out of thirty-five inſtances. They may ariſe from the aorta higher or lower than the point which has been mentioned. The artery of the right ſide ſometimes comes from the right renal; but the left ariſes much more commonly from the renal artery, inſomuch, that this has been deſcribed as the accuſtomed origin. Often a ſmaller branch from the renal joins the trunk of the ſpermatic. It deſcends at an acute or half-right angle, and goes in front of the vena cava, on the right ſide of the body; but has been ſeen behind that vein. Its courſe is rather tortuous: joining the vein on the pſoas muſcle, it deſcends along the cord, and arrives at the teſtis in two branches. It gives off ſmall twigs to the renal capſule, fat of the kidney, ureter, lumbar glands, and the cord itſelf. The area of the veſſel, inſtead of being diminiſhed by all theſe branches, is rather increaſed. Several ramifications are diſpatched, below the ring, to the cremaſter, tunica vaginalis, and cellular ſubſtance of the ſcrotum. Ultimately it is diſtributed in numerous branches to the epididymis and teſticle; theſe partly perforate the back of the albuginea, and are employed in ſupplying the pulpy ſubſtance of the organ. Some of the ramifications communicate with branches of the epigaſtric artery. Smaller arteries come to the ſpermatic cord, or teſticle, from the epigaſtric, or from the circumflexa abdominis. The ſcrotum, and its cellular ſubſtance, receive twigs from the arteries of the thigh. "Hence," ſays Haller, "tying the ſpermatic arteries does not deſtroy the teſtis, on account of the ſupply derived from the external veſſels; but as theſe are very ſmall, the venereal powers of the organ are loſt." Element. Phyſiolog. v. 7. p. 430.

It has been aſſerted by many anatomiſts, and ſome of conſiderable celebrity, that the ſpermatic arteries and veins communicated together: and Euſtachius has drawn large communicating channels. That injection will ſometimes paſs from one order of theſe veſſels into the other, when dexterouſly impelled, is very true, and it holds equally good of other parts; but there is no more than the ordinary kind of communication here.

The ſpermatic veins, like the arteries, are two in number: the right uſually terminating in the front of the vena cava, the left in the renal vein, either alone, or in conjunction with the capſular, or a lumbar, or the hemiazyga. The left ſpermatic may end in the vena cava; or the right in the renal vein. Sometimes the vein ends by two, three, or four branches in the cava and renal vein. The ſize of the veſſel is very conſiderable when compared to that of the artery: its diameter being nearly a line and a half. When the veſſel has reached the pſoas muſcle, it divides into branches, which unite again, and give origin to other ramifications, which alſo anaſtomoſe together, and ſo on: thus a large plexus of veins is formed, conſtituting the *corpus pampiniforme*, forming the chief bulk of the cord, and increaſing in ſize as it approaches the teſtis. Branches correſponding to theſe arteries, which ariſe from the ſpermatic, join the vein. Valves are found in the ſpermatic veins, but none at their terminations: the tendency to the formation of varices in theſe veſſels, ſhews the neceſſity for the exiſtence of valves. The veins of the ſcrotum, derived from the epigaſtric, communicate with the ſpermatic, and with thoſe of the penis.

The abſorbents of the teſticles are numerous and large, but have not been long known. Nuck had demonſtrated them by inflating the ſpermatic veins; and Monro rejected them when he had thrown quickſilver into the vas deferens. He obſerved four or five valvular veſſels ariſing from the rete teſtis, and aſcending the cord. Haller candidly admits that he did not know much of them; "In homine aliquoties vidi majuſcula, non tamen valde numeroſa, in funiculo ſeminali cum venis aſcendentia, valvuloſa, ut tamen neque originem, neque finem ſatis accurate viderem." (Elem. Phyſiol. v. 7. p. 436.) Mr. Cruikſhank has given us the moſt perfect account of theſe veſſels. "The abſorbents of the tunica vaginalis," ſays he, "are eaſily diſcovered, lying between the reflection of that coat and the tunica albuginea. Though they are thus ſituated, I know that they belong equally to the body of the teſticle; they are in great numbers, and I have ſometimes covered the albuginea with abſorbents injected with quickſilver; perhaps there is not any part of the body where the abſorbents are larger or more numerous, in proportion to the part, than they are here. They ſoon leave the albuginea, and get upon the cord, where they are joined by others, to be deſcribed preſently; but the tunica vaginalis has alſo other abſorbents, upon the anterior and lateral parts, which have not the leaſt connection with the body of the teſticle, nor with the albuginea, and which alſo ſoon blend with the former, on the beginning of the cord. The abſorbents, which ariſe out of the rete teſtis, are exceedingly large, and appear to have no connection with its coats. A very beautiful preparation of theſe veſſels I made at Windmill-ſtreet, at leaſt ten years ago: I injected the vas deferens with quickſilver, and had in view not only the filling of the epididymis, but the tubuli teſtis themſelves. I had forced the mercury along the epididymis, and was delighted to ſee it get into the body of the teſticle; the mercury continued to deſcend very quickly through the glaſs injecting tube, but I ſoon found that it was not running into the tubuli teſtis, but into ſome veſſels, which mounted along the cord: theſe I ſoon perceived were abſorbents. I have alſo injected them from every part of the epididymis, from its ſuperior extremity, from the middle, and from the lower end. The abſorbents, having reached the cord, form from ſix to twelve trunks or more; ſome of theſe are ſometimes larger than a crow-quill: they do not appear to anaſtomoſe with one another as they paſs along the cord; at firſt they run ſtraight upwards, in the direction of the ring of the external oblique muſcle; after which they are bent upon themſelves, and paſs a little way in the direction of the ſpine of the ilium; after which they are bent as it were a ſecond time upon themſelves, and run over the anterior ſurface of the pſoas muſcle, and terminate at laſt in the lumbar glands. The reaſon of their termination, ſo diſtant from their origin, will eaſily occur to thoſe who reflect that the original ſituation of the teſticle was at this place, and that it was natural for it, like the other viſcera, to receive its blood-veſſels and nerves from the neareſt trunks, and to return its abſorbents to the neareſt glands." Anatomy of the abſorbing Veſſels, p. 140.

The nerves, like the blood-veſſels of this organ, ariſe from the trunks contained in the abdomen, and have conſequently a long paſſage to their ultimate deſtination. They are rather numerous than large. They are produced from the renal plexus chiefly, with additions from the meſenteric and hypogaſtric plexuſes, and from the trunk of the great ſympathetic. They are cloſely connected to the veſſels in the cord, but can hardly be traced to the teſtis. The ſcrotum and cremaſter are ſupplied by the lumbar nerves. Although the teſtis does not appear to poſſeſs acute ſenſibility, compreſſion of the organ cauſes a peculiar, dull, and intolerable ſenſation, of the moſt diſtreſſing kind.

Beſides the parts juſt enumerated, the cord contains the vas deferens, which will be preſently noticed; and the cremaſter muſcle, which is deſcribed under the article Cremaster.

A ſoft and looſe cellular ſubſtance unites together the parts which have been juſt mentioned; it reſembles that of the ſcrotum in not containing fat generally; but in corpulent perſons ſmall depoſitions of adipous matter may be obſerved in it. It does not communicate with that of the ſcrotum, as the fibrous covering of the cord is interpoſed between them; and it is much leſs ſubject than the latter to anaſarcous affections. Indeed its quantity is proportionally leſs abundant. Yet in rare caſes it has been the ſeat of aqueous infiltration, conſtituting a very uncommon kind of hydrocele of the cord: the latter complaint ſhews itſelf more frequently ly in the form of a ſingle cyſt with ſmooth ſides, contained in the cellular ſubſtance of the part.

The *vas*, or *ductus deferens*, is the tube which conveys the ſemen from the epididymis to the urethra. Its figure is for the moſt part cylindrical, and it conſiſts of a very ſmall tube, which will only admit a large briſtle, with very thick ſides. Although its calibre is ſo ſmall, the diameter of the part on a ſection equals a line. The ſubſtance of its ſides is very firm, and cuts like cartilage; hence we can diſtinguiſh it by the feel from the other component parts of the cord, by ſliding them between the finger and thumb in the living ſubject. The internal ſurface of the tube is ſmooth. Nothing of a muſcular ſtructure can be diſcerned in its compoſition.

It ariſes from the poſterior and inferior part of the epididymis, aſcends behind and a little on the inſide of that organ, and then continues its courſe along the ſpermatic cord behind the veſſels to the ring. Compreſſion of this part occaſions the ſame kind of pain as is experienced when the teſtes are injured; and the very acute ſuffering obſerved on tying the cord in caſtration, has been explained by the circumſtance of this tube being included in the ligature. Perhaps this explanation may be doubted, as the nerves of the teſtes are alſo among the compreſſed parts; however, the vas deferens is eaſily omitted, as its hard feel enables us to ſeparate the veſſels which lie in front, and are connected to it by a looſe cellular ſubſtance. It paſſes through the abdominal canal, holding the ſame relative ſituation to the ſpermatic veſſels. It ſeparates from them behind the opening, and then bends downwards and backwards along the ſurface of the pſoas muſcle, and of the iliac veſſels, to enter the pelvis. Here it becomes attached to the poſterior and lateral part of the bladder, and deſcends obliquely from without inwards, juſt in the ſituation where the peritoneum is reflected to the bladder from the ſide of the pelvis, connected by cellular ſubſtance on one ſide to the bladder, and on the other to the peritoneum, and ſituated in front of the rectum. In this courſe it decuſſates the umbilical artery, behind which it paſſes: it alſo croſſes the ureter, being placed between the lower extremity of that canal and the bladder. At the lower and back part of the latter organ it turns forwards and inwards, ſo as to approach towards the canal of the oppoſite ſide, ſtill connected to the ſurface of the bladder: in this direction it continues along the under ſurface of the organ, within the veſicula ſeminalis, and connected below by cellular ſubſtance to the rectum. In the neighbourhood of the proſtate, the two vaſa deferentia are placed cloſe together, and each unites juſt at the ſurface of the gland, with the anterior extremity of the veſicula ſeminalis. The canal, reſulting from this junction, ſometimes called the ejaculatory duct, penetrates the ſubſtance of the proſtate, from below and behind, upwards and forwards, and opens in the urethra at the ſide of the veru montanum.

The commencement of the vas deferens is a little convoluted, and rather larger in its calibre: at the upper part of the teſtis it becomes ſtraight in its courſe, and its area is diminiſhed. Under the bladder it is conſiderably enlarged again, where it lies along the inner edge of the veſicula ſeminalis. It has here ſometimes a ſlightly ſerpentine courſe, and poſſeſſes a flattened form. Its cavity is proportionably augmented, and, inſtead of a cylindrical tube, preſents a reticulated texture, like that of the veſiculæ ſeminales. Its ſurface is irregular and tuberculated in conſequence of this cellular ſtructure. After receiving the tube of the veſicula ſeminalis, it is again diminiſhed remarkably in ſize, and forms a ſmall cylindrical canal.

The vas deferens receives arterial and venous ramifications from the trunks, in the neighbourhood of which it paſſes. Nothing is known of its nerves.

It is by no means common in animals for the vas deferens to join the veſicula ſeminalis in the manner already deſcribed. In all caſes where there are teſticles, that duct conveys the ſecreted fluid into the urethra, there being no veſiculæ in ſome, while in others they terminate by ſeparate openings. The communication between the two parts in man is a very free one; and, although the canal formed by their junction proceeds in a ſtraight direction to its termination in the urethra, yet quickſilver, or any other injected fluid, or air thrown into the vas deferens, paſſes into, and diſtends the correſponding veſicula before it gets into the urethra. The compreſſion of the common canal by the firm ſubſtance of the proſtate, the ſmall ſize of the tube and of its opening, and a particular turn made by it, have been aſſigned to explain this fact. If the injection is puſhed further, it will go into the urethra. Fluids thrown into the veſicula alſo diſtend the vas deferens, but are more readily admitted into the urethra, as the capacity of that veſſel is not conſiderable.

The *veſiculæ ſeminales* are two ſoft bodies, reſembling, when undiſturbed by diſſection, membranous tubes with blind extremities, convoluted, and therefore marked with riſings and grooves on their ſurface. They are ſituated under the inferior flattened ſurface of the bladder, and upon the upper ſurface of the rectum, being connected to both theſe organs by looſe cellular adheſions. They are pyriform, with the apex placed forwards, and the baſis backwards, and convergent from behind forwards. Their anterior extremities, joined, as we have already mentioned, to the vaſa deferentia, lie on the upper and back part of the proſtate, and would be in contact with each other, were they not ſeparated by the tubes juſt alluded to. From this point they grow gradually broader, and are divergent, terminating behind in rounded ends, which are the moſt diſtant from each other. The ſuperior ſurface, in contact with the bladder, is rather flattened: the inferior, lying upon the rectum, is ſlightly convex. The vas deferens runs in contact with the inner margin, and the outward edge is turned towards the ſide of the bladder. The poſterior broad and rounded ends are partly in contact with the peritoneum, and lie at the ſides of the pouch, formed where that membrane is reflected from the bladder to the rectum. Numerous arterial and venous ramifications, particularly the latter, and a conſiderable quantity of cellular ſubſtance, ſurround theſe organs in all directions, and connect them to the neighbouring parts. In ſome individuals the pyriform ſhape is not well marked; but the anterior and lower end is always ſmall. The flattened appearance of its ſurfaces is altered by injection: the whole organ then appears thicker, and the tubercular riſings of the ſurface are more diſtinct.

A very different appearance is produced when theſe bodies are unravelled by the anatomiſt. Each veſicula is then found to conſiſt of a ſingle tortuous tube, about the ſize of a writing quill, with a blind extremity, and ſeveral lateral appendices, which alſo end in cul-de-ſacs. Sometimes the latter are very few; perhaps one or even none. In other inſtances they may amount in number to ten, or more. Haller has ſeen ſeventeen larger, beſides ſmaller ones. Some of theſe are ſimple blind appendices; others, particularly near the anterior end of the organ, again branch out. Sometimes the whole veſicula is bifid almoſt from its very origin; the varieties, indeed, are ſo numerous, that two veſiculæ will hardly be found exactly reſembling each other; but theſe variations are not important. (See Monro de Teſtibus, tab. 3.) This tube, with its appendices, is ſo convoluted upon itſelf, the turnings being cloſely connected together by cellular ſubſtance, containing numerous vaſcular ramifications, that the organ, when undiſſected, is four or five times ſhorter than the unravelled tube; and a ſection of it in this ſtate makes it appear to be compoſed of numerous cells, communicating together. This ſtructure accounts to us alſo for the knotted appearance of the organ on its ſurface.

The ſtructure of the veſicula is analogous to that of the vas deferens: its ſides are not ſo thick, but they are ſtill denſe and ſtrong. The external coat is of a cloſe texture, and whitiſh colour, covered with cellular ſubſtance externally. Nothing of a muſcular nature can be diſcerned here, although the functions of the organ oblige us to admit that it poſſeſſes a contractile power. We cannot otherwiſe account for the expulſion of the contents of the veſicula. The action of the levatores ani, which has been aſſigned as the efficient cauſe of this expulſion, is certainly inadequate to account for it; as their ordinary daily exertion is attended with no ſuch effect, when the venereal orgaſm is not preſent, and theſe parts are not exerted in their ſpecific manner. We may obſerve, moreover, that the perineal muſcles contract at the moment of ejaculation; now the contents of the veſiculæ muſt be conveyed into the urethra in the previous moments. The internal ſurface of the veſiculæ is formed by a mucous lining, connected cloſely to the preceding tunic. Its colour is whitiſh, and its thickneſs not conſiderable. It is continuous with the lining of the urethra. Its ſurface is very minutely reticulated, and marked with extremely ſmall diviſions, not to mention the larger ſepta formed by the turnings and folds of the tube and its appendices. It has, moreover, a downy or villous appearance: a ſimilar ſtructure characterizes that enlarged portion of the vas deferens which lies along the edge of the veſicula. The ſtructure of theſe parts, as well as the junction of the vas deferens and veſicula at an acute angle, has very conſiderable analogy to the gall-bladder and ductus hepaticus. Both have the ſame reticulated internal ſurface; the union of the two tubes, and the ſuppoſed courſe of the contained fluids, are conſidered to be ſimilar.

Some anatomiſts have deſcribed glands as being contained in the ſubſtance of the coats of the veſiculæ, and ſecreting the mucous fluid poured into theſe organs: but the moſt careful inveſtigation does not lead us to detect any thing glandular, and the ſecretion is probably performed by the ſurface of the parts.

We proceed to deſcribe more exactly the canal by which the veſicula and vas deferens communicate with the urethra. The tube of the former aſſuming a ſmooth appearance on its internal ſurface, and rather diminiſhed in ſize, converging towards its fellow, joins the correſponding vas deferens at a very acute angle: it is ſtill conſiderably larger than the latter canal. When the parts are diſſected, and the connecting cellular membrane removed, as in the hepatic and cyſtic ducts, the junction appears to be effected at a half right angle. The canal formed by this union, and belonging equally to the veſicula and vas deferens, proceeds more directly in the courſe of the latter, lies in cloſe contact with its fellow, paſſes between the proſtate and neck of the bladder, and thus arrives at the under ſurface of that part of the urethra, which runs through the gland. A ſmall elongated eminence is found in this portion of the urinary canal, compoſed of its internal coat, broader behind, where it aſſumes an oval figure. Towards the front it is continued into a long prominence, which is ſimply a fold of the urethral lining, and diſappears in the bulb, ending in one of the long ſtriæ, of which ſeveral are ſeen in the urethra, and ſometimes bifid, or even radiated at its extremity. It is called caput gallinaginis, or veru montanum. The elevations of the lining of the bladder, continued from the ureters, terminate in this eminence. Its oval portion is hollow, and preſents a long ſlit leading into a cul-de-ſac, which can be inflated, but which has no communication with the ſeminal paſſages. On each ſide of the eminence there is a ſmall oblong opening, the termination of the ejaculatory duct, but much narrower than the calibre of that tube, which is ſuddenly reflected from within outwards, at nearly a right angle, and pours its contents, by this ſmall opening, into the urethra. There is no valvular ſtructure at theſe orifices. The ſlit and cul-de-ſac already mentioned have given riſe to an opinion, that the two ejaculatory ducts terminated by a common orifice, which is altogether erroneous.

The proſtate is a firm glandular body, placed behind the ſymphyſis pubis, in front of the neck of the bladder, and ſurrounding the commencement of the urethra. In moſt animals there are two ſeparate glands in this ſituation, and the expreſſion *proſtates* has been erroneouſly transferred to the human ſubject. The ſize and figure of this part have been not unaptly compared to thoſe of a large cheſnut. Its broader end is turned towards the bladder, and is divided by a ſlight fiſſure into two lateral lobes, the narrower part is ſituated forwards. It is conſiderably thicker from ſide to ſide, than in the vertical direction. The ſuperior ſurface correſponds to the arch of the pubis, but is rather behind that part: it is covered by a ſtrong fibrous expanſion, deſcending from the arch, and named the inferior ligament of the bladder. Below, the gland is connected by cloſe cellular adheſions to the upper ſurface of the rectum, and the contact of theſe two parts is more extenſive in proportion to the ſize of the gut, which, when much diſtended, riſes ſlightly on each ſide of the proſtate, ſo as to be endangered in the lateral operation of lithotomy. The convex prominent ſides are covered by the anterior fibres of the levator ani. The baſis, or broad poſterior part, which is gently concave, embraces the neck of the bladder, and the ſmall anterior ends of the veſiculæ ſeminales and vaſa deferentia. The cellular ſubſtance, which connects it here to the bladder, is very denſe and firm, and the muſcular fibres of the organ are partly interwoven with it. This part preſents the groove already mentioned as dividing the organ into two lateral lobes. In front, the narrower portion of the proſtate is loſt indefinitely on the membranous part of the urethra, to which it adheres moſt firmly. The bulk of the urethra, the fat and muſcles of the perineum, cover the part ſo deeply on its anterior aſpect, that it can by no means be felt from the ſurface: on the upper part of the rectum, however, the gland may be diſtinctly recognized by the finger introduced into the gut, as nothing but the inteſtine covers it in this ſituation: and it projects ſenſibly into the tube when enlarged.

The urethra, immediately at its origin from the bladder, paſſes through the proſtate from behind forwards, and the membrane is almoſt conſolidated with the ſides of the opening in the gland. This paſſage does not take place at the centre, but nearer to the ſuperior ſurface, ſo that a ſmall portion only of the gland is above the urethra, and the chief bulk of it below and at the ſides. At the inferior part of the opening, by which the urethra commences, a ſmall portion of the gland projects ſlightly towards the bladder; and this part is perforated by the ſeminal ducts. It has been particularly deſcribed by Mr. Home as forming a third lobe of the proſtate. See the deſcription of a ſmall lobe of the human proſtate gland in the Philoſ. Tranſact. 1806, pt. 1.

The external ſurface of the proſtate is covered by a more or leſs diſtinct cellular inveſtment, which is the moſt complete below, and ſurrounded by numerous vaſcular ramifications, particularly of the venous kind. For an account of ſome muſcular fibres connected to it, ſee COMPRESSOR.

Its ſtructure is rather obſcure; for it does not conſtitute a ſimple gland with one excretory cavity, nor is it ſeparable into ſmaller conſtituent portions. It is denſe and very firm to the feel, apparently homogeneous when cut into, of a light brown colour, and on the whole conſiderably reſembling a ſcirrhous maſs. Small cavities are ſcattered through it, and excretory ducts, from 7 or 8, to 12 or 15 in number, continued from theſe, open into the commencement of the urethra, on each ſide of the caput gallinaginis. From theſe openings, a white and thickiſh fluid may be expreſſed in conſiderable abundance: it differs eſſentially in its colour from that contained in the veſiculæ ſeminales.

Cowper's glands, are two ſmall glandular maſſes, ſo named from the anatomiſt who particularly deſcribed them, and publiſhed figures of them; ſee his Deſcriptio glandularum, quarundam nuper detectarum, &c. 1702. They have alſo been called the inferior, or ſmaller proſtates, or glandulæ acceſſoriæ; they are of a roundiſh or oval figure, rather flattened, about the ſize of a pea, placed on each ſide of the lower end of the bulb of the urethra, and covered by the accelerator muſcle. They may be eaſily demonſtrated by cutting through the middle of that muſcle, and reflecting it towards each ſide: they are of a reddiſh-grey colour, and compoſed of many little portions, united together by cellular ſubſtance. Each of them has a ſeparate excretory duct, about half an inch in length, running obliquely forwards, and opening into the urethra by an aperture, which will admit a hog's briſtle. They ſecrete a mucous fluid, of a reddiſh colour, which aſſiſts in lubricating the lining of the urethra. According to Morgagni, they are ſometimes wanting. Haller has always found them, when he ſought for them carefully. Cowper deſcribes a third gland as being placed under the pubes in the curve of the urethra; but this has not in general been admitted.

The Penis.—After this deſcription of the organs, which ſecrete and preſerve the ſeminal fluid, or form other liquors which are added to the produce of the teſticles, we proceed to ſhew how this is conveyed to the place of its deſtination in the female. The urethra is a common paſſage for the ſemen and urine, commencing at the bladder, continued along the penis to its extremity, at which it opens, and facilitating, by its connection with this organ, the tranſmiſſion of the fecundating liquor to the germs prepared in the generative parts of the female. The penis is a very leading character in the ſtructure of the male, and is the ſeat of enjoyment in the act of copulation. Its form is elongated, and nearly cylindrical; it is placed at the middle and lower part of the abdomen, in front of the ſymphyſis pubis, and at the bifurcation of the lower limbs. When not erected it is ſoft and pendent, hanging in front of the ſcrotum. Its length and ſize are not conſtant, even in this condition, in the ſame individual: for there are numerous degrees between the conſiderable diminution of bulk produced by the operation of cold, and the ſwelling, which precedes erection, in any of which the organ may be found according to circumſtances; yet there is a middle ſtate, in which it is commonly found, which is not the ſame in all individuals. In the erected ſtate it is lengthened, enlarged, changed in its direction, and rendered, by the ſwelling of the urethra, ſomewhat triangular: a ſlight curvature may be obſerved in it at this time, adapted to the direction of the vagina. The increaſe in the length and ſize of the penis is always the ſame in the ſame individual: and it is more conſiderable in proportion as the dimenſions of the organ in its ſtate of repoſe are greater; but this is not conſtant. We may notice a ſuperior and inferior ſurface, two ſides, an anterior and a poſterior extremity.

The upper ſurface, named the dorſum, or back of the penis, is inclined forwards; it is turned towards the abdomen, and becomes poſterior in the erected ſtate. A large vein runs along its middle, and ſometimes there are two trunks. The inferior ſurface, turned backwards, is placed againſt the front of the ſcrotum; it forms a prominent line from the courſe of the urethra, and the integuments in this ſituation have a longitudinal rough mark, called the raphé, continuous with a ſimilar part in the ſcrotum. On each ſide of this middle prominence there is a ſuperficial depreſſion, where the urethra is in contact with the corpora cavernoſa. The two ſides of the penis are rounded. The poſterior extremity, called alſo the root of the penis, is divided into three portions, which will be preſently deſcribed, *viz.* the urethra in the middle, and the two corpora cavernoſa, one on each ſide. The anterior extremity preſents the glans and prepuce.

The penis is made up of various parts, each of which ſerves ſome particular purpoſe in the functions of the organ, conſidered as an inſtrument of reproduction. 1ſt. The corpora cavernoſa, making up its chief bulk, ſoft and looſe in the ſtate of repoſe, are ſo organized as to become very ſuddenly increaſed in ſize and hardneſs, in conſequence of the operation of certain ſtimuli. By theſe the penis is rendered capable of introduction into the female vagina. 2dly. The urethra, by which the fecundating liquor is conveyed, is a membranous canal, ſurrounded by a vaſcular ſubſtance, called corpus ſpongioſum, which is ſuſceptible of the ſame change in erection as the corpora cavernoſa. 3dly. The glans is a ſmall organ, conſiſting of a continuation of the corpus ſpongioſum, covered by a highly organized and acutely ſenſible ſkin, the excitation of which, in the act of coition, determines the diſcharge of the ſeminal fluid through the urethra. The penis poſſeſſes an external cutaneous covering, which is ſimply contiguous to the glans, but united to the corpora cavernoſa and urethra by cellular ſubſtance.

The *corpora cavernoſa*, or *crura penis*, are two nearly cylindrical bodies, of a very firm texture, united laterally in the greateſt part of their length, but ſeparated from each other behind, like the branches of the letter Y, and terminating by ſlender, conical, and pointed extremities. Theſe, fixed behind to the rami of the iſchia and pubes, advance forwards and inwards, approximating to each other. In front of the ſymphyſis pubis they come in contact, or rather, are confounded together in one ſingle body, the ſize of which is uniform throughout, except in front, where it terminates by a blunt extremity. The ſeparate origin of the two lateral portions has led anatomiſts in general to ſpeak of the *corpora cavernoſa* in the plural number; but their conſolidation into one body has induced Sabatier, and ſome other modern authors, to admit only a ſingle *corpus cavernoſum*, bifurcated behind for a double inſertion into the pelvis. The ſingle body, formed by the union of the two crura, to which the bulk and firmneſs of the penis are almoſt entirely owing, is flattened above and below, and preſents two ſurfaces, a ſuperior and an inferior, on each of which there is a longitudinal groove, correſponding to the ſeptum, which is within the corpus cavernoſum. That of the upper ſurface is the ſmalleſt, and lodges the great veins of the penis; the inferior, broader and deeper, receives the urethra, to which it is united by a cloſe cellular ſubſtance. The ſides of the body are rounded and covered by the ſkin, its anterior extremity forms a blunt point, received into a concavity, at the baſe of the glans. The two parts are united by a very denſe cellular ſubſtance, and ſome blood-veſſels paſs between them, but there is no other kind of communication; and air or injection, thrown into the cellular ſubſtance of the corpus cavernoſum, do not find their way into the glans. The latter, therefore, is not an expanſion or continuation of the former, as ſome old anatomiſts ſuppoſed. The poſterior extremity is bifurcated, and its two prolongations form the two crura penis already mentioned. Theſe begin in a pointed form a little above the tuberoſities of the iſchia, from the inner ſurface of the bone, to which they are attached as far as the ſymphyſis. Below and within they are covered by the erectores and accelerator muſcles, above and without they adhere ſtrongly to the bone. They leave between them a triangular ſpace, filled by fat, and by the urethra, which occupies its middle. Three parts are to be conſidered in the corpus cavernoſum, *viz.* an external membrane, a peculiar ſpongy ſubſtance, and a longitudinal ſeptum, occupying its middle. The outer membrane is of a fibrous nature, very thick and firm, whitiſh in its colour, and beſtowing on the body its peculiar figure. Its external ſurface is covered with a denſe cellular tiſſue: on the inſide it adheres cloſely to the ſpongy ſubſtance. Thinner on the crura, in the groove lodging the urethra, and at the anterior extremity, it preſents in theſe ſituations a livid tint, produced by the contained blood, while it is thicker every where elſe, whitiſh, and opake. In the former ſituations there are ſome perforations for the admiſſion of blood-veſſels. It is continuous and ſtrongly interwoven with the perioſteum of the os innominatum, at the origin of the crura. It partakes entirely of the characters belonging to fibrous organs; and is made up of fibres variouſly interlaced, and forming ſeveral ſtrata. It is found to be very hard and reſiſting, when expoſed to the action of a cutting inſtrument. It experiences a paſſive dilatation from the influx of blood in erection, and returns to its former ſtate, when this extenſion goes off. It does not ſeem to poſſeſs any vital properties.

The ſpongy matter of the corpus cavernoſum is a cellular ſubſtance, compoſed of very fine and numerous plates and fibres detached from the internal ſurface of the fibrous membrane, and decuſſating each other in every direction. Its cells are all communicated together, and are more or leſs filled with blood, which can be removed by forcible ſqueezing, or repeated waſhings. Various fibrous threads croſs the cellular ſubſtance in different ſituations, and are attached to the ſurface of the fibrous membrane. They are ſaid to prevent exceſſive diſtention of the corpora cavernoſa. An artery and a vein paſs through the centre of the cellular ſubſtance on each ſide, from behind forwards. Their minute ramifications muſt, undoubtedly, communicate with the cells of the organ, ſince injection will paſs from the arteries into theſe cells; and injected fluids or air, after filling the corpus cavernoſum, gain admiſſion into the veins. The blood contained in the corpus cavernoſum has always a dark livid appearance in the dead body; but it is red during life, as may be ſeen in amputation of the penis, or in living animals. Its quantity varies very conſiderably, according to the condition of the penis; when it is increaſed, the whole corpus cavernoſum is diſtended; from the bony origin to the glans, it is elongated and hardened, and erection is produced.

The ſeptum of the penis divides it longitudinally into two portions, which moſt anatomiſts conſider as diſtinct tubes, under the name of corpora cavernoſa. In order to ſee it well, the fibrous membrane ſhould be cut through on each ſide of the penis, and all the ſpongy ſubſtance removed; the ſeptum will then be found continuous, by its two edges, with the fibrous membrane, and compoſed of ſtrong whitiſh fibres, not forming an entire plane, but leaving intervals between them, at which the two ſides of the corpus cavernoſum communicate freely. From this ſtructure the name of ſeptum pectiniforme has been derived. The intervals between the fibres are larger towards the inferior than the ſuperior edge of the ſeptum. At the part where the two crura meet together, the ſeptum is complete, it degenerates into ſeparate faſciculi towards the oppoſite end of the organ, and the intervals between theſe are more conſiderable, as we approach nearer to the front extremity.

The dimenſions of the penis are determined in great meaſure by the corpus cavernoſum; and to this body the organ owes that firmneſs in the erected ſtate, which enables it to fulfil its office in the buſineſs of generation.

Each of the crura penis gives attachment at its origin to a tolerably ſtrong muſcle, named the *erector* penis, probably, becauſe when a power, capable of producing the effect indicated by that name, was ſought for by anatomiſts, this muſcle ſeemed to be their only reſource. At preſent the name appears very ill adapted, ſince the muſcles in queſtion obviouſly draw the penis downwards and backwards, inſtead of upwards and againſt the pubes. Thoſe who explain the erection of the penis, by the compreſſion of its vein, ſhould find out a power capable of elevating the organ againſt the bone, and of carrying it forwards. It has a tendinous origin, below the attachment of the crus penis, from the inner ſurface of the tuberoſity, and ramus of the iſchium. It paſſes forwards, upwards, and a little inwards, and is firmly implanted in the fibrous membrane of the crus penis. It will draw the corpus cavernoſum downwards, ſo as to bring it more nearly into a direction, ſuitable to the cavity of the vagina: it has a ſlight power of ſhortening the crus penis, and thereby expreſſing the blood into the anterior part of the organ, ſo as to increaſe its turgeſcence. Its origin and courſe render it completely incapable of compreſſing the large vein of the penis.

The *urethra*, which, in the female, belongs only to the urinary paſſages, conſtitutes moreover in man an eſſential part of the generative apparatus. Its length is very conſiderable, and its organization very complicated, in conſequence of the latter office. It has connections with almoſt all the parts belonging to this apparatus; the ejaculatory and proſtatic ducts open into it; it is cloſely connected to the corpus cavernoſum, and terminated by the glans. In the male ſubject it forms a canal extended from the neck of the bladder to the end of the penis, and giving paſſage to the urine and ſemen. Its length, which varies in different individuals, and in ſubjects of different ages, is about nine or ten inches in the adult. At its origin it penetrates the proſtate, paſſing forwards and downwards; it goes under the ſymphyſis pubis, and then aſcends in front of that part, between the two crura penis, in order to reach the inferior ſurface of the corpus cavernoſum, and become attached to the channel which we have already deſcribed. Being thus united to the corpus cavernoſum, it runs along the whole length of that body, and follows its direction. Laſtly, it traverſes the glans penis, and opens at its extremity, by a vertical ſlit with ſlightly rounded edges of a bright red colour. Hence the canal forms in its courſe curvatures reſembling thoſe of the letter S; but this is only when the penis is relaxed; for, in the erected ſtate, the curvature in front of the pubes, of which the concavity is turned downwards, is entirely effaced, and that only remains, which is below the pubes, and of which the concavity faces upwards.

The canal is divided into three portions, diſtinguiſhed from each other by their organization. The firſt, of about an inch in length, which paſſes through the proſtate, has received no name; the ſecond, of about equal extent, continued from the proſtate to the bulb, is called the membranous portion; the latter correſponds above to the inferior ſurface of the ſymphyſis pubis, but is about half or three quarters of an inch below the bone. Below it is connected by cellular ſubſtance to the ſurface of the rectum, and at the ſides, the front edges of the levatores ani are in contact with it. This part of the canal has been called the membranous portion, from a notion that the membrane of the urethra was covered here by no external inveſtment, but in fact it is cloſely ſurrounded by a thick ſtratum of muſcular fibres. The moſt interior of theſe are circular, and lie cloſe upon the membrane of the urethra. Mr. Wilſon has lately deſcribed ſome fibres, ariſing by a double tendon from the arch of the pubes, deſcending on each ſide of the urethra, and united under the canal. (See the Medico-chirurgical Tranſactions, vol. i.) Theſe fibres are connected in front with the accelerator urinæ, and behind with the levatores ani. They will compreſs the canal when they contract, and, by cloſing it at the time of emiſſion, will prevent the ſeminal fluid from being driven backwards by the action of the accelerator. The third portion of the urethra, including all the reſt of the canal, is called the ſpongy part. It begins by an oblong rounded portion, named the bulb of the urethra. This is ſituated below the union of the crura penis, between which it makes a remarkable prominence. Below, and on the ſides, it is covered by the accelerator urinæ (ſee ACCELERATOR), and by Cowper's glands. Together with the two preceding parts of the canal, the bulb forms the firſt curvature of the urethra, and its ſides are ſtrongly connected to the arch of the pubis by means of a fibrous expanſion, termed the triangular ligament of the urethra. The latter part poſſeſſes the figure, which its name indicates; the baſe of the triangle is turned downwards, the apex upwards, correſponding to the junction of the oſſa pubis, and the ſides are attached to the rami of the pubes. It is perforated by the paſſage of the urethra, which it holds firmly in its relative ſituation to the bone. In the reſt of its extent, the ſpongy portion of the urethra correſponds above to the channel in the under ſurface of the corpus cavernoſum. Below, it is covered near the bulb by the accelerator, then by the cellular ſubſtance of the ſcrotum, and afterwards by the integuments of the penis.

The diameter of the canal is by no means uniform in its whole length. It is large in the middle of the proſtate, and ſmaller where it enters and leaves the gland. The canal is here rather flattened laterally. In the membranous portion it is perfectly cylindrical, but ſmall in its ſize; and the narroweſt portion of the whole canal is juſt where the bulb and membranous part join. In the bulb it is again conſiderably enlarged, and after contracting ſlightly, preſerves a cylindrical figure and uniform ſize to the baſe of the glans. There it again dilates, and forms what ſome anatomiſts have called the foſſa navicularis; its anterior opening is ſomewhat narrower. Mr. Home took the trouble of aſcertaining the dimenſions of the canal by filling it with wax, and meaſuring the caſt thus formed. The length was nine inches; from the external orifice to the bulb, ſeven. The membranous portion was $1\frac{1}{2}$ inch, and the proſtatic part of the canal half an inch. The diameter of the caſt, at $\frac{3}{4}$ of an inch from the external orifice, was 9-20ths of an inch in a ſubject of 80 years, and 7-20ths in one of 30 years; at $4\frac{1}{2}$ inches from the external orifice 7-20ths; at the bulb of the urethra 12-20ths; in the membranous part, immediately adjoining the bulb, 7-20ths; in the middle of the proſtate 11-20ths; at the neck of the bladder 9-20ths. Home on Strictures, vol. i. p. 24, and 25.

The ſituation of the eminence, on which the ejaculatory ducts open, called the veru montanum, in the proſtatic part of the urethra, and its figure, have been already noticed; as well as the openings of the proſtatic ducts in the ſame part of the canal. In the reſt of its extent, the internal ſurface of the canal poſſeſſes a reddiſh colour In the membranous and ſpongy portions, longitudinal folds are obſervable, diſappearing on extenſion. Theſe are not ſeen in the proſtate, nor at the glans, becauſe the firm texture of the parts which adhere ſo very cloſely to the mucous membrane, keeps it conſtantly ſmooth. Hence the diameter of theſe parts is nearly uniform at all times. The ſides of the canal exhibit openings of numerous ſmall oblique ducts, frequently named after Morgagni. Theſe are only ſeen in that part of the urethra which is in front of the bulb, and are ſometimes called lacunæ; their number and ſize vary in different ſubjects. They run from behind forwards, and terminate by ſimple oblique orifices. They are always very numerous about the foſſa navicularis, from which ſome have explained the circumſtance of this part being particularly affected in gonorrhœa. They conſiſt of ſhort canals, formed in the membranous ſides of the urethra, lined by a continuation of the internal membrane of this canal, and about large enough to admit a large hog's briſtle. They are of various lengths, but commonly about a quarter of an inch. Sometimes ſeveral ſmaller join into one larger duct. If carefully examined, their whole number will not be found leſs than 60 or 70. No glandular apparatus can be diſcerned connected with them. In theſe tubes the mucous fluid is ſecreted, by which the ſurface of the urethra is ſmeared, and defended from the action of the urine. Where theſe lacunæ do not exiſt, as in the bulb, membranous portion and proſtate, a protecting fluid is furniſhed from other ſources, as Cowper's glands and the proſtate. The fluid of the lacunæ ſeems to be a clear viſcid ſecretion, ſimilar in appearance and tenacity to the white of egg. In this form it can be expreſſed from the openings on the ſurface of the urethra. Under various circumſtances of diſeaſe it is increaſed in quantity, and variouſly altered from its natural properties, as in gonorrhœa and gleet, and in ſtricture. In ſome of theſe inſtances, it is a clear, tranſparent, viſcid fluid, being the natural ſecretion in a more abundant form.

The ſides of the urethra are differently organized in different parts; it is lined indeed throughout by a mucous membrane, but this is covered externally by very different ſtructures. Where the canal is paſſing through the proſtate, the ſides are formed merely by the mucous membrane, cloſely united to the gland by a denſe cellular texture. The firm ſubſtance of the proſtate, ſo intimately connected with the canal, gives to it a ſtrength and thickneſs in this part. The membranous portion is differently circumſtanced; this is the thinneſt, and leaſt firmly ſupported diviſion of the canal, and, as it is placed in the bend of the urethra, is particularly liable to injury in the employment of the catheter. Even here the membrane is covered by a denſe cellular texture, continued from the proſtate, and by the muſcular fibres already deſcribed. In the ſpongy portion of the urethra, the ſides of the canal are covered by a ſubſtance of peculiar organization, analogous in its effects to that which fills the corpora cavernoſa penis. This is called corpus ſpongioſum urethræ, or corpus cavernoſum. It begins in front of the membranous part of the canal, by a large protuberance already mentioned, as the bulb of the urethra. It forms an oblong rather elongated production, hanging between the crura penis and below the canal of the urethra, ſometimes bearing a ſlight appearance of diviſion into two lateral parts by a middle line, and terminating behind by a rounded end. The bulb correſponds only to the inferior ſurface of the urethra; but a thinner layer of the corpus ſpongioſum, continued from the bulb, covers the urethra on all ſides in front of that body to the end of the canal. Here it is again increaſed in quantity, and reflected over the anterior extremity of the corpus cavernoſum penis, to form the glans. The ſpongy ſubſtance ſurrounds the urethra uniformly on all ſides. It is cloſely connected to the corpus cavernoſum above by cellular ſubſtance, and by veſſels which are ſeen when the urethra is detached from its channel; below and on the ſides it is covered by a cellular ſheath, common to it with the corpus cavernoſum penis. The external ſurface of the corpus ſpongioſum conſiſts of a thin but compact fibrous layer; and the interval between this and the mucous membrane ſeems to be filled by a very fine cellular net-work, the cells of which contain venous blood. The tenuity of the external layer occaſions the part to poſſeſs a livid colour, as the tint of the blood is diſcernible. This net-work is covered in the glans by a highly organized ſpecies of ſkin, through which the colour of the venous blood is not diſcernible. The corpus ſpongioſum does not conſiſt, according to the common opinion, of a cellular texture; but it is made up of very ſmall and repeatedly convoluted veins, as may be aſcertained diſtinctly enough by inſpecting attentively the ſurface of it, when ſucceſsfully injected: this ſtructure is more evident in ſome animals, as particularly in the dog. The bulk of the corpus ſpongioſum depends on the quantity of blood which it contains; and this part admits of the ſame diſtinction, as the ſpongy ſubſtance of the corpora cavernoſa penis, and for the ſame purpoſes. Air, impelled into any part, finds its way readily over the whole extent of the ſubſtance, and the ſame circumſtance may be obſerved of injection. It may be readily injected from the large vein at the back of the penis; but the valves ſometimes prevent the ſucceſs of this attempt.

The canal of the urethra is lined by a mucous membrane, continuous with the lining of the bladder at one extremity, and with the cutaneous covering of the glans at the other, and ſending prolongations into the mucous ſinuſes of Morgagni, the ducts of Cowper's glands, the ejaculatory ducts, and thoſe of the proſtate. Its ſurface is perfectly ſmooth, excepting the longitudinal wrinkles, which are effaced by extenſion. The colour is a bright red at the external orifice, and in the foſſa navicularis: in other parts it appears pale, when the blood has been expreſſed from the corpus ſpongioſum. But the injection of coloured fluids proves that it receives every where an abundant ſupply of blood-veſſels. Its ſubſtance is very thin, and the opinion of its being covered by a continuation of the epidermis does not ſeem to be at all well-founded, as there is a well marked line of ſeparation at the glans, and no cuticle can be ſhewn in the canal. The external ſurface is rough and cellular for its connection to ſurrounding parts. No appearance of muſcular ſtructure can be diſcerned in any part of the membrane. The introduction of an inſtrument ſhews this membrane to poſſeſs acute ſenſibility; and the repetition of the practice evinces the force of habit in blunting ſuch feelings. The firſt time of paſſing a bougie or ſound is ſometimes attended with fainting, and almoſt always with ſharp pain, but after a few times, no unpleaſant ſenſation is excited. The paſſage of the urine is attended ordinarily with no ſenſation; but this becomes moſt acutely painful when the membrane is inflamed. It has been much diſputed whether or no this canal poſſeſs a contractile power in its own lining. The phenomena are ſtrongly in favour of the affirmative, although no muſcular fibres have been demonſtrated. The temporary obſtruction to the flow of urine, under circumſtances of diſeaſe, and the ſudden ceſſation of this inconvenience, can hardly be [illegible]ile force to the membrane. [illegible] from the canal is [illegible] ſame kind. That the urethra is extenſible, and that it returns again to its original ſize, is proved by the paſſage of inſtruments. Haller ſtates that chemical ſtimulants will cauſe it to contract.

The *glans* is the body ſurmounting the anterior and upper part of the corpus cavernoſum penis, and forming the front extremity of the organ, of which it augments the length in a trivial degree. It has the form of a cone, ſlightly flattened from before backwards, with its baſe very obliquely truncated. Its apex preſents the aperture of the urethra already deſcribed. Below this, is placed the frenum connecting it to the prepuce; and on each ſide of this fold it ſwells into a ſmall convex protuberance (colliculi glandis). This part is called by Haller "ſenſus acerrimi ſedes." The glans cannot be ſaid to extend below the urethra, as that part belongs to the corpus ſpongioſum. Since the baſis is ſo obliquely truncated, the depth of the organ is very inconſiderable at the two convexities already named; but it is much more conſiderable above, where it is produced over the corpus cavernoſum, and terminated by a thick riſing edge of a ſemi-lunar outline, with the convexity turned backwards, called the corona glandis. This margin, ſufficiently thick and prominent to elevate the integuments, and cauſe a perceptible riſing externally, forms the front boundary of a cul-de-ſac, or gutter, cauſed by the reflection of the inner membrane of the prepuce over the glans. Below, the corona glandis is interrupted by a ſmall groove, which extends to the orifice of the urethra, and gives attachment to the fold which forms the frenum. In ſome ſubjects this groove is hardly perceptible. The colliculi glandis are continuous below with the corpus ſpongioſum; the baſis of the glans is hollowed out, and the anterior extremity of the corpus cavernoſum penis is received into the concavity. In conſequence of this ſtructure, although the glans appears to be an inch or more in length, it makes very little addition to the length of the penis.

The ſubſtance of the organ conſiſts of a ſpongy matter ſimilar to and continuous from that of the urethra. Air or injected fluids paſs readily from one into the other. This matter is made up, as in the urethra, of convoluted veins, and it admits of the ſame changes of laxity and erection from the ſame cauſes. Sometimes there is an appearance as if the corpus ſpongioſum urethræ and the glans were ſeparated from each other by a ſeptum. The ſubſtance of the glans is always more denſe, and contains leſs blood than that of the urethra. The ſurface of the organ is covered by a very vaſcular and delicate production of the integuments, continuous towards the apex of the glans with the mucous lining of the urethra, and at its baſis with the inner layer of the prepuce. This covering is very thin, and ſmooth and ſoft to the touch. Its external ſurface is compoſed of a delicate epidermis; this is ſucceeded by a layer of the true ſkin, of a very ſoft and delicate ſtructure, covered with numerous ſmall villous proceſſes, which are moſt diſtinctly ſeen about the corona glandis. The moſt favourable method of obſerving theſe villi is to plunge the part in boiling water, which ſeparates the cuticular covering; they are then viſible in vaſt numbers over the whole ſurface, giving it an irregularity in its appearance. This circumſtance in the ſtructure of the glans was firſt demonſtrated by Albinus (Annot. Academ. lib. iii.), and is admitted by Ruyſch and Winſlow, although ſome anatomiſts have queſtioned it, probably becauſe the demonſtration is rather difficult. That the nerves of the organ are continued into theſe papillæ, as they are in the tongue, and that the exquiſite ſenſibility of the glans ariſes from this organization, is rather matter of probable conjecture, than the reſult of direct proof. The blood-veſſels of this cutaneous production are numerous, ſo that a general redneſs is produced by minute injections. The oppoſed ſurfaces of the glans and prepuce are ſmeared over with a white, friable, and unctuous ſubſtance, of a very peculiar odour, moiſtening the parts and preventing the effects which might otherwiſe follow their mutual attrition. In animals there are manifeſt glands to ſecrete this ſubſtance, and an apparatus of glandular ſtructure deſtined to the ſame office has been deſcribed in man. This kind of ſebaceous matter is formed in other ſituations of the body by peculiar glandular organs, as in the eye-lids by the Meibomian glands; and the notion that it is depoſited by the urine, which is contrary to all obſervation, and to every thing we know of the properties of that fluid, would be immediately overturned by the fact, that a ſimilar depoſition occurs under the preputium clitoridis of the female, where the urine could not form it. Although in many ſubjects no glands can be ſeen, they are occaſionally obvious enough, and are now univerſally admitted, under the name of glandulæ odoriferæ. Morgagni, in his Adverſaria, has given a very particular deſcription of them, and Haller confirms his ſtatements. They are hardiſh, white, and very ſmall bodies, particularly obſervable about the corona glandis, and in the channel behind that part, where the prepuce is reflected. Morgagni alſo mentions them near the frenum in the prepuce. "I have ſeen," ſays Haller, "five rows of them in the corona, but their number diminiſhed towards the frenum, ſo that no more than two rows could be ſeen." They can be obſerved moſt advantageouſly when the cuticle has been removed. That the orifices of theſe bodies can be ſeen, and their ſebaceous contents ſqueezed out, is not ſo clearly aſcertained; but both theſe facts are aſſerted by competent witneſſes. They may be rendered more evident when enlarged in diſeaſe; and might be miſtaken for venereal pimples, if their ſymmetrical arrangement did not throw light on the appearance. That the matter ſecreted by theſe glands accumulates under the fore-ſkin, in the form of a white, ſoft, and greaſy ſubſtance, where the neceſſary attentions to perſonal cleanlineſs are neglected, and that in hot weather, it may become acrid and irritating, ſo as to produce excoriation and even ulceration, are well known facts. The inhabitants of warm climates are chiefly expoſed to theſe inconveniences, and the moſt important advantage of circumciſion conſiſts in its obviating ſuch accumulations. Hence we know that Chriſtians, living under the burning ſun of Senegambia, ſubmit to this operation, and that uncircumciſed Europeans, living in the Eaſt, very frequently experience the ill effects ariſing from the ſource juſt alluded to. For this reaſon Guido de Cauliaco, a celebrated ſurgeon of his time, about the middle of the fourteenth century, obſerved that circumciſion was uſeful to many others beſides Jews and Saracens: "propterea quod non congregantur ſordities in radio balani et calefacerent ipſum." Chirurgiæ, tr. vi. doctr. ii. p. iii. iii.

The glans penis poſſeſſes a very exquiſite ſenſibility, particularly in perſons where it is habitually covered by the prepuce; this feeling is only obſerved on certain occaſions, and is the ſource of that phyſical ſenſation experienced at the expulſion of the ſeminal fluid. It ſwells and becomes firm in the act of erection, as well as the reſt of the penis.

The cutaneous covering of the penis is continuous, at one end, with that of the ſcrotum and pubes, and at the other with the prepuce. It is thin, furniſhed with numerous ſebaceous glands, particularly at the under ſurface, and marked in that ſituation by a rough line, called the raphé, running along the middle of the organ, and continued with a ſimilar one on the ſcrotum. It is darker coloured than the integuments in general, and has a few hairs towards the root of the organ. The cellular texture connecting the ſkin to the penis is very looſe, and contains no fat except cloſe to the pubes; hence the ſkin adapts itſelf with the greateſt facility to the varying bulk of the organ, falling into wrinkles in the collapſed ſtate, and extended more ſmoothly in the erected condition. It is continuous with the cellular ſubſtance of the ſcrotum, groins, and pubes, and air paſſes readily between them. Towards the ſurface of the corpus cavernoſum it becomes more denſe, and aſſumes the form of a regular membranous covering; it is more and more looſe towards the ſurface, and has, when inflated, a cottony appearance. The ſuſpenſory ligament of the penis is placed at the root of the organ, which it unites to the ſymphyſis pubis. It conſiſts of a denſe, cellular, elongated, and flattened band, proceeding from the front of the ſymphyſis pubis, running along the cellular tiſſue of the organ, and expanded under the ſkin. Its limits and figure are not very determined, and the knife of the diſſector often influences its ſize and appearance.

The prepuce or fore-ſkin is a looſe fold of the cutaneous covering of the penis, continued over the glans, without adhering to it, and affording a more or leſs complete covering to the extremity of the penis. Its length varies in different individuals; ſometimes it is produced conſiderably in front of the glans, and its opening is then generally ſmall. Its external ſurface offers the ſame ſtructure and appearance as the integuments covering the body of the penis, and is ſmooth or wrinkled, according to the ſtate of the organ. The inner ſurface, much ſofter to the touch, is in contact with the glans, to which it has a membranous attachment below, termed the frenum. The latter is continuous, on one ſide, with the internal membrane of the prepuce, and fixed, on the other, to the ſmall longitudinal groove which we have deſcribed in the under part of the glans; and it ends in this ſituation by a prominent line fixed to the very opening of the urethra. The frenum limits the extent to which the retraction of the prepuce can be carried; but allows the organ either to be brought ſufficiently forwards to cover the whole glans, or to be carried backwards far enough to expoſe its whole ſurface. In the latter ſtate the frenum is on the ſtretch, and, if the prepuce be moved forcibly in this direction, it may even be torn, as in coition: this accident is particularly likely to occur, if the ſhortneſs of the fold allows only a partial expoſure of the glans. Such a diſpoſition of parts rendering the act of copulation painful, might require a ſection of the frenum. The baſis of the prepuce is attached, on the inſide, to the baſe of the glans, behind which it is reflected ſo as to line the ſmall channel already deſcribed in this ſituation. Its apex forms a large round opening, of a ſufficient magnitude, in general, to allow the part to be drawn entirely back behind the glans; and, even where it is more contracted, much larger than the orifice of the urethra. In ſome caſes its opening is ſo ſmall as not to allow the retraction of the organ, and even to obſtruct the flow of urine; this conſtitutes phymoſis: in others, it can be withdrawn, but the tightneſs is ſo great that it may not be poſſible to reſtore it; that is termed paraphymoſis. It has been aſſerted of ſome races in the Eaſt that the prepuce is unuſually long, and that this ſtructure particularly favours the accumulation of the matter ſecreted by the glandulæ odoriferæ; ſo that circumciſion has been more eſpecially neceſſary on that account.

The integuments of the penis, having arrived at the baſe of the glans, are continued forwards to its apex, as far as the opening of the prepuce. There they acquire a different organization, are folded back in a contrary direction, and terminate by a firm attachment round the baſis of the glans. The two layers, of which the exterior does not differ from the ſkin of the penis, except in being thinner, are connected by a ſtratum of very looſe cellular ſubſtance, perfectly free from fat. The laxity of this cellular matter is ſo conſiderable, that, when the prepuce is withdrawn as far as poſſible, the two component layers are no longer in contact, but ſeparated completely. The ſurfaces, by which they before adhered, are now applied to the corpora cavernoſa, and the integuments of the penis are withdrawn towards the pubes. The prepuce ſeems deſigned to protect the glans, and defend it from the effects of contact, and rubbing againſt external objects. Yet it is not eſſential to the functions of the organ, that it ſhould poſſeſs ſuch a covering, as the deſtruction of it by circumciſion or diſeaſe proves. The covering of the glans becomes afterwards thicker and harder, but the peculiar ſenſibility, excited in the performance of the generative functions, does not ſeem to be diminiſhed.

The arteries of the male generative organs are chiefly furniſhed by the trunk of the pudendal; but the proſtate and veſiculæ ſeminales receive branches alſo from the veſical arteries. The integuments of the external parts have branches from the perineal artery, and from the veſſels of the thigh. The veins of the penis unite, for the moſt part, into a large trunk at the middle of the upper ſurface of the organ, which paſſes under the ſymphyſis pubis, and opens into a large plexus ſurrounding the proſtate and neck of the bladder. Theſe end partly in the hypogaſtric veins, and partly in the inferior meſenteric. Beſides theſe there are ſuperficial veins in the prepuce and penis, terminating in the ſaphena and femoral vein. The lymphatics of the penis are divided into ſuperficial and deepſeated. The former ariſe from the prepuce and integuments, and go to the ſuperficial inguinal glands. The latter, ariſing from the urethra and corpus cavernoſum, enter the pelvis in company with the branches of the pudendal artery, and join the hypogaſtric plexus. The nerves of the penis are of conſiderable ſize, and are derived principally from the 2d, 3d, and 4th ſacral pairs.

Developement of the Male generative Organs.—As the function of generation does not commence until a conſiderable period after birth, the developement of its organs in the human ſubject follows a law derived from this circumſtance. They undergo no remarkable change from birth till the age of puberty, at which time the proceſs of nutrition is carried on in them with great activity. But they may be obſerved at an early period in the fœtus, where, without having any remarkable predominance over other parts, they are conſiderably advanced, as if nature, in ſketching out the organization, had wiſhed to mark decidedly the diſtinguiſhing ſexual traits.

In the fœtal ſtate, we ſhall deſcribe merely the condition of the teſtis and ſpermatic cord, as theſe are the only parts differing eſſentially at that time from the ſtate in which they are found in the newly born child. The reſt of the generative apparatus undergoes no remarkable changes, until the time of birth, and we ſhall therefore not notice them until that time.

There is no part in the body which undergoes ſo remarkable a change in its ſituation as the teſticle; and, if it be interrupted in this proceſs, a particular diſeaſe is very commonly occaſioned. This organ, which, at its firſt formation, lies in the abdominal cavity at the inferior margin of the kidney, ſurrounded by the inteſtines, paſſes in the advanced periods of utero-geſtation into the ſcrotum, and, as the canal through which it deſcended is ſhut up, never regains its original ſituation. At the time of birth, or very ſoon after, man and moſt other mammalia have both teſticles in the ſcrotum. This remarkable change was firſt noticed and deſcribed about the middle of the laſt century, when many celebrated anatomiſts turned their attention to it, inſomuch that it is difficult to determine with whom the credit of being the firſt deſcriber reſts. The peculiar kind of rupture, called hernia congenita, which takes place when the deſcent of the teſtis is not accompliſhed in the regular manner, was the circumſtance which principally led to the diſcovery, and more minute inveſtigation of the facts. When ſurgeons began to reaſon on the cauſes and ſeats of ruptures, and the ſtructure of the hernial ſac, they naturally turned their attention towards theſe parts, and ſoon diſcovered that kind of the complaint in which the parts occupy the canal formed by the deſcent of the teſtis, and to which the name of congenital was given, becauſe the ſtate of parts favouring its occurrence commonly exiſts at the time of birth. The examination of the origin and peculiarities of this affection, led to a complete elucidation of the whole affair, in a ſeries of excellent publications.

Reneaulme de la Garaune, a French ſurgeon, who wrote a treatiſe on ruptures in 1726, has the firſt hint on the ſubject; he ſpeaks of the inteſtines and omentum eſcaping through the ſame canal at which the teſtis has paſſed out. Among the numerous claims, which the great Swiſs phyſiologiſt poſſeſſes, to the gratitude and reſpect of all medical men, is that of having given the firſt clear account of this matter. Indeed, there is hardly any part of the ſubject which has not been diſcuſſed and explained in the writings of this great man; and, as the obſervation of La Garaune is a ſingle and indirect hint, we muſt aſſign the honour of the diſcovery entirely to Haller. (See Commerc. litterar. Norimberg. 1735, p. 197; 1737, p. 3. Programma, herniarum obſervationes aliquot. Goetting, 1739. Opuſcula pathologica, Lauſanne, 1755.) Soon after theſe publications, the ſubject was taken up in England by the Hunters. Dr. W. H. according to his brother's ſtatement, had found both teſtes lying in the abdomen in a ſtill-born child of ſeven or eight months, ſome years before the publication of Haller's "Opuſcula Pathologica," and could not explain the matter to his ſatisfaction. Mr. J. Hunter publiſhed a very full and accurate account of the original ſituation, and of its change in the teſtis. (See Medical Commentaries, p. 1. Lond. 1762, cap. ix.) About the ſame time the obſervations of Mr. Pott were made public. The vaſt practical opportunities enjoyed by this gentleman enabled him to explain all the pathological circumſtances connected with the deſcent of the teſtis; his knowledge of the anatomy was probably derived from the ſources already pointed out. (See account of a peculiar kind of rupture frequently attendant upon new born children, and ſometimes met with in adults, London, 1765. Treatiſe on the Hydrocele, ſect. 3. p. 12. Chirurgical obſervations and caſes relative to ruptures, ſect. 2.) Camper, who united ſo ſucceſsfully anatomical and ſurgical purſuits, inveſtigated this matter with conſiderable attention, and gave the reſults of his labours to the public in the Haarlem Tranſactions, v. 6. and 7. The works of Neubaur and Lobſtein muſt not be omitted in this enumeration; that of the former is entitled, "De tunicis vaginalibus teſtis et funiculi ſpermatici." Gieſſæ, 1767. The diſſertation of the latter, "De hernia congenita, inqua inteſtinum in contactu teſtis eſt," Argentorat 1771, contains a very excellent and complete account of the whole matter, both in an anatomical

cal and ſurgical point of view. In addition to theſe we have to notice, as containing good deſcriptions and uſeful information, the following more modern works. Girard's Appendix adjecta tabulis poſthumis Santorini. Palletta nova gubernaculi teſtis Hunteriani et tunicæ vaginalis anatomica deſcriptio. Mediolani, 1777. Brugnone de teſtium in fœtu poſitu, &c. Wriſberg obſervationes anatomicæ de teſticulorum ex abdomine in ſcrotum deſcenſu, &c. in the Gottingen commentaries for 1778. Vicq d'Azyr recherches ſur la ſtructure et la poſition des teſticules, &c. in the Memoires de l'Acad. des Sciences, année 1780. Martin commentarius de herniæ congenitæ ortu, &c. in the Nova Acta Reg. Soc. Scient. Upſal. v. 3. Sandifort icones herniæ congenitæ, Lugd. Bat. 1781, 4to.

Until the approach of birth, the teſtes of the fœtus are lodged within the cavity of the abdomen, and may therefore be reckoned among the abdominal viſcera. They are ſituated immediately below the kidneys, on the fore-part of the pſoæ muſcles, and by the ſide of the rectum, where this inteſtine is paſſing down into the cavity of the pelvis; for in the fœtus, the rectum, which is much larger in proportion to the capacity of the pelvis, than in the full-grown ſubject, lies before the lumbar vertebræ, as well as before the ſacrum. Indeed the caſe is nearly the ſame with regard to all the contents of the pelvis; that is, their ſituation is much higher in the fœtus than in the adult; the ſigmoid flexure of the colon, part of the rectum, the greateſt part of the bladder, the fundus uteri, the Fallopian tubes, &c. being placed in the fœtus above the hollow of the pelvis, in the common or great abdominal cavity. At this time the figure of the gland is much the ſame as in the adult, and its poſition is the ſame as when it is in the ſcrotum, that is, one end is placed upwards, the other downwards; one flat ſide is to the right, the other to the left; and one edge is turned backwards, the other forwards. But as the teſtis is leſs firmly connected to the ſurrounding parts, while it is in the loins, its poſition may vary a little. The moſt natural ſeems to be when the anterior edge is turned directly forwards; but the leaſt touch will throw that either to the right ſide, or to the left, and then the flat ſide will be turned forwards. It is attached to the pſoas muſcle all along its poſterior edge, except juſt at its upper extremity. This attachment is formed by the peritoneum, which covers the teſtis and gives it a ſmooth ſurface, in the ſame manner as it envelopes the other looſe abdominal viſcera. The epididymis lies along the outer and poſterior edge of the organ, in the ſame relative poſition, which it occupies at a more advanced age. This part is larger in proportion, and adheres behind to the pſoas. When the fœtus is very young, the adheſion of the teſtis and epididymis to the pſoas is very narrow, the part is conſequently more looſe and prominent. As its age advancees, the adheſion becomes broader and tighter. The blood-veſſels, like thoſe of moſt parts of the body, commonly ariſe from the neareſt large trunks; *viz.* from the aorta and cava, or from the emulgents. The nerves too come from the neareſt ſource; that is, from the abdominal plexuſes of the intercoſtal. In reſpect, therefore, to its ſupply of nerves and of veſſels, this organ may be reckoned an abdominal viſcus; and this circumſtance of its peculiar ſituation before birth accounts for its being ſupplied afterwards from ſo remote a ſource.

The vas deferens, inſtead of running upwards from the lower end of the teſtis, as it does at a more advanced period of life, goes downwards and inwards in its whole courſe; it continues, indeed, in the direction of the epididymis. It turns inwards from the lower end of that organ, behind the upper extremity of the gubernaculum, which we ſhall deſcribe preſently; then it goes over the iliac veſſels, and the inſide of the pſoas muſcle, ſomewhat higher than in the adult, and paſſes afterwards, in the direction already deſcribed, along the bladder. The cremaſter muſcle turns upwards, inſtead of deſcending over the pubes, and ſeems to be loſt on the peritoneum near to the teſtis.

No ſpermatic cord exiſts at the time of life we are now conſidering. The arteries and veins of the teſtis go behind the peritoneum, connected to it by looſe cellular ſubſtances, and enter the ſubſtance of the organ at its poſterior edge, where the peritoneum is reflected over it, juſt as the veſſels of the inteſtines paſs between the laminæ of the meſentery or meſocolon. The vas deferens alſo goes behind the peritoneum from the teſtis to the bladder.

While it remains in the abdomen, the teſtis is connected in a very particular manner with the parietes of the cavity, and with the ſcrotum, at the place where the ſpermatic veſſels paſs out. This connection is by means of a ſubſtance, which runs down from the lower end of the teſtis to the ſcrotum, and which Mr. Hunter named the ligament, or gubernaculum teſtis, becauſe it connects the organ with the ſcrotum, and, as he conceived, directs its courſe in its deſcent. It has been deſcribed alſo under the names of ligamentum ſuſpenſorium, baſis, and cylindrus. It is of a pyramidal form; its largeſt part is placed upwards, and fixed to the lower end of the teſtis and epididymis, while the lower and ſlender extremity is loſt in the cellular membrane of the ſcrotum. The upper part of the gubernaculum is within the abdomen, before the pſoas, and reaches from the teſtis to the abdominal muſcles. It runs into the ſcrotum through the ſame opening that is afterwards occupied by the ſpermatic veſſels, and is there loſt. That portion of it which is within the abdomen is covered by the peritoneum, except at its poſterior part, which is contiguous to the pſoas, and connected with it by the reflected membrane and cellular ſubſtance. Its colour is white, and it may be diſtinguiſhed by this circumſtance from the teſtis, which is of a reddiſh-grey. The texture is ſoft, and has a fibrous vaſcular appearance. "It is covered," ſays Mr. Hunter, "by the fibres of the cremaſter muſcle, which is placed immediately behind the peritoneum: this is not eaſily aſcertained in the human ſubject, but is very evident in other animals, more eſpecially in thoſe whoſe teſticles remain in the cavity of the abdomen after the animal is full grown." He obſerves again, "that in the human fœtus, while the teſtis is retained in the cavity of the abdomen, the cremaſter is ſo ſlender, that I cannot trace it to my own ſatisfaction, either turning up towards the teſtis, or turning down towards the ſcrotum." The peritoneum, which covers the teſtis and its gubernaculum, is firmly united to the ſurfaces of thoſe two bodies; but all around, that is, on the kidney, the pſoas, the iliacus internus, and the lower part of the abdominal muſcles, that membrane adheres very looſely. Where it is continued, or reflected from the abdominal muſcles to the ligament of the teſtis, it paſſes firſt downwards a little way, as if paſſing out of the abdomen, and then upwards, ſo as to cover more of the ligament than what is within the cavity of the abdomen. At this place the peritoneum is very looſe, thin in its ſubſtance, and of a tender gelatinous texture; but all around the paſſage of the ligament it is conſiderably tighter, thicker, and more firm. When the abdominal muſcles are pulled up, ſo as to tighten or ſtretch the peritoneum, this membrane remains looſe at the paſſage of the ligament, while it is braced or tight all around; and in that caſe, the tight part forms a kind of border, or edge, around the looſe doubled portion, where the teſtis is afterwards to paſs. If the parts are drawn towards the abdomen, there is no appearance of an aperture, or paſſage, down towards the ſcrotum: but when the latter and the ligament are drawn downwards, then there is an aperture from the cavity of the abdomen all round the fore-part of the ligament, apparently ready to receive the teſtis. This aperture becomes larger when the teſtis deſcends lower, as if the pyramidal ligament was firſt drawn down, in order not only to direct, but to make room for the teſtis, which muſt follow it. The aperture is ſometimes ſo large that the teſtis can be puſhed into it, as far as the tendon of the external oblique muſcle.

From this original ſituation in the abdomen, the teſtis moves downwards, at a certain period, to its deſtined ſtation in the ſcrotum. Its lower extremity comes into contact with the lower part of the abdominal parietes. At this time, the upper part of the ligament, which hitherto was in the abdomen, has ſunk downwards, and lies in the paſſage from the abdomen to the ſcrotum, which is afterwards to receive the teſtis. As the latter paſſes out, it inverts the gubernaculum, going down behind it: what was the anterior ſurface of that organ now becomes poſterior, and compoſes the lower and anterior portion of the tunica vaginalis. Mr. Hunter ſtates, that the place where the ligament is moſt confined, and where the teſtis meets with moſt obſtruction in its deſcent, is the ring in the tendon of the external oblique muſcle; and, conſequently, that where the teſtes are not in the ſcrotum, they are more frequently lodged immediately within the tendon of that muſcle, than included in the cavity of the abdomen. The teſtis commonly remains for ſome time by the ſide of the penis, and deſcends only by degrees to the bottom of the ſcrotum. When it has entirely deſcended, the ligament is no longer viſible.

While the teſtis is deſcending, and even when it has paſſed into the ſcrotum, it is ſtill covered by the peritoneum, and is connected by its poſterior edge exactly in the ſame manner as when it was within the abdomen. The ſpermatic veſſels run in the ſame way behind the membrane, the teſtis is fixed backwards to the parts againſt which it reſts, and is unconnected and looſe forwards, as it was when in the abdomen. In its deſcent the teſtis brings the peritoneum with it; but the elongation of that membrane, though it reſembles, in ſome circumſtances, a common hernial ſac, in others is very different. If a perſon can repreſent to himſelf a hernial ſac reaching to the bottom of the ſcrotum, and covered by the cremaſter; if he can imagine, further, that the poſterior half of the bag covers, and is united with the teſtis, epididymis, ſpermatic veſſels, and vas deferens, while its anterior half lies looſe before all thoſe parts, he will have a perfect idea of the ſtate of the peritoneum and of the teſtis when it firſt deſcends into the ſcrotum. This gland, therefore, does not fall looſe, like the parts protruded in a rupture, into the elongation of the peritoneum; but it ſlides down from the loins, carrying the peritoneum with it, and both continue to adhere, by cellular membrane, to the parts behind them, as they did in the loins. The ductility of the peritoneum, and the looſeneſs of its connection to the parts ſurrounding the teſtis, are circumſtances which favour its elongation and deſcent into the ſcrotum with the teſtis.

It is plain, from this deſcription, that the cavity of the bag, or elongation of the peritoneum, which contains the teſtis in the ſcrotum, muſt at firſt communicate with the general cavity of the abdomen, by an aperture at the abdominal ring. That aperture has exactly the appearance of a common hernial ſac: the ſpermatic veſſels and vas deferens lie immediately behind it, and a probe paſſes readily through it from the general cavity of the abdomen down to the bottom of the ſcrotum. And if this proceſs of the peritoneum be laid open through its whole length on the fore-part, it will be plainly ſeen to be a continuation of the peritoneum; the teſtis and epididymis will be ſeen at the lower part of it; and the ſpermatic veſſels and vas deferens may be obſerved, covered by the poſterior part of the bag, in their whole courſe from the groin to the teſtis.

Before the teſtis has quitted the abdomen, the ſcrotum is ſmall and corrugated, and contains nothing but cellular ſubſtance. This is looſe, and yielding near the ring, but more denſe and cloſe below. Some have deſcribed a pouch of peritoneum paſſing through the ring, and therefore contained in the ſcrotum, previouſly to the deſcent of the teſtis: but this is not generally correct. There is no ſuch pouch while the gland remains near the kidney. The parts about the ring are ſurrounded by ſuch a looſe and cellular texture, that, by drawing the gubernaculum downwards, the peritoneum is carried with it ſo as to repreſent a ſmall cul-de-ſac. The teſtis, too, after it has paſſed the ring, may be drawn up again into the abdominal cavity, in conſequence of this laxity of the ſurrounding ſubſtance.

In the human body then, when the teſtis has recently come down, it is contained in a membranous bag, formed of an elongation of the peritoneum, and communicating with the abdomen by means of a narrow proceſs, aſcending in front of the ſpermatic cord. The parts remain in this condition throughout life in the quadruped, but in man the communication between the membranous covering of the teſtis and the abdomen is ſoon cut off. The upper end of the canal is cloſed firſt, and the aperture is obliterated ſo ſpeedily, that there is ſeldom any communication in a child born at its full time. The proceſs of contraction is continued downwards, along the cord, to the upper end of the teſtis, at which it ſtops. Thus the tunica vaginalis teſtis, which was in the firſt inſtance a production of peritoneum, becomes entirely ſeparated from that membrane; the peritoneal covering of the gland is the reflected tunica vaginalis.

"This contraction and obliteration of the paſſage ſeems," ſays Mr. Hunter, "to be a peculiar operation of nature, depending upon ſteady and uniform principles, and not the conſequence of inflammation, or of any thing that is accidental: and, therefore, if it is not accompliſhed at the proper time, the difficulty of bringing about an union of the part is much greater: as in children who have had the ſac kept open by a turn of the inteſtine falling down into the ſcrotum immediately after the teſtis." "The cloſing of the mouth, and of the neck of the ſac, is peculiar to the human ſpecies; and we muſt ſuppoſe the final cauſe to be the prevention of ruptures, to which men are ſo much more liable than beaſts, from their erect ſtate of body." We feel ſome heſitation in admitting this reaſoning as to the cauſe of obliteration: at all events, if we ſhould acknowledge it, the frequent occurrence of ruptures muſt prove that nature accompliſhes her end very imperfectly. "What!" ſays the ſame phyſiologiſt, "is the immediate cauſe of the deſcent of the teſtis from the loins to the ſcrotum? It is evident that it cannot be the compreſſed force of reſpiration, becauſe commonly the teſtis is in the ſcrotum before the child has breathed; that is, the effect has been produced before the ſuppoſed cauſe has exiſted. Is the teſtis pulled down by the cremaſter muſcle? I can hardly ſuppoſe that it is. Becauſe, if that was the caſe, I ſee no reaſon why it ſhould not take place in the hedge-hog, as well as in other quadrupeds; and if the muſculus teſtis had this power, it could not bring it lower than the ring of the muſcle."

The proceſs, which we have now deſcribed, is liable to ſome variations. In ſome individuals, the neck of the peritoneal elongation is not obliterated, ſo that the tunica vaginalis communicates permanently with the abdomen, as in quadrupeds. Hence, we ſometimes ſee hydroceles particularly in children, where the fluid can be made to paſs into the belly by preſſure. If a rupture occurs in ſuch individuals, it is contained, together with the teſtis, in the tunica vaginalis. Sometimes the teſtes do not deſcend before birth; when they paſs down after this time, a part of the inteſtine or omentum is liable to deſcend with them, and is of courſe contained in the tunica vaginalis. One or both may be retained in the abdomen beyond the uſual period. When the natural proceſs has not begun, or has been interrupted before birth, it becomes afterwards very uncertain when the deſcent will be completed. It takes place moſt frequently between the years of two and ten, while the perſon is young and growing, being ſeldom delayed beyond the age of puberty. However, one or both of theſe glands may be retained in the abdomen through life. In this caſe, Mr. Hunter conceives that there is ſome imperfection in their formation. "I am inclined," ſays he, "to ſuſpect that the fault originates in the teſticles themſelves." And again, "when both teſticles remain through life in the belly, I believe that they are exceedingly imperfect, and incapable of performing the natural functions of thoſe organs; and this imperfection prevents the diſpoſition for their deſcent taking place." The writer of this article has ſeen two caſes, where one teſtis had remained in the abdomen, and where the circumſtances aſcertained by anatomical examination corroborated the opinion of Mr. Hunter. In one, the body of the gland was not more than half its uſual ſize: the epididymis, which was very imperfect, ran for about an inch behind the ſac of a hernia, which had occurred in this individual, and did not join the body of the teſtis. The other caſe preſented exactly the ſame appearances. A third inſtance has come to his knowledge, in which both of the teſtes remained in the abdomen, but were formed apparently perfect in their ſtructure. In this caſe, it was underſtood, that the ordinary functions of the glands had been executed in a healthy manner during the perſon's life.

The times, at which the changes in poſition already deſcribed take place, are moſt accurately noted by Wriſberg in the memoir above quoted. He gives a tabular arrangement of his obſervations on this ſubject, deduced from very numerous examinations, of which the following account contains the chief particulars. "At the age of one month and three weeks, the teſtes were cloſe to the kidneys, with the ſmalleſt poſſible interval; the ſcrotum looſe and œdematous. At two months, the teſtes, exceedingly ſmall, touched the kidneys; the gubernaculum very long, and the ſcrotum wrinkled and rather hard. Two months and one week, teſticles very near the kidneys; ſpermatic veſſels diſcernible through the peritoneum, like very fine threads; gubernaculum diſtinct. Three months, teſtes about the ſize of hemp-ſeeds, placed rather further from the kidneys, and at the edge of the pelvis. Three months one week and a half, the ſcrotum extremely ſmall, and indeed ſcarcely diſcernible, ſo that the penis hung from a ſlight prominence of the ſkin. The ſmall inteſtines coiled together in the upper part of the abdomen, far from the teſtes. The latter had deſcended farther on the ſide of the pelvis; the gubernaculum very ſhort. Three months and three weeks, the ſcrotum ſmall and contracted: the teſtes more than three lines below the kidneys. Four months, the ſcrotum very ſmall: the teſtes deeply placed, with their inferior ends touching the rings. A diſtinct canal of peritoneum on the left ſide, leading from the cavity of the abdomen into the ſcrotum, although the gubernaculum was not yet inverted. Four months and one week, the teſtes very high, nearly touching the kidneys: the gubernacula long; no canal paſſing through the ring, which was perfectly cloſed. Four months and two weeks, the teſtes near the ring, with a canal of peritoneum on each ſide, paſſing to the bottom of the ſcrotum. Five months and two weeks, both teſtes in the rings; ſo that they could not be ſeen until preſſed towards the abdomen, when they appeared readily. Eight months, ſcrotum well formed, with its ſurface wrinkled, but empty. The teſtes had paſſed the ring, but remained in the neighbourhood of the groin: the right could be eaſily puſhed back into the abdomen through the proceſs of peritoneum, which was ſtill open; but the left could not, as the communication was already cloſed. Nine months, teſtes in the bottom of the ſcrotum; the canal of communication perfectly cloſed on the left ſide; it was ſhut on the right by a ſoft cellular ſubſtance eaſily yielding to the probe. Nine months, both canals perfectly cloſed."

From the foregoing facts, the following concluſions may be drawn: 1ſt. Before the beginning of the ſixth month the teſtis has not paſſed the ring on either ſide; but generally remains near the kidney: ſo that this ſituation may be depended on as a proof of the immaturity of a fœtus. 2dly. Between the beginning of the ſixth, and end of the ſeventh month, they are generally found about the ring; being in ſome inſtances above it, in ſome within the canal, and in others juſt below. 3dly. The ſcrotum in the firſt months, up to the ſixth, is ſmall in proportion to the body, ſometimes looſe, ſometimes harder, but always empty, and containing cellular ſubſtance inſtead of the cavity, in which the teſtis is to be afterwards lodged. A broad and ſtrong faſciculus of fibres (the gubernaculum) is contained in the midſt of its cellular ſubſtance. 4thly. When the teſtes have firſt deſcended into the ſcrotum, the canal of peritoneum ſtill opens to the abdomen, ſo that they can be eaſily drawn back into the belly, and ſink down again. This is generally practicable, in fœtuſes, between the 7th and 9th months.

The ordinary law of nature on this ſubject is, that the human ſubject, born at the expiration of the full term of utero-geſtation, has both teſticles in the ſcrotum. Haller's contrary ſtatement, "ut rariſſime fetus in lucem edatur, cum teſticulis ſcroto incluſis," (Element. Phyſiol. vol. 7. p. 413.) has been completely diſproved by the teſtimony of ſubſequent obſervers. Whether the canal of communication be generally cloſed before birth, is a point on which authors are not unanimous. According to Wriſberg, with whom Vicq d'Azyr agrees, this is commonly the caſe. But the repreſentation of Camper is ſomewhat different: this anatomiſt and Lobſtein obſerve, that the obliteration takes place earlier on the left than on the right ſide. Of 53 newly born children examined by Camper, 23 had the canal open on both ſides, 11 on the right ſide only, and ſix on the left only. In ſix it was cloſed on both ſides. In four both teſtes were contained in the abdomen; and in three only the right.

In the excellent memoir of Wriſberg, already referred to, there is a table of 103 births obſerved by himſelf, in which the poſition of the teſtes was carefully aſcertained. The proportion of premature to mature and perfect births was as 9 to 94, or in round numbers 1 to 10. All the children, whoſe weight did not exceed 5lbs. came into the world at the beginning of the ninth month, or in the eighth, or even in the ſeventh month. Three of theſe had both teſtes in the ſcrotum; three in the groins, and three in the abdomen of the children born towards the end of the ninth month, 69 had both teſtes in the ſcrotum, 17 one or both in the groin, eight one in the abdomen, and three, whoſe weights were 5¾, 6¾, and 7lbs. both in the abdomen. In the 12 out of theſe 103 caſes, where one or both teſtes remained in the abdomen, they were obſerved to deſcend on the days mentioned below, viz. : in one inſtance it paſſed down on the day of birth; the deſcent took place in three ſubjects on the ſecond day, in an equal number on the third, in two on the fifth, and in one on the twenty-firſt. In the remaining individuals, they had not appeared on the fourth and fifth weeks from the time of birth ; and as the children then left the hoſpital, the time of deſcent was not known. In three inſtances, the deſcent was obſerved to be accompanied with crying and convulſive motions of the limbs. Both teſtes had paſſed into the ſcrotum of one child, born at the end of ſeven months, and weighing only 3½lbs. ; which muſt be deemed a rare occurrence. They have been ſeen in the ring in a fœtus of four months. Bichat, Anat. Deſcr. t. 5. p. 234.

The colour of the organ, while in the abdomen, is greyiſh, and its form elongated. The epididymis is conſiderably larger in proportion than in the adult, and its head lies conſiderably above the teſtis : it is more looſely connected to the body of the gland. The conſiſtence of the teſtes at this time is ſoft and pulpy.

The penis, at the time of birth, although ſmall, is well formed, and poſſeſſes an elongated prepuce, which completely covers the glans. The integuments of the penis, as well as thoſe of the ſcrotum, are not diſtinguiſhed in colour from thoſe of the body in general. The rugæ of the ſcrotum are not yet well marked. There is a ſmall quantity of fat in the ſcrotum, and the fibrous covering, common to the cord and teſtis, cannot yet be diſtinguiſhed. The veſiculæ ſeminales, in conſequence of the poſition of the bladder, peculiar to this age, are nearly vertical in their direction, very ſmall and collapſed, and not exhibiting the tubercles on their ſurface ſeen in the adult. Internally they contain a mucous fluid.

The corpus cavernoſum penis is very ſhort and ſmall, and remarkable for the ſmall proportion of its ſpongy ſubſtance, and the trifling quantity of blood which it contains. The latter circumſtance is ſtill more ſtriking after a few years, in conſequence of the increaſed thickneſs of the fibrous membrane : hence, as erection depends principally on the ſwelling of the ſpongy part of the corpus cavernoſum, the penis of children, when erected in conſequence of ſome ſympathetic excitation, is hardly increaſed in ſize, and very little in length. The urethra, in the firſt years of life, is long ; and its direction from the bladder to below the ſymphyſis pubis is more oblique than in the adult. Theſe two circumſtances, in the conformation of the urinary canal, ariſe from the bladder being ſituated higher in the abdomen, and from the ſuperior aperture of the pelvis being more ſlanting. The prepuce is elongated, ſo as to give the penis a pointed termination. Its opening, always very narrow, may be ſo ſmall as to prevent the diſcharge of the urine, or to render it impracticable to denude the glans. The latter circumſtance conſtitutes congenital phimoſis. The frenum is narrow and reaches to the opening of the urethra.

No great changes are obſerved in the organs of generation from the time of birth until puberty. Buſied with the general organization of man, and particularly attentive to the bringing to perfection the agents by which he communicates with ſurrounding objects, to the putting in action the ſprings of his intellectual powers, nature ſeems, if we may uſe the expreſſion, to forget the inſtruments of reproduction, which continue for a time ſtationary. If, during this long period, theſe organs undergo no important revolution, they partake ſlightly in the general growth. Each of them, conſidered ſingly, without increaſing in any very marked degree, becomes more perfect in its organization, of which the principal traits may be more eaſily obſerved ſome years after birth. But theſe changes, which take place very gradually, are trifling when compared with thoſe which happen at puberty.

Changes in the male Organs at the Time of Puberty.—In the two or three years immediately preceding this period, the pubes is covered by a ſlight down, which appears generally before the beard. We may remark alſo, that its appearance is more conſtant, and its growth more rapid. In fact, the hair on the generative organs, although it is not completely developed for ſome years, has gained nearly its full length and thickneſs, while the beard is ſtill thin and ſhort. At the ſame time that the hairs appear, the ſkin of the ſcrotum and penis loſes its whiteneſs, and becomes more or leſs brown in conformity with the tint which it poſſeſſes in other parts of the body. The ſcrotum, hitherto contracted, becomes longer ; the teſticle is removed to a greater diſtance from the ring, and the ſpermatic cord proportionally elongated. The penis becomes larger and longer ; the frequent erections occaſion the prepuce to appear ſhorter, and the glans to be a little uncovered. The various layers compoſing the ſcrotum are complete at this time. The teſtis is proportionally larger than the veſiculæ ſeminales and penis, as the exerciſe of the generative functions commences here. The veſiculæ ſeminales are ſtill very ſmall, even in a ſubject of 14 or 15 years. The canal of the urethra, as well as the other parts of the penis, is conſiderably increaſed, as may be ſeen by obſerving the ſtream of urine.

In old men the ſcrotum is generally ſoft and pendent, and external impreſſions are no longer able to bring it into the ſtate of corrugation. The cellular ſubſtance which it contains is frequently the ſeat of watery effuſion. The fibrous covering of the teſtes and cord is denſe, thick, and eaſily demonſtrable. The teſticle is ſmall, ſoft, and waſted ; but without any remarkable change in its organization : the volume of the epididymis, on the contrary, is equal to what it poſſeſſed in the adult. The ſpermatic cord is rather ſmaller, unleſs the veins ſhould be in a dilated ſtate. The veſiculæ ſeminales are collapſed, and the proſtate becomes hard : the penis is conſtantly placid.

Phyſiology of the male Organs of Generation.—We ſhall deſcribe, in the firſt place, the fecundating fluid, as it appears when expelled from the body in the act of copulation ; and ſhall then diſtinguiſh the various parts of this compound liquor. We ſhall exhibit the facts which have been aſcertained concerning this intereſting ſubject, juſt as we treat any other part of phyſiology : we muſt either uſe ſuch language as ſhall be intelligible, or paſs over in entire ſilence every thing which relates to the production and development of the new beings, and the continuation of the ſpecies.

The fluid expelled from the urethra of a healthy man, under the influence of the venereal act, is white, inclining perhaps ſlightly to a blueiſh caſt. But it is not homogeneous, as it contains thicker and more opaque mixed with a more thin and ſemipellucid matter. The latter is more abundant in proportion as the ſubject is weaker, and the act more frequently repeated. From this difference in the appearance of its component parts it has been ſometimes compared to coagulated milk. It is of a viſcous or glutinous nature, and therefore readily entangles air : hence it becomes frothy if rubbed in a mortar. When firſt diſcharged, its conſiſtence is about equal to that of a thick cream ; but as it cools, the opaque mucilaginous part becomes tranſparent, and acquires greater conſiſtency. In about twenty minutes after its emiſſion the whole becomes liquid : at this time, too, it is tranſparent, having depoſited a ſediment of a whitiſh matter, reſembling a maſs of ſlender rags. The liqueſaction is not owing to the abſorption of moiſture from the air, for it loſes inſtead of acquiring weight during its expoſure to the atmoſphere ;

nor is it owing to the action of the air, for it takes place equally in cloſe veſſels. It has been obſerved that the thick flaky portion is thrown out firſt; while the thinner part comes after. It is heavier than any animal fluid, and ſinks immediately in water: but a part ſwims, conſiſting of white ſhining filaments, forming a cobweb-like texture, and compoſing ſmall floating maſſes. That which ſinks in the mucous or pulpy portion, which is the greater part of the whole; but of this little membranous-like flakes are ſometimes ſuſpended by air bubbles. Theſe ſink to the bottom and diſappear on the ſecond day, but the water remains turbid, and contains flocculi and white ſhining threads. Its odorous properties are very ſenſible; not irritating but mawkiſh and unpleaſant, like the farina of the Spaniſh cheſnut. In animals it is ſaid to be of a more penetrating nature; ſo that when abſorbed it infects the whole body, and renders the fleſh unfit for eating, unleſs the teſtes are cut out immediately after the animal's death. (See Buffon, t. 5. p. 121. of the boar.) The taſte is at firſt inſipid; yet there is ſomewhat of pungency in it, which after ſome little time ſtimulates and excites a degree of warmth in the mouth.

It converts paper ſtained with the bloſſoms of mallows or violets to a green colour, and conſequently contains an alkali. It diſſolves readily in water, after its ſpontaneous liquefaction: alcohol or oxymuriatic acid precipitates white flakes from this ſolution. Acids readily diſſolve the ſemen, and alkalies do not decompoſe this ſolution. Lime diſengages no ammonia from freſh ſemen; but after that fluid has remained for ſome time in a moiſt and warm atmoſphere, lime ſeparates a great quantity from it. Conſequently ammonia is formed during the expoſure of ſemen to the air. When oxymuriatic acid is poured into ſemen, a number of white flakes precipitate, and the acid loſes its peculiar odour. Theſe flakes are inſoluble in water, and even in acids. If the quantity of acid be ſufficient, the ſemen acquires a yellow colour. Thus it appears that ſemen contains a mucilaginous ſubſtance analogous to that of the tears, which coagulates by abſorbing oxygen. Vauquelin obtained ſix parts of this mucilage from 100 parts of oxygen. When expoſed to the air at the temperature of 60°, a pellicle forms gradually, and in three or four days ſmall tranſparent cryſtals of phoſphate of lime are formed. Afterwards ſmall round maſſes of the ſame ſubſtance are obſerved in the pellicle. If the air is moiſt, cryſtals of carbonate of ſoda may be formed. The evaporation does not go on to complete exſiccation, unleſs in a temperature of 77° with dry air. When all the moiſture is evaporated, the ſemen has loſt 0.9 of its weight; the reſiduum is ſemi-tranſparent like horn, and brittle. When kept in moiſt air, at the temperature of 77°, it acquires a yellow colour, acid taſte, and putrid odour. Expoſed to heat, it becomes brown, and exhales a yellow fume, having the odour of burnt horn. When the heat is raiſed the matter ſwells, becomes black, and gives out a ſtrong odour of ammonia. When the odour of ammonia diſappears, if the matter be lixiviated with water, an alkaline ſolution may be obtained, which, by evaporation, yields cryſtals of carbonate of ſoda. If the reſiduum be incinerated, there will remain only a quantity of white aſhes, conſiſting of phoſphate of lime. Thus it appears that ſemen is compoſed of the following ingredients:

90	water,
6	mucilage,
3	phoſphate of lime,
1	ſoda.
100	

The ſeminal fluid, in its recent ſtate, contains an immenſe number of animalcula, called ſometimes vermiculi ſpermatici. They have a rounded head, with a gradually tapering tail, not ſtraight, but alternately bent to either ſide. They are 1000 times ſmaller than a hair, and 10,000 times more ſlender than one of the tubuli teſtis: ſo that, according to Leeuwenhoeck, 216,000 of them would go in a ſphere, equal in diameter to the breadth of a hair. Their length has been eſtimated at $\frac{3}{1,162,361}$dth of an inch. They are found in all quadrupeds, in reptiles, birds, fiſhes, inſects, and even in teſtaceous animals. Some variations in figure are obſerved in different animals: but their ſize is nearly uniform in all. They are no larger in a whale than in a ſmall fiſh. They are ſaid not to exiſt in children, nor to be obſervable after frequent coition, nor in old ſubjects; but only in healthy and prolific ſemen, ſo that their preſence may perhaps be deemed a criterion of the maturity and perfectneſs of that fluid. The ſeminal vermiculi were firſt obſerved by a German youth, Lewis Hamme. He ſhewed living animals in the human ſemen to Leeuwenhoeck in the year 1677. This indefatigable obſerver immediately employed himſelf on the ſubject, and in the ſame year ſent an account of the phenomenon, with drawings of the vermiculi in the dog and rabbit, to the Royal Society at London. (See Phil. Tranſ. n. 143.) The communication was received with great applauſe, the facts were ſhewn to king Charles II. and admitted by all. At the ſame time they were examined and deſcribed in France, and, as far as the mere demonſtration goes, they were univerſally admitted in the literary world. Nicolas Hartſoeker claimed the diſcovery, but not till the year 1678. (Eſſais de Dioptrique, p. 227.)

It has been alleged that theſe animalcula are not peculiar to the ſemen, but that they are found in various other animal fluids. Accurate inveſtigation has not ſubſtantiated this objection; but, on the contrary, ſhews that they are peculiar to the ſeminal fluid. Others have denied that they poſſeſſed tails; and Buffon, in particular, repreſents the facts very differently from Leeuwenhoeck. (Hiſtoire Nat. Gener. & Partic. t. 2. p. 176 & ſeq.); his repreſentations being ſupported by thoſe of Turberville Needham. (Nouvelles Obſervations Microſcopiques, p. 213.) M. De Buffon obſerved the fluid from the ſeminal veſſels of a dead human body yet warm. It was full of filaments moving about, and branching into many parts. The filaments ſwelling burſt, and many ovular corpuſcula eſcaped, which ſtill remained attached to the filament, as by a thread: then they oſcillated like a pendulum, and during thoſe oſcillations the thread extended. The corpuſcula, at length detached from the filaments, traverſed the moſt fluid part of the ſemen, along with their filaments, the extreme length of which impeded their motions, and they ſeemed to him to endeavour to free themſelves from it. Having diluted the ſemen with rain water, the microſcopic view was better defined. It clearly appeared that each ovular corpuſcle had a double motion of oſcillation, and of progreſſion. In two or three hours the ſeminal matter acquired greater fluidity, the filaments diſappeared; the number of corpuſcula increaſed; the threads contracted; the oſcillations relaxed; and the progreſſive motion increaſed. In five or ſix hours the ovular corpuſcula, having loſt the threads, reſembled animals more than ever; not only becauſe their quickneſs in ſwimming was greater, but becauſe they directed their courſe to every quarter. In twelve hours the activity of the corpuſcula was great; and ſome revolved upon their axis; others changed the ovular to the globular figure under the obſerver's eye; ſome divided aſunder, ſo that one formed two.

At the end of one day the number diminiſhed ; and, upon the third, none were to be ſeen. In other ſemen, which ſeemed to be entirely filamentous, the ovular corpuſcula did not proceed from the filaments ; but theſe, dividing in two, were metamorphoſed into corpuſcula. They were embarraſſed by a thread. The longer it was, the more it impeded their motion ; but it gradually contracted, and was at laſt completely deſtroyed. The figure of theſe ovular corpuſcula reſembled that of thoſe of infuſions. They ſwam with a progreſſive motion, though, at firſt, the thread occaſioned a ſimple oſcillation. He obſerved ſimilar phenomena in the ſeminal fluid of other animals. Sometimes the corpuſcula altered their figure ; ſometimes they divided into two. Buffon conceives that they cannot properly be deemed animals, and he forms of them a particular claſs, under the term of *organic molecules*, which are particles diſſeminated through all matter, original, incorruptible, animated, and always active. Nor does he heſitate to confide the formation of the animated univerſe to thoſe molecules. Subſequent reſearches have not confirmed theſe opinions of the French naturaliſt. That the ſeminal vermiculi have tails is proved by numerous accurate obſervers, and is particularly ſupported by the teſtimony of Haller. (Elem. Phyſiol. t. 7. p. 521.) It ſeems queſtionable whether Buffon ever ſaw the real ſpermatic vermiculi ; for the latter live at moſt only for a few hours after the diſcharge of the fluid, while thoſe obſerved by him remained for ſome days. And his remarks on the whole ſeem much more applicable to the microſcopic animalcula obſerved in vegetable infuſions, as well as in all liquors expoſed to the air. This point ſeems clearly proved by the labours of Spallanzani, who made a vaſt number of obſervations on the ſubject, and ſet the whole hiſtory of the ſpermatic animalcula in ſo clear a light, that no doubt can remain on the ſubject. The general reſult of his reſearches tends completely to confirm the original remarks of Leeuwenhoeck. (See his Tracts on the Nature of Animals and Vegetables, Edinb. 8vo. 1799.) He obſerves that his experiments on freſh human ſemen preſented him with totally different reſults from thoſe deſcribed by Buffon, but as he could not regard Buffon's ſtatements as purely chimerical, he thought the contradiction might be reconciled by ſhewing that the French naturaliſt had deſcribed animals of a different kind. " I had remarked," ſays he, " that there is no part of an animal which, when infuſed, does not give exiſtence to a particular kind of animalcula. They are produced indifferently, by the muſcles, brain, nerves, membranes, tendons, veins, and arteries. The ſame holds good of the blood, ſerum, milk, chyle, ſaliva, &c. mixed with water, or even by themſelves. I had not yet made experiments upon the human ſemen for this purpoſe ; but it was moſt probable, that the putrefaction of this liquid would give exiſtence to particular beings. May not M. de Buffon have confounded theſe with the ſeminal vermiculi, and aſcribed to the latter the properties and phenomena exhibited by the former ? I determined to aſcertain this fact by obſerving what happened ſucceſſively to the ſemen, when long preſerved in a watch-glaſs. I made my firſt experiments on the human ſeminal fluid. The vermiculi died in three hours and a half, and were precipitated to the bottom of the glaſs. Upon the ſixth day, the ſeminal fluid began to exhale a fœtid and diſagreeable odour ; but I could perceive no animated being : only, upon taking ſome drops from the bottom of the glaſs, I obſerved the dead bodies of the vermiculi apparently very entire. The ſeventh and eighth days I ſaw no change, but the fœtor increaſed. On the ninth I diſcovered very minute animalcula, their ſize nearly equalling that of ſpermatic vermiculi ; but they had no tail, and greatly reſembled moſt minute ſpherules. Like animalcula of infuſions, they ſometimes ſtopped at little fragments of corrupted ſemen : ſometimes their courſe was very rapid, retrograde, riſing and ſinking in the fluid : in a word, they poſſeſſed every property of infuſion animalcula. They were ſeen in every ſtratum of the ſemen ; and thoſe at the bottom put in motion the dead bodies of the ſeminal vermiculi, which were ſtill entire, and remained ſo ſome days longer." Two or three ſucceſſive generations of theſe animals were obſerved, as in the caſe of other animalcula. When the ſemen was expoſed to a greater degree of heat, they appeared at a more early period, even as ſoon as twenty-three hours from the removal of the fluid from the dead body. In one inſtance they were obſerved to propagate by a ſpontaneous tranſverſe diviſion of the body. " Theſe facts ſufficiently ſatisfied me that Buffon had erroneouſly aſcribed to the ſpermatic vermiculi properties belonging only to the animalcula of infuſions. Let us, in a few words, collect the circumſtances. According to this author, after a certain time, the vermiculi were deprived of their tails. He ſhould have ſaid that the animalcula of infuſion came in the place of the vermiculi, which were already dead, and precipitated to the bottom of the liquid. He was arreſted by their firſt appearance : and took them for ſeminal vermiculi deprived of their tail, which in truth they often very much reſemble. When diſengaged from the tail, Mr. Buffon adds, they acquire greater activity. This was a neceſſary conſequence of the firſt miſtake. When the infuſion animalcula had taken place of the vermiculi, their increaſed agility could not be unobſerved, ſince the animalcula move with much greater quickneſs than the vermiculi. This erroneous ſuppoſition being admitted, Mr. Buffon had to relate, as he has done, the remainder of the phenomenon. He had to ſpeak of the imaginary changes of the vermiculi, of their diviſion, and their diminution, with the more confidence, as his opinions had to be confirmed by a repetition of his experiments, if not upon all, at leaſt upon many ſpecies of infuſion animalcula in the ſemen." p. 135--142. The following account of the ſpermatic vermiculi is taken from the work of Spallanzani already quoted, which contains the moſt complete account of the ſubject.

When the ſemen begins to diſſolve, if it be examined with a magnifier of ſmall power, the irregular parts ſeem to be in an indiſtinct ſlow agitation, produced by globular corpuſcula, of which each poſſeſſes a ſort of filament, or ſhort appendage, about ſix times the length of the body. They have two motions ; one oſcillatory, from right to left, and *vice verſâ*, in which the appendage is curved from one ſide to the other : the other is progreſſive, the vermiculus tranſporting itſelf by oſcillation. They ſtrike againſt every obſtacle, and when in conſiderable numbers, make a thouſand contortions to eſcape, at laſt taking that way where they feel the leaſt reſiſtance. Thus they are in continual motion. In twenty-three minutes the motions of oſcillation and progreſſion had diminiſhed ; and in an hour and a half it had leſſened ſo much, that a very ſmall number of corpuſcula poſſeſſed any power of motion. In general, the progreſſive motion ceaſes before the oſcillatory ; ſo that, at laſt, the corpuſcle merely bends from right to left, and reciprocally. They continue fixed to the ſame ſpot, until the oſcillatory motion inſenſibly dies away. After all motion is gone, the corpuſcula remain entire in the fluid, and then they are better ſeen than even when the liquid is diluted with water. Each corpuſcle is not properly globular, but elliptic, and the appendage is not only longer than it appears, but the breadth is not equal throughout like a thread, but increaſes as it approaches the body. Water or other fluids rendered them immediately motions. They may be ſometimes obſerved, in the clots of the ſemen, before they have diſſolved, attached by their appendages to the filamentous matter: they ſtruggle to diſengage themſelves, and then ſwim about in the fluid. The motion continues much longer when the temperature of the atmoſphere is increaſed: at 36° all motion had ceaſed in three quarters of an hour: at 49° in two hours; at 59° in three hours and a half: and at 81° they lived for ſeven or eight hours. The corpuſcula were ſeen in the fluid obtained from the epididymis and teſticles of various living and recently dead animals. That they are not formed, according to the ſentiment of Buffon, from the filamentous part of the ſemen, is proved by this; that they are moſt abundant in the fluid part, and even do not exiſt at all in the clots, where they are examined in a very recent ſtate, and freed as much as poſſible from the thinner part of the ſeminal fluid; while the latter, at the ſame time, abounds with them. Nor are they generated, as Needham aſſerted, by expoſure to air. For Spallanzani ſaw them in the uſual numbers, when the time employed in taking the fluid matter from the ſeminal veſſels ſtill warm, to preſent it to the microſcope, did not exceed a ſecond; and they were obſerved in the ſame numbers in ſeminal fluid carried without delay from the epididymis of a living ram to the microſcope.

Great care and attention are neceſſary in obſerving the appendages of theſe vermiculi, and hence they eſcaped the notice of Buffon. It is wonderfully ſlender, and at the ſame time tranſparent, ſo that too ſtrong a light confounds it with the ſeminal fluid: the ſlider ſhould be fine and thin, and the drop of fluid very thin: and a microſcope of a ſingle lens is preferable to the compound one.

They live longer in cloſe veſſels, than when the ſemen is expoſed to the air; and they alſo live longer in vacuo. The difference of time at which they die in theſe different ſituations amounts even to one, two, or three hours. "Theſe facts prove that the air is noxious to the vermiculi, and the following prove that it is the cauſe of their being in continual agitation. With the blow-pipe I formed capillary tubes, one end of which I immerſed in recent ſemen; it aſcended the cavity, filling the tube to a certain height. Breaking the tubes near the part to which it aſcended, I preſented this extremity to the blow-pipe, and immediately ſealed it hermetically. I did the ſame to the other end, by which means the ſeminal fluid was deprived of all communication with the external air. I drew out the tubes, ſo that the thinneſs of the tubes permitted me to ſee the vermiculi within. The peculiarities preſented by the vermiculi in the tubes were very different from thoſe of the reſt. All, or at leaſt moſt of them, had a ſingular mode of moving. Some had that ſort of activity obſerved in thoſe, which experience the influence of the open air. Others had a continued irregular motion; they changed from quickneſs to inactivity, and reciprocally. Others ſtopped entirely, and, after reſting ſome minutes, reſumed their former velocity; beſides, they were not obſerved to run againſt the ſolid portions of the ſemen, but to avoid them by turning aſide or retreating. Theſe peculiarities always ſucceeded better, and with more uniformity, when the tubes were kept warm. I have before ſaid that the longeſt period of life, of the human ſpermatic vermiculi, was ſeven or eight hours, when expoſed to the open air, but this period is greatly prolonged when they are included in tubes. In ſummer I have ſucceeded in preſerving them two days or more; and in ſpring and autumn they have lived almoſt three." P. 158.

Cold, near to that of freezing, renders the vermiculi motionleſs; but they are recovered by the application of heat. A temperature of 131° kills them; but the animalcula produced in the ſemen by putrefaction are deſtroyed by a temperature of 108°.

To this account of the ſeminal vermiculi we ſubjoin the following reflections on them by Bonnet, obſerving only that we are in a ſtate of the moſt profound ignorance of all the points alluded to in his queſtions.

"The vermiculi are, of all the animalcula of liquids, thoſe which have moſt excited my curioſity; the element in which they live, the place of their abode, their figure, motion, ſecret properties, all, in a word, ſhould intereſt us in ſo ſingular a kind of minute animated beings. How are they found there, how are they propagated, how are they developed, how are they fed, and what is their motion? What becomes of them when the liquid they inhabit is returned by the veſſels, and mixed with the blood? Why do they appear only at the age of puberty; where did they exiſt before this period? Do they ſerve no purpoſe but to people that fluid, where they are ſo largely ſcattered? How far are we from being able to anſwer any of theſe queſtions!" Spallanzani's Tracts, p. 179. The reader may alſo conſult, on this ſubject, W. F. von Gleichen über die Saumen-unk infuſions-thierchen, Norimb. 1778, 4to.

The opinions of Leeuwenhoeck concerning theſe vermiculi; *viz.* that they are of different ſexes, that they copulate, become impregnated and produce young; and that they are the rudiments of the future beings, to be conveyed by copulation into the body of the mother, and there developed; are deſtitute of all proof, and completely chimerical.

We have no accurate accounts of the ſenſible properties, nor any chemical hiſtory of the fluid ſeparated in the teſtis. When obſerved in the vas deferens or epididymis of man, after death, it poſſeſſes a light-brown or yellowiſh colour, and approaches in fluidity to water. It may be ſeen in animals, on cutting into the teſtis or epididymis, much thicker, viſcous, and of a grey colour. At leaſt it has this appearance in a dog. The whole gland, in a healthy animal, is turgid with this fluid. The contents of the veſiculæ ſeminales differ in their appearance from the ſecretion of the teſticles. It is a browniſh or yellowiſh fluid of light colour, ſemitranſparent, and often containing flakes or coagula, ſo as to vary in conſiſtence in different parts of the bag. Expoſure to the air produces no change in its conſiſtence, as it does in the ſemen. Sometimes the contents of theſe bags are a clear mucous fluid. Mr. Hunter took the trouble of obſerving them, in two healthy perſons killed ſuddenly, immediately after death. "In one the fluid in the veſiculæ was of a lighter colour than is uſually found in men who have been dead a conſiderable time; but it was not by any means like the ſemen either in colour or ſmell." In the other "the contents of the veſiculæ were of a lightiſh whey colour, having nothing of the ſmell of ſemen; and in ſo fluid a ſtate, as to run out on cutting into them." (Obſ. on the animal Economy, p. 28.) Thus it appears that the fluid of theſe bags differs both from that contained in the teſtis, and from the ſemen emitted in coition; conſequently, that they are not merely reſervoirs for the matters ſeparated in the teſticle, but that they add to the ſecretion of that gland ſome conſiderable bulk of fluid, ſeparated by their own veſſels. The peculiar organization of their internal ſurface would have led us a priori to expect this, as it exhibits an arrangement of parts found only where ſome ſecretion is performed. The ſame argument will lead us to aſſign a ſimilar function to the enlarged portion of the vas deferens lying by the ſide of the veſicula ſeminalis. The exact nature of the fluid ſeparated in the veſiculæ is not known; nor have we any chemical analyſis of it. In many inſtances it looks like a ſimple mucus; and there can be very little doubt, that in all caſes the contents of theſe bags conſiſt chiefly of their own ſecretions.

The opinion, that the veſiculæ perform a particular ſecretion, was held by Haller: "I have," ſays he, "no experiments of my own to prove that any thing is ſeparated in theſe organs, and mixed with the fluid formed in the teſtes. I ſuſpect, however, that a ſecretion takes place here as in the gall-bladder." (Elem. Phyſiol. 7. p. 540.) Galen conceived that the ſemen was generated in theſe parts; and Riolau, Ruyſch, and Swammerdam, were of opinion that they added ſomething to the ſeminal fluid. The point has been moſt clearly proved by Mr. Hunter in a paper contained in his Obſervations on the animal Economy, and entitled "Obſervations on the Glands ſituated between the Rectum and Bladder, and called Veſiculæ ſeminales." His chief argument is derived from the examination of the organs in perſons who have loſt one of the teſtes by accident, or in conſequence of diſeaſe. It is well known that this loſs does not affect the generative powers, and that ſuch individuals retain their ſexual appetites and the faculty of procreation. We may conſequently preſume that they have afterwards had connection with women, and conſequently had the action of emiſſion, which muſt have emptied the veſicula of the caſtrated ſide, if it had contained ſemen; and, as the removal of the teſtis muſt have cut off all ſource of ſupply from that quarter, it ſhould be found empty after death, on the ſuppoſition of its contents being ordinarily derived from the teſtis. Such caſes alſo afford an opportunity of making comparative obſervations between the veſicula of the perfect and that of the imperfect ſide.

"A man," ſays Mr. H., "who was under my care in St. George's hoſpital for a venereal complaint, died there, and was diſcovered to have loſt his right teſticle. From the cicatrix being hardly obſervable, it muſt have been removed ſome conſiderable time before his death; and the complaint, for which he was received into the hoſpital, is a convincing proof that he had connection with woman after that period. I inſpected the body in the preſence of Mr. Hodges, the houſe ſurgeon, and ſeveral of the pupils of the hoſpital. Upon diſſecting out, and examining the contents of the pelvis, with the penis and ſcrotum, I found that the vas deferens of the right ſide was ſmaller and firmer in its texture than the other, eſpecially at that end next to the abdominal ring, near to the part that had been cut through in the operation. The cellular membrane ſurrounding the duct on the right ſide was not ſo looſe as on the left; neither were the veſſels which ramified on the right veſicula ſo full of blood. But upon opening the veſiculæ, both appeared to be filled with a kind of mucus ſimilar to that which is found in other dead bodies; and the veſicula on the right ſide was rather larger than that on the left. Whatever, therefore, may be the real uſe of theſe veſiculæ, we have a proof from this diſſection, that in the human ſubject they do not contain the ſemen.

"In a man who died in St. George's hoſpital with a very large bubonocele, the teſticle of that ſide was diſcovered to have almoſt loſt its natural texture from the preſſure of the hernial ſac; and upon examining the teſticle with attention, there was no appearance of vas deferens till we came near the bladder, where it was almoſt as large as uſual. The veſicula of that ſide was found to be as full as the other, and to contain the ſame kind of mucus.

"I extirpated the left teſticle of a Frenchman on account of its being diſeaſed. He was a married man, and died about a year afterwards, having been extremely ill for ſeveral months before his death. On examining the body, the veſiculæ were both found nearly full; more eſpecially that of the left ſide, which I ſuppoſe might be accidental. But upon examining the vas deferens of the left ſide, where it lies along the ſide of this bag, and where it has a ſimilar ſtructure with the veſiculæ, I found it filled with the ſame kind of mucus; and this, I believe, is always the caſe, whether the teſticle has been removed or not.

"A young man, a coachman, who had a diſeaſe in his left teſticle, had it removed, at St. George's hoſpital, by Mr. Walker, in Auguſt 1785; and in February 1786 he returned again to the hoſpital, on account of uncommon pains all over him, and for which he requeſted to be put into the warm bath. But as he was going from the ward to the bath, he dropped down, and died almoſt immediately. The body was inſpected, with a view to diſcover the cauſe of his death, and upon an examination of the veſiculæ, the bag of the left ſide was as full as that on the right, and the contents in both were exactly ſimilar.

"In diſſecting a male ſubject, in the year 1755, for a ſide view of the contents of the pelvis, I found a bag on the left ſide, lying contiguous to the peritoneum, juſt on the ſide of the pelvis, where the internal iliac veſſels divide above the angle of reflection of the peritoneum at the union of the bladder and rectum. The left vas deferens was ſeen paſſing on to the bag; and, what is very ſingular, that of the right or oppoſite ſide croſſed the bladder near its union with the rectum to join it. I traced the left vas deferens down to the teſticle; but on following the right through the ring of the external oblique muſcle, I diſcovered that it terminated at once, about an inch from its paſſage out of the abdomen, in a blunt point, which was impervious. On examining the ſpermatic cord from this point to the teſticle, I could diſcover no vas deferens, but by beginning at the teſticle, and tracing the epididymis from its origin about half way along, where it lies upon the body of the teſticle, I found that it at firſt became ſtraight, and ſoon after ſeemed to terminate in a point. The canal at this part was ſo large as to allow of being filled with quickſilver, which however did not paſs far, ſo that a portion of the epididymis was wanting; and the vas deferens for nearly the whole length of the ſpermatic cord of the right ſide. On the left ſide the vas deferens begun where the epididymis commonly terminates; and there was a deficiency of nearly an inch of the extremity of the epididymis. I then diſſected the bag above-mentioned, which proved to be the two veſiculæ; for by blowing air from one vas deferens I could only inflate half of it; and from the other vas deferens, the other half. They contained the mucus commonly found in theſe bags; but upon the moſt accurate examination I could diſcover no duct leading from them to the proſtate gland, nor any remains of one. In this ſubject it was evident that there was no communication between the vas deferens and epididymis; nor between theſe bags and the urethra. The caput gallinaginis had the common appearance, but there were no orifices to be ſeen. The teſticles were very ſound; and the ducts from them to the epididymis were very manifeſt, and full of ſemen." P. 30—32.

Mr. Hunter obſerves further, in ſupport of his opinion, that theſe bags are as full of mucus in bodies much emaciated, where the perſon has died from a lingering diſeaſe, as in ſtrong robuſt bodies where death has happened from violence or acute diſeaſes; and they are nearly as full in the old as in the young; which moſt probably would not be the caſe if they contained ſemen." Ibid. p. 33.

The ſecretion of the proſtate is the laſt ingredient in the ſeminal fluid; and it contributes very largely to the bulk of what is expelled in copulation. Its opaque whiteneſs and viſcidity completely obſcure the properties of the fluid ſecreted in the teſtis, and beſtow on the ſeminal liquor its moſt obvious characters. The opinion which ſuppoſes that the ſemen is formed, or that part of it is produced in the proſtate, is not therefore ſo very far from the truth. A thick, white, and opaque liquor may be expreſſed in conſiderable abundance from the proſtatic ducts on each ſide of the caput gallinaginis after death. Phyſiologiſts aſcribe to the proſtatic fluid the office of increaſing the bulk of the ſemen, and of thereby augmenting its impetus, ſo that it may arrive with greater force at the place of its deſtination.

It has been conjectured that a nervous fluid is mixed with the ſemen, and hence the weakneſs of the male after copulation has been explained. We may be excuſed from diſcuſſing this opinion until we know what nervous fluid is. The convulſive exertion of the whole frame, which occurs in the venereal organs, will ſufficiently account for the ſenſe of fatigue that follows it.

It appears from what we have ſaid, that the fluid expelled in copulation is furniſhed in a ſmall proportion only by the teſtes; that a peculiar ſecretion of the veſiculæ ſeminales is added to this, and that the chief bulk is made up of the proſtatic liquor. An important queſtion ariſes here, which of theſe is the eſſential and immediate agent in impregnation? The general practice in the Eaſt, continued from ages of the moſt remote antiquity, of entruſting their females to the care of eunuchs, and the common operation of gelding, as performed on various domeſtic animals, lead us to aſſign this prerogative to the fluid ſecreted in the teſtis. In emaſculating animals, or men, the teſtes are cut or torn out, or they are compreſſed ſo as to deſtroy their organization, or the cord is ſo ſqueezed or bruiſed as to annihilate the functions of the part. Yet, under the circumſtances juſt enumerated, we read of numerous examples where venereal deſires have been experienced, where erection, copulation, and emiſſion have taken place, and even where children have been begotten. Theſe examples, however, are too repugnant to the general effect of caſtration, as obſervable in man and animals, to allow of our admitting them. Ordinarily we obſerve not only that no deſires are felt, but alſo that the loſs of the organs, in which the natural and leading ſtimulus reſides, occaſions the other parts concerned in the buſineſs of generation to be much diminiſhed in ſize, and altered in appearance. Where emaſculation has been performed merely by compreſſing the cord or teſtis, the organization of the part may not have been deſtroyed ſufficiently to interrupt its functions, and ſuch an animal might be ſtill capable of fecundating; but no well authenticated inſtance can be produced of impregnation being effected where the teſtes had been cut out in any male animal. Yet it cannot be doubted that eunuchs may have erections, ſince the ſeat of the phyſical feeling is in the glands, and the whole apparatus concerned in erection remains entire after the loſs of the teſtes. A man, after the latter occurrence, like one who has loſt his powers through age, may at times be ſtimulated by the recollection of paſt joys. Hence, in the Eaſt they value thoſe eunuchs moſt highly, in whom the penis as well as the teſtes has been removed; no cauſe for the ſlighteſt jealouſy can then remain. The proſtatic liquor, or that of the veſiculæ ſeminales, might be diſcharged in the eunuch. If an animal has impregnated another after caſtration, there may have been ſome ſemen remaining in the veſiculæ ſeminales.

Beſides the facts now enumerated, we may obſerve that all animals which copulate have teſtes; but that ſeveral have either no proſtate or no veſiculæ.

The ſecreted ſemen is either expelled from the body, fulfilling the purpoſes of its formation; or it is retained in its receptacles, and taken up by the abſorbents. The ſeminal veſſels are always full of their peculiar fluids, which are only diſcharged at conſiderable intervals, and often only at periods of ſome months or years. As the teſtis and veſiculæ ſeminales poſſeſs numerous abſorbents, we cannot doubt that the contained fluids are conveyed by theſe veſſels into the general circulation. It has been a general opinion that this abſorption produces many of the changes which are well-known to take place at puberty; and which obviouſly depend, as we have already ſhewn, on the teſtes. We refer to a former part of the article on this ſubject. The males of animals, when the rutting ſeaſon approaches, have their whole bodies penetrated by a ſingular fetor, ſo that they are unfit for food. The fleſh at this time putrifies more rapidly than at other ſeaſons in the ſtag. That abſorbed ſemen is the cauſe of this fetor, is rendered probable by the fact, that the removal of the teſtes deſtroys it; and by its abſence from caſtrated animals of the ſame ſpecies. The ſame cauſe has been aſſigned for the phenomena conſequent on conception in the female; but this ſeems very doubtful. This abſorbed ſemen has been ſuppoſed by phyſiologiſts to act as a ſtimulus on the heart, and the organs of motion, to increaſe the muſcular ſtrength, and to contribute thereby to health of body and ſtrength of mind. Hence, too, they have explained the ſoftneſs and inſipidity of the fleſh obſerved in ſome animals after the copulating ſeaſon; as, for inſtance, in the boar. The fleſh of the ſalmon is remarkably changed in colour and flavour at this time. Caſtration produces debilitating effects both on the body and mind of man and animals; the ferocious and powerful bull is changed into the mild and patient ox. The influence of the ſame proceſs in mankind has been already noticed; and we have ſufficiently proved that the remarkable developement of the frame at the time of puberty ariſes entirely from the influence of the teſticles. And it is no leſs true that the reſt of the ſexual organs are particularly affected by the preſence and activity of the teſtes. In this country we have little or no opportunities of obſerving in eunuchs the effect of the mutilation on the other organs of generation; but we can ſee the conſequences in animals. In Mr. Hunter's opinion, the penis, urethra, and all parts connected with them, are ſo ſubſervient to the teſticles, that he conceives that few of them would have exiſted if there had been no teſticles in the original conſtruction of the body; theſe parts would then have been ſo formed as to aſſiſt merely in the expulſion of the urine. To illuſtrate this opinion, let us obſerve what is the difference between theſe parts in the perfect male, and in a male that has been deprived of the teſticles when very young, at an age when they have had no ſuch influence on the animal economy as to affect the growth of the other parts. In the perfect male the penis is large; the corpora cavernoſa being capable of dilatation. The corpus ſpongioſum is very vaſcular; and that part of the canal which is called the bulb is conſiderably enlarged, forming a cavity; the muſculi acceleratores urinæ, as they are called, are ſtrong and healthy. In many animals which have long peniſes, they are continued forwards to the end of it, and in others they are not extended ſo far, but are very large. On the contrary, in the caſtrated animal, the penis is ſmall and not capable of much dilatation; the corpus ſpongioſum is leſs vaſcular; the cavity at the bulb is a little larger than the canal of the urethra; and the muſcles are white, ſmall, and have a ligamentous appearance. The ſame obſervations are true, if applied to the erectores penis. The penis of the perfect male is of ſufficient length, when erected, to reach to the further end of the vagina of the female. In the caſtrated animal it is much ſhorter; and erections having thus become unneceſſary, the parts which ſhould project often adhere to the inſide of the prepuce. The proſtate, Cowper's glands, and the glands along the urethra, of which the lacunæ are the excretory ducts, in the perfect male, are large and pulpy, ſecreting a conſiderable quantity of a ſlimy mucus, which is ſalt to the taſte, is moſt probably for the purpoſe of lubricating thoſe parts, and is only thrown out when the animal is in vigour for copulation; while in the caſtrated animal they are ſmall, flabby, tough, and ligamentous, and have little ſecretion." Animal Economy, p. 39.

It muſt be acknowledged that we have no very direct proof that any actual abſorption of ſemen takes place from the teſticles or veſiculæ, and ſome phyſiologiſts deny it altogether. "I very much doubt," ſays Blumenbach, "whether real ſemen be ever abſorbed from its veſicular reſervoirs in a healthy man;—ſtill more of what has been occaſionally aſſerted, that it is immediately conveyed into the neighbouring veins: and moſt of all, that ſuch abſorption (ſuppoſing [illegible]tence to be granted) ſhould be conſidered as a proviſion againſt premature venereal ſtimuli. On the contrary, if we compare the phenomena obſerved in animals, the impetuous irreſiſtible nature of their deſires at particular ſeaſons of the year, with the conſtitution of ſuch as are caſtrated, we ſhall rather deem ſuch abſorption the cauſe of that ungovernable and almoſt furious appetite. I conceive that a very different means (peculiar, as far as I know, to the human ſubject) has been adopted to anſwer the purpoſe juſt alluded to; *viz.* nocturnal emiſſions, which I refer to the natural excretions of man, inaſmuch as their more rare or frequent occurrence, according to varieties of temperament and conſtitution, ſerves to liberate him from the troubleſome and inconvenient conſequences of an abundant ſeminal ſecretion. It may be readily granted that barbarous nations, of a phlegmatic temperament, and practiſing irregular ſexual intercourſe, do not require ſuch an excretion: yet, I think it muſt be deemed a very natural and ſuitable relief in a young unmarried man, of a ſanguine temperament, plethoric habit, lively and warm imagination, particularly if he indulges in a luxurious mode of life and enjoys perfect health. See Chr. Rud. Jaeniſch de pollutione nocturna. Götting. 1795, 4to. Inſtitut. Phyſiol. ſect. 36.

The length of courſe, and the ſmall diameter of the ſpermatic artery, together with the impoſſibility of forcing any injected fluid from its branches into the ſecretory tubes of the teſticle, have led phyſiologiſts to conclude that the ſecretion of the ſeminal fluid is performed very ſlowly. But various circumſtances are capable of accelerating this proceſs. "Princeps eſt amor;" ſays Haller, Elem. Phyſiol. 7. 551. "Nemo forte fuerit, quin in juventute ſua feminam concupiverit; quin ſi caſta fuit, in ejus familiaritate ignes conceperit occultos: quin ſenſerit cum dolore et incommodo ſibi teſtes intumeſcere, et vaſa ſeminalia; dolore certe tanto, ut vix tangere poſſet eam regionem, vix incedere. Manifeſto in hoc malo accelerata eſt ſecretio ſeminis, ejuſque liquoris major penus teſtem diſtendit. Id mali genus ex reddita tranquillitate animi, et abſentia amotæ feminæ ſedatur; et celerius etiam ſanatur fruitione cupitæ puellæ, et ſi neutrum remedium acceſſerit in difficiles tumores abire poterit. Quare in univerſum, ut plurimum ad movendam venerem irritamenta faciant deſideratæ feminæ, aut imagines aſpectu lubricæ, aut alia quæcunque, quæ per legem aſſociationis idearum voluptatis memoriam renovant; ita abſentia ejuſmodi ſtimuli, et cogitationes perpetuo ad alia averſæ, ipſaque religio, ita minuunt ſeminis generationem, ut multo minori copia gignatur, neque moleſtum ſit, et demum vaſa ſeminis pene coaleſcant, et genitalium moles ipſa diminuatur." A healthy and ſtrong ſtate of the animal, nutritious and perhaps rather generous food, and a certain warmth of the weather, promote the ſeminal ſecretion. All theſe circumſtances diſpoſe the organs for action, when the natural feelings are duly excited; and the oppoſite cauſes, as infirm health, fatigue, inſufficient or bad food, and conſiderable cold, prevent the feelings or diſpoſitions neceſſary for the action of the generative organs from taking place. The reproductive function is ſo much influenced by the ſeaſon in animals, that it is only carried on at a particular time of the year; and the leading organs (the teſticles) are reduced in many inſtances to a very ſmall ſize in the winter. But in man, and in ſuch domeſticated animals as are not in a ſtate of nature, no ſuch change takes place in the teſticles; they are conſequently always in good condition, and in that ſtate to which other animals that are left to themſelves, can only attain in the warmer ſeaſon.

That the ſemen, ſecreted in the ſerpentine tubuli of the teſtis, is conveyed from them into the epididymis, and thence into the vas deferens, is ſufficiently obvious from the anatomical ſtructure. De Graaf proved it ſtill further, by tying the vas deferens of a dog before copulation: all the ſecreting tubes were diſtended to the utmoſt, and the teſtis conſiderably ſwollen.

We cannot doubt that the ſecretory veſſels of the teſtis propel their contents by ſome contractile power; although the preciſe manner in which this is effected eſcapes our obſervation. Does the elevation of the teſtis to the ring, by the action of the cremaſter, conſtantly obſerved to accompany emiſſion, promote the progreſs of the ſecreted fluid? The immenſe length and numerous turns of the ſeminal tubes muſt render the paſſage of this fluid from its firſt ſecretion very ſlow: hence, when the ſupply contained in the veſiculæ is entirely exhauſted, an intermiſſion of ſome time is neceſſary for the reproduction of a ſufficient ſupply; hence too, in the dog, where there are no veſiculæ, the act of copulation is unuſually prolonged.

It has been generally conſidered that the fluid produced in the teſtes is depoſited and retained in the veſiculæ ſeminales, as in reſervoirs, until occaſion occurs for its diſcharge. Mr. Hunter has endeavoured to ſhew that theſe bags are not to be regarded in the light of receptacles for the ſemen, but as deſtined to perform a peculiar ſecretion. The common opinion reſts on the facts of the very free communication between the vaſa deferentia and veſiculæ, on the courſe which injected fluids take in the dead body, and the extreme minuteneſs, numerous convolutions, and great length of the ſeminal tubes, which ſeem very unfavourable to the production of ſemen in the ſudden way, and at the very ſhort notice at which it muſt be formed, if we do not ſuppoſe it to come from the veſiculæ. We have already detailed the proofs by which it appears that theſe organs perform a ſecretion; but none of thoſe facts ſhew that the contents of the veſiculæ may not conſiſt, in part, of matter formed in the teſtis. We know that the gall-bladder produces a copious ſecretion of its own; but that it alſo receives bile from the hepatic duct through the ductus cyſticus. Mr. H. endeavours to adduce a deciſive argument from comparative anatomy: he ſtates that in many animals, the parts correſponding to the human veſiculæ ſeminales have no communication with the vaſa deferentia, and moreover, that their ſtructure, in ſeveral inſtances, ſeems little calculated to make them reſervoirs. Where the obvious ſtructure is ſo different, we are by no means warranted in concluding that the functions are exactly ſimilar. To argue that the ſemen does not paſs into the veſiculæ of man, where the vaſa deferentia are ſo intimately connected to thoſe bags, becauſe the analogous parts are not connected in other animals, is not more reaſonable, than it would be to affirm aſfirm that the fluid of the vaſa deferentia paſſes into the veſiculæ in animals, where the two are not connected, becauſe the ſtructure leads us to infer that it does ſo in man.

Mr. Hunter continues, “ we may likewiſe infer, from what has been ſaid, that the ſemen is not retained in reſervoirs after it is ſecreted, and kept there till it is uſed; but that it is ſecreted at the time, in conſequence of certain affections of the mind ſtimulating the teſticles to this action: for we find, that if laſcivious ideas are excited in the mind, and the paroxyſm is afterwards prevented from coming on, the teſticles become painful and ſwelled from the quantity of ſemen ſecreted, and the increaſed action of the veſſels; which pain and ſwelling are removed immediately upon the paroxyſm being brought on and the ſemen evacuated; but if that does not take place, the action of the veſſels is ſtill kept up, and the pain in the teſticles will generally continue till the paroxyſm and the evacuation of the ſemen are brought on, which renders the act complete; without which a ſtop cannot be put to the action of the veſſels that produce the ſecretion, nor the parts be allowed to fall back to their natural ſtate. There is at this time no ſenſation felt in the ſituation of the veſiculæ ſeminales. The pain in the teſticles, in conſequence of their being filled with ſemen; and the action being incomplete, is ſometimes ſo conſiderable as to make it neceſſary to produce an evacuation of the ſemen to relieve the patient.” Animal Economy, p. 33.

We certainly admit with Mr. H. that the veſiculæ ſeminales of the human ſubject perform a particular ſecretion; but we do not conceive him to have ſucceeded in proving that they are not alſo reſervoirs for the ſemen.

The opinion, which denies the veſiculæ ſeminales to be reſervoirs for the ſemen, is defended alſo by J. A. Chaptal, in the Journal de Phyſique, February 9, 1787, p. 101. Soemmerring has refuted it in the third vol. of Blumenbach's Mediciniſche Bibliothek, p. 87.

The tranſmiſſion of the ſemen, from its ducts or veſiculæ, into the urethra, takes place under the influence of a particular ſtate of mind; and its expulſion from the body is effected, in all animals which have a penis, by means of what is called the erection of that organ. In the human ſubject, this is an increaſe of volume produced by the diſtention of the three corpora cavernoſa. Among the exciting cauſes of this proceſs, we may enumerate, in the firſt place, the preſence of a ſufficient ſupply of ſeminal fluid: when this is preſent, any additional ſtimulus eaſily produces the effect. Hence, we obſerve, that the venereal powers of animals are the greateſt, when their teſtes are of the largeſt ſize; hence, too, we may perhaps explain the erection ſometimes obſerved after a full meal. A ſecond and more powerful excitement is derived from mental cauſes. “ Altera cauſa,” ſays Haller, “ in ſano homine eſt imaginatio, ſive cupido veneris, quæ ex quacunque cauſa orta, lectione, viſa pictura, memoria voluptatis priſtinæ, confabulatione, tactu, et aliis cauſis, in ſano homine continuo in erectionem erumpit. Eadem nocturnam illam et ſolitariam venerem ſola abſolvit, qua ſe natura nimii ſeminis onere liberat variis, pro varia ſeminis abundantia, et ſenſu acriori aut obtuſiori, intervallis. Nam pueris facillima, ſenibus ea venus rarior eſt, aut nulla. Soli homini data eſt, forte quod homo potiſſimum memoria et imaginatione valeat. Imaginationem ſolam, non erectionem, ſed plenam venerem, etiam in vigilantibus perfeciſſe adſunt teſtimonia. Neque poteſt abſque imaginatione excitata unquam hoc opus perfici; ut turpi, neque hactenus adamata in femina venus vix exerceri poſſit. Inde illæ impotentiæ ex verecundia, ex imaginaria debilitate, quo faſcinum revoco, aut ex odio, quæ quidem ſpecies cum relativa poteſtate conjuncta eſt. Hinc manifeſta iniquitas ejus legis, quæ ex congreſſu de virilitate mariti judicabat, quem in exoſa uxore, poſt ſummam injuriam paſſam, in conſpectu tot hominum, ferreum oporteret eſſe, ut iis cum impedimentis venerea jura perficiat. Quare in Gallia anno, 1677, die 18. menſis Januarii, ridicula lex abolita fuit, cum Marchio de Langey, a judice poſt congreſſum pro impotente damnatus, diſſoluto matrimonio, cum alia uxore multos filios generaſſet.” (Element. Phyſiol. 7. 557.) The peculiar odour exhaled from the female organs, particularly at certain ſeaſons, is a very powerful incentive of venereal feelings in the animal kingdom. Haller conſiders that this cauſe acts in the human race alſo. “ Propius partes genitales ipſas adficit, et excretionem extorquet, auget et perficit, frictio glandis, et potiſſimum colliculorum, qui ſunt ſub ortis urethræ, quocunque fere modo ea frictio adminiſtretur. Sed ea cum voluptate peculiari, ſumma, pene nimia, conjungitur, agitque iterum manifeſto in nervos, ut vel ex acuto ſenſu glandis conjicere licet.” Elem. Phyſ. ibid.

Erection of the penis takes place from various cauſes, not enumerated under the foregoing heads; and then it has no concern with the expulſion of the ſeminal fluid. When a perſon wakes in the morning, with the bladder tolerably full of urine, the organ is commonly erect; but it ſubſides when the water is evacuated. Striking the nates with a rod is well known to produce erection; and has ſometimes been reſorted to to rouſe dormant paſſions. Calculus, ſtrangury, and hemorrhoids are ſometimes attended with this ſymptom; which has been occaſionally obſerved alſo in other affections. It is often particularly troubleſome in gonorrhœa; and has been obſerved many times after death, particularly in thoſe who have been hanged. (See Morgagni de Sed. et Cauſ. Ep. xix.) Mechanical obſtruction to the return of blood from the part will produce erection, and even ſuch a ſwelling as ends in gangrene, if the obſtacle be conſiderable and long continued. Ligatures, thoughtleſsly placed on the penis by children, and the ſtricture produced by the retracted glands in paraphymoſis, come under this deſcription. In the ſame way dangerous ſwelling has been produced by drawing a ring over the penis. The effect of intercepting the return of blood is clearly ſhewn, in an experiment made by Mr. Hunter on the dog. “ In April 1760, in the preſence of Mr. Blount, I laid bare the penis of a dog, almoſt through its whole length; traced the two veins that came from the glans (which in this animal makes the largeſt part of the penis), and ſeparated them from the arteries by diſſection, that I might be able to compreſs them at pleaſure, without affecting the arteries. I then compreſſed the two veins, and found that the glans and large bulb became full and extended; but when I irritated the veins, in order to ſee if there was any power of contraction in them, which might occaſionally ſtop the return of the blood, no ſuch appearance could be obſerved.” Animal Economy, p. 40, note *a*.

That erection is produced by blood being ſent into the penis faſter than it can be returned, and that the encreaſed ſize of the organ is entirely produced by this ſanguineous diſtention, are points clearly aſcertained. The obſtacle to its return is ſo complete, that no mechanical preſſure applied to the body of the penis can force the blood on into the veins. The exact mode, in which this object is accompliſhed, has not, we believe, been as yet aſcertained. There certainly is no power capable of directly compreſſing the veins: and the erector penis in particular, by drawing the organ away from the ſymphyſis pubis, would rather free them from preſſure. The accelerator urinæ, by ſqueezing the blood forwards from the bulb, may make the front of the corpus ſpongioſum and glans rather more firm when they are erect, but can produce no effect on the penis in general.

Neither is the phenomenon at all like thoſe produced by muſcular contraction: it is a quiet and gradual increaſe, and it often laſts for hours. Muſcular action is ſudden, and not of ſuch long duration. There are other examples of analogous effects, which are totally inexplicable by muſcular action. The nipple, when left to itſelf, like the penis, is ſoft and flaccid, ſhort, and retracted: when excited by gentle friction, it riſes into a cylindrical form, ſwells, grows red and warm: yet there is nothing like a muſcle in the part. The red fleſhy organs about the head and neck of ſome gallinaceous birds undergo a ſimilar proceſs.

It appears, therefore, that the change termed erection, may take place in animal ſtructures, without the aſſiſtance of any muſcular power; and it is by no means certain, that any muſcle is concerned in the particular caſe now under conſideration. All that we can aſcertain on the ſubject is, that the blood is ſent into the corpora cavernoſa in much greater quantities than it can return. If a mechanical obſtacle does not produce that rigid ſtate of the organ, which is created by the immediate action of deſire, we conclude, that a more ſudden and complete congeſtion is produced by the latter than by the former cauſe. We cannot explain how the proportion of blood, which arrives, is thus altered in relation to that which returns, any more than we underſtand the analogous phenomenon in inflammation. It does not ſeem poſſible to aſcertain the mechaniſm of the proceſs by actual obſervation. The circumſtances already mentioned render it probable that the nerves are materially concerned.

Erection varies conſiderably in its degree. The organ at firſt ſwells, but continues ſoft; it then grows conſiderably longer, thicker, more firm and warm; and the glands become redder. The corpora cavernoſa penis are firſt diſtended, and the glands ſubſequently. In the ſtate of greateſt rigidity, it is proved, by ridiculous experiments, that conſiderable weights can be ſupported by the organ. The mere act of erection is not attended with thoſe remarkable effects on the frame which accompany emiſſion; it may be repeated or continued for any length of time without any injurious operation on the animal economy: hence, it is much more frequent than the latter act. Under the influence of certain feelings of the moſt acute kind, excited in the act of copulation, the ſeminal fluid is expelled from the ejaculatory ducts into the urethra. The pleaſurable ſenſation is raiſed to its higheſt pitch, and is attended with a convulſive agitation of the whole frame, before this effect follows. "Maxima certe eſt in venere convulſio, et late patens tremor, ut femina, cui clitoris titillatur, neque ſe ſuſtinere poſſit, neque genua coercere, ne tremant, et in aliis res in plenam epilepſiam erumpit: nihil audit neque ſentit animal in venerea tentigine. Sunt, qui animo in venere linquuntur, etiam feminæ; ſunt non rari, qui in grato nimis opere perierint. Eſt autem omnino major maris voluptas, etiam in pleriſque animalibus; nam mares, [illegible]r pauca exempla, feminas ſequuntur, et nonnunquam pene invitas vi [illegible]nt: eſt in viris glans, ſenſus venerei præcipua ſedes, multo quam clitoris major, et certe in ve[illegible]ilior. Et ſi aliquis ſenſus eſt in oſtio uteri interiori, quando ſemen eo pervenit, manifeſto tamen mas in egerendo ſemine majoribus, quam femina in toto venere, furiis agitatur. Quæ omnia ſapientiſſimis conſiliis ita facta ſunt, ut virum robore armatum, amoris dulcedo feminæ redderet æquiorem. Demum et cordis vires vehementer incitantur, et pulſus acceleratur, et cor palpitat, et reſpiratio laborat, et eadem, quæ in nixu, phænomena oriuntur." Element. Phyſiol. 7. 567.

After this tumultuous agitation of the whole frame, and when the ſwelling of the penis and glands has reached its greateſt extent, the ſeminal fluid is thrown into the urethra. The anus is cloſed by its ſphincter, and it is ſaid that the levatores ani, by their mechanical preſſure, ſqueeze out the contents of the proſtate and veſiculæ into the urethra. Probably the coats of the veſiculæ and vaſa deferentia poſſeſs ſome contractile power, by which their evacuation is aſſiſted. The contents of the proſtate and veſiculæ are collected in the bulb of the urethra, which is enlarged ſo as to form a kind of reſervoir for them; and are expelled with ſome force, by ſucceſſive ſpaſmodic contractions of the accelerator urinæ. As ſoon as this is finiſhed, the temporary agitation ſubſides, the blood returns from the cells of the penis, and that organ regains its original magnitude. A degree of languor follows, proportioned to the previous excitation; the palpitation of the heart goes off, the hurried reſpiration is quieted, and the ſtrength ſlowly returns. The ſubſequent weakneſs is greater, in proportion as the act has been more frequently repeated, and at ſhorter intervals. In many animals, where the ſexual appetites are only exerted at a particular ſeaſon, and where the powers are exhibited and exerciſed on a much grander ſcale than in man, the debilitating influence is very ſtrongly marked. The venereal powers of the human ſubject certainly appear very limited, when compared to thoſe of moſt animals: with a due regard to health, he cannot much exceed the limits aſſigned by Haller. "Homini adeo modicæ ſunt vires, ut non multo plus, quam bis in ſeptem diebus coire poſſit, et ſi forte acri amore percitus, poſt longam caſtitatem, femina concupita potitus, aliquoties poſſit ſemen emittere. Sed ea neque multum repeti poſſunt, neque durare." An attention to the dictates of nature will certainly enjoin temperance in theſe enjoyments. The performance of a function, ſo neceſſary to the continuance of the ſpecies, has been enſured by the phyſical pleaſure aſſociated with it: but the effects of too frequent repetition produce thoſe ſerious conſequences which the univerſal and violent influence of the act on our bodies would naturally lead us to expect. Severe nervous affections, impaired mental faculties, and premature death, are the ſure concomitants of exceſſive venereal enjoyments. Whether the convulſive agitation of the body, or the emiſſion, be the moſt injurious under theſe circumſtances, cannot, perhaps, be decidedly aſcertained. "Omnia iſta majora et celeriora, et minus medicæ manui obtemperatura, eveniunt ab illa deteſtabili juvenum circe, a qua amor abeſt, et in qua ſemen, multo quam in naturæ opere difficilius, elicitur. Ab ea enim corruptela impotentia inſanabilis ſupervenit, et ſeminis fluxus involuntarius perpetuus, obſtipa rigiditas, tabes intra triennium funeſta, amiſſa judicii vis, et omne fere malorum genus, quod votis velis avertere." Elem. Phyſiol. 7. 573.

Theſe circumſtances render it very plain that polygamy is not ſuited to the organization and powers of man; and afford a much ſtronger argument againſt the practice, than the alleged ſuperior numbers of females in Eaſtern countries would be in favour of it, even if the fact were well proved; which we by no means admit. We may collect alſo, from the foregoing account, that the ſexual functions ought not to be exerciſed, until the growth and ſtrength are complete; and that all attempts at exciting the venereal appetites, before the natural period of their developement, muſt be prejudicial. On this ſubject we ſhould bear in mind the obſervation of Tacitus concerning the ancient Germans; "Sera juvenum Venus, eoque inexhauſta pubertas."

Man is capable of exerciſing the generative functions through a certain portion only of his life. We have explained that the organs are in a ſtate of very imperfect developement during the early periods of his exiſtence. Boys have erections, but they are not produced by thoſe ſtimuli which act at a more advanced age. In the middle of Europe, a ſecrea ſecretion of ſeminal fluid generally takes place about the twelfth or fourteenth year, inſomuch that it is commonly diſcharged from the effect of dreams. Soon after this time there is a complete capacity of performing the ſexual functions; and there is a well-known inſtance of a prince who begot twins in his 16th year. The approach of puberty is regulated conſiderably by the climate, and alſo by manners; in warm countries it comes on earlier than we have mentioned, and later in colder regions. In the higher ranks of ſociety, where the feelings are prematurely and artificially excited, and encouraged by a copious and generous diet, and looſe morality, the generative functions may be called into exerciſe more early, than under the oppoſite circumſtances. As the individual approaches to the 50th year, the venereal ſuſceptibility is conſiderably diminiſhed. Semen is ſtill ſecreted, but hardly ever emitted during ſleep, even after the longeſt abſtinence. The venereal act is more ſlowly performed, but is equally efficacious in producing impregnation. From this time the powers are gradually diminiſhed; but a man of 60 may ſtill become a father, although ſome legiſlators have choſen to determine otherwiſe. A longer continued and more powerful irritation is required to produce erection and emiſſion at this age. In rare examples men have been known to retain their powers of propagation even to the age of 100 years; and it is very well authenticated that Thomas Parre married at 120, and performed the duties of a huſband until the age of 140. Theſe latter examples muſt, however, be regarded as deviations from the ordinary courſe; and we have equally remarkable inſtances of the generative functions being performed at an unuſually early age. Perhaps the moſt remarkable caſe of this kind is a boy now living in London, of whom an account is given in the Medico-Chirurgical Tranſactions, vol. i. p. 276, & ſeq. At the time of birth this child had much long hair on the head, and the ſutures of the cranium were perfectly cloſed. At the end of the firſt year thoſe changes took place which uſually happen at puberty. The penis and teſtes increaſed in ſize, hairs appeared on the pubes, and the tone of the voice was evidently altered. From this time his body grew very rapidly, and the expreſſion of his features, as well as the general organization, had a completely manly character. The prominence of the thyroid cartilage, and the voice, reſembled thoſe of a youth of 16. "The pubes and ſcrotum are covered with black curling hair. The penis and teſtes are as large as I have ſeen in ſome adults. The latter are firm and perfect in their formation, and the cord may be diſtinctly felt. The uſual brown appearance of the integuments of theſe parts is here to be obſerved." There has been a ſecretion of ſemen from the end of the ſecond year. This account was drawn up when he was three years old. In his "Anecdotes de Médecine," Borden mentions three boys who had ſtrong venereal deſires between 10 and 11 years of age: the generative organs were unuſually large in theſe individuals. and were fully capable of exerciſing their ordinary functions at this time. "Ils ne penſaient qu'au plaiſir phyſique de l'amour; ils ne ſemblaient avoir autre ſenſation que celle de cette paſſion; ils ſe fondaient, pour ainſi dire, en ſperme; ils tiraient leur caractere individuel de l'organiſme ſeminal."

The moſt ſuitable and natural ſtate after the age of puberty, is that of marriage. If the deſigns of nature are not fulfilled; if, by refuſing to ſatisfy the imperious calls of love, we prevent the exceſs of vital energy, which ſoon animates the generative organs, from being carried off in its natural channel, the accumulated irritability of theſe organs will frequently diſturb the whole frame by its re-action. The phyſical feeling of love, the impulſe of reproduction, has generally a remarkable character of violence and energy in animals. The phenomena of the rutting ſeaſon ſhew the effects of this powerful appetite in a much ſtronger point of view than they are ſeen in the human ſubject; as the influence of the paſſion is here heightened by its being reduced within a ſhort period of time. Great fierceneſs, impetuous motions, and often even convulſions, are the effects of the new want in many animals. Parrots, canary-birds, and bull-finches, experience attacks apparently of an epileptic kind, when ſeparated from their females. The phyſical appetite is rarely accompanied with ſuch phenomena in man. With many individuals, the obſervance of the laws of chaſtity hardly requires an effort. However, if the influence of the generative organs ſhould predominate ſo far as to conſtitute a well-characterized erotic temperament; if an ardent imagination and a forced ſtate of celibacy ſhould ſtrengthen this temperament, its influence on the conſtitution may be exceſſive, and cauſe various kinds of general diſorder. Under the influence of ſuch circumſtances, a ſoldier ſeized and attempted to violate a girl in public at Montpelier. Neither the publicity of the ſituation, nor the cries of his victim, nor the exclamations and blows of the ſurrounding perſons, could prevail with him to relinquiſh his attempt, for which he was hanged. (Borden, Anecdotes de Médecine.) The unnatural abſtinence obſerved from miſtaken notions of religion, has produced very remarkable effects in ſome caſes. An eccleſiaſtic mentioned by Buffon, in whom the feelings were very ſtrong, fearing he ſhould be tempted to break his vow, cut away the organs. The ſame author relates the ſufferings of another individual during a kind of erotic delirium, which laſted for ſix months, and ſeems to have amounted nearly to mental derangement.

Female Organs of Generation.—Woman contributes more largely than man to the buſineſs of reproduction; and the apparatus deſtined to this function includes the generative organs, properly ſo called, and the breaſts. Theſe iſolated parts are appropriated to the execution of a common object, to which each contributes in its own way, and their developement is regulated by a common law. They are called into activity at the ſame epocha, and their reſpective functions ceaſe, or at leaſt their capacity of fulfilling them ceaſes at the ſame time. The cloſe ſympathy which connects them has been remarked at all times. The breaſts, however, are manifeſtly dependent on the generative organs; while the former exerciſe but a very ſlight influence on the latter. As the male organs are calculated by their formation to convey the prolific fluid, ſo the female are conſtructed with a view to its reception; and the two differ completely from each other. Yet there is a conſiderable reſemblance in ſome parts of the apparatus in both ſexes. Thus the clitoris, which is concealed under the pubis in the ſuperior commiſſure of the labia, reſembles the penis in many points; differing from it by having no connection with the urethra, and conſequently being imperforate, alſo in being very ſmall in well-formed individuals. The moſt convenient arrangement of the ſubject, for anatomical deſcription, is that in which the organs are divided into the external and internal. The latter include the eſſential agents of the generative proceſs in the female; *viz.* the vagina, with the uterus and its appendages. The former conſiſt of a longitudinal ſlit, placed between the thighs, containing the termination of the urethra and vagina, and certain prominent parts compoſed chiefly of folds of the integuments.

The external organs, which can be ſeen without the aid of diſſection, are the mons veneris, the vulva or pudendum, the labia, frenulum, foſſa navicularis, clitoris, nymphæ, meatus urinarius, and opening of the vagina.

A broad prominence, placed in front of the pubes, and between the groins, is called the mons veneris. At the time of puberty, this part becomes more convex, and is covered with hairs, of which the number, length, and colour, vary in different individuals. Theſe very ſeldom advance along the middle line of the abdomen, towards the navel, as in man. Their eminence is formed ſimply by the accumulation of an adipous cellular ſubſtance at this particular point, and it conſequently varies in ſize, according to the *embonpoint* of the individual. A longitunal fiſſure, or ſlit-like cavity, extends from the mons veneris, between the thighs, to within an inch of the anus; this is called the vulva, or pudendum, (which names ſometimes include, in a more large application, the external organs,) or ſinus pudoris. This excavation is larger in women who have had children, than in virgins. The ſpace left between the poſterior end of the vulva and the anus, which may be about one inch in length, is the perineum, in which the raphé can hardly be traced. The labia, or alæ majores, are two elongated cutaneous eminences, filled with adipous ſubſtance, deſcending from the mons veneris towards the anus, and forming the lateral boundaries of the cavity juſt mentioned. They have been named, from a compariſon with the lips of the mouth; but the fiſſure between them is vertical, inſtead of being tranſverſe, as in the other inſtance. Their length, which is nearly the ſame in all inſtances, and may be ſomewhere between two and three inches, determines the extent of the vulva. Their ſize and prominence vary according to the general embonpoint of the individual. Theſe folds are thicker above than below; their external ſurface, which correſponds to the upper and inner ſide of the thighs, is covered with hairs ſimilar to thoſe of the mons veneris, and poſſeſſes ſome ſebaceous glands. The internal ſurface, formed by a mucous membrane, is ſmooth, ſoft to the touch, is contiguous to that of the oppoſite ſide, and to the nymphæ. In virgins the colour of this ſurface is red; it acquires afterwards a pale and rather livid caſt. The upper edge of the labia is adherent, and continues externally with the integuments, on the inſide with the covering of the nymphæ: the inferior margin is unconnected, convex, rounded, and covered with hairs, and exhibits the continuity of the integuments with the mucous membrane. The anterior, or ſuperior extremity, is confounded with the mons veneris: the poſterior, growing gradually ſmaller, ends in a point, and is united with that of the oppoſite ſide behind the foſſa navicularis. From this union a ſharp prominent ridge reſults, called the commiſſure of the labia, or frenulum, and in French la fourchette. The following parts enter into the compoſition of the labia; 1ſt, a continuation of the ſkin forming their external ſurface and inferior or convex edge, provided with ſebaceous glands, in the ſecretion of which the diſtinguiſhing odour of theſe parts reſides: 2dly, a mucous membrane covering their internal ſurface, continuous on one ſide with the integuments, and on the other with the mucous covering belonging to the whole vulva: 3dly, an adipous tiſſue filling the interval between theſe layers, and giving to the parts their various degrees of thickneſs and prominence. The latter texture reſembles on the whole that of the mons veneris, with which it is continuous, but it preſents, in addition, ſome membranous laminæ deſcending from the iſchium and pubes to the looſe edge of the labium. It does not contain ſo much fat as the mons veneris, and hence, like the ſcrotum of the male, it is a part in which anaſarcous depoſitions are frequently obſerved.

The labia cover all the other external organs of generation, which, by this means, are conſtantly moiſtened with a mucous fluid, preventing the effects of friction, and preſerving the acute ſenſibility of the parts. In the ordinary attitudes of the body, theſe organs are in a ſtate of mutual contact, and therefore completely conceal the parts which we are proceeding to deſcribe: they are ſeparate only when the thighs are thrown widely apart; they receive an extraordinary developement during parturition, and thereby increaſe the capacity of the vulva. When the labia are ſeparated, the following parts may be obſerved in ſucceſſion from above downwards: 1. The clitoris, which appears as a ſmall tubercle, more or leſs prominent, ſeparated from the upper commiſſure of the labia by a ſmall ſmooth ſurface: 2. The nymphæ, alæ minores, or petites levres, ariſing from the inferior lateral parts of the clitoris, deſcending and diverging as they deſcend, and loſt on the ſides of the opening of the vagina: 3. A triangular ſurface ſlightly concave, bounded above by the clitoris, below by the meatus urinarius, on the ſides by the nymphæ, and ſometimes called veſtibulum: 4. The meatus urinarius, ſituated about one inch below the clitoris: 5. The orifice of the vagina, with the hymen, or carunculæ myrtiformes, placed immediately under the meatus: 6. The foſſa navicularis, a ſmall tranſverſe depreſſion, ſeparating the entrance of the vagina from the frenulum: 7. The frenulum, or poſterior commiſſure of the labia; behind which is the perineum. The clitoris occupies the upper part of the vulva, and forms a reddiſh ſlightly elevated tubercle, which ordinarily does not exceed the level of the labia. Its figure is obtuſely conical, ſomething like that of the end of the penis; this is called the glans clitoridis, and is covered by a looſe fold of the mucous membrane lining the vulva, and named preputium clitoridis. Beſides, the difference of its ſize, the want of a perforation at the extremity, ſufficiently diſtinguiſhes it from the penis. A ſmall part only of the organ appears on external examination; the larger portion, which is concealed, and can be brought into view only by diſſection, lies over the vagina, and under the arch of the pubes, and bears a great analogy to the penis, as it conſiſts of two crura or corpora cavernoſa, with erector muſcles. Theſe ariſe from the inner and even poſterior ſurface of the rami of the oſſa innominata; aſcend, approaching to each other, and unite into a ſmall cylindrical body, terminating in an obtuſe extremity, called the glans. Theſe crura are made up of a firm fibrous membrane, confuſed with the perioſteum, forming a tube filled with a cellular or ſpongy ſubſtance, into which blood is effuſed from the arteries, to be again taken up by the veins, as in the penis. There is a complete ſeptum between the two crura, ſo that they are diſtinct throughout. The ſpongy ſubſtance of the crura is more denſe than in the penis, and conſequently admits of leſs diſtention; hence the ſize of the organ is not greatly increaſed in the erect ſtate.

The *erector clitoridis* muſcle is analogous in every reſpect to the erector penis of the male; its origin, termination, and probably uſe, are ſimilar, but the ſize is ſmaller in proportion to that of the crus. It ariſes from the inner ſurface of the iſchium, aſcends and paſſes forwards, and is implanted in a tendinous form, in the inferior and poſterior extremity of the crus clitoridis.

The ſubſtance of the glans is not different from that of the body of the clitoris, as there is no urethra in this organ, and conſequently no peculiar corpus cavernoſum. It is rounded above and ſlightly bifid below. The looſe and folded prepuce covers it above and at the ſides, but not below, being attached to the two ſides of the ſlit, by which the part is marked in this ſituation. A white, friable, ſebaceous, and concreting ſubſtance, ſimilar to that formed by the glandulæ odoriferæ of the penis, is depoſited under the preputium clitoridis.

This ſecretion, being liable to accumulate, and becoming irritating in warm countries, as is the caſe with the analogous ſubſtance in the male, has given riſe to a ſimilar operation of circumciſion in girls in ſeveral parts of Africa and Aſia. Niebuhr enjoyed the very rare opportunity of ſeeing the pudenda of an Arabian girl, eighteen years of age, who had been circumciſed; he drew the parts from the life, and brought the repreſentation home with him. See his Beſchreibung von Arabien, p. 77. et ſeq.

The clitoris correſponds above to the arch of the pubes, to which it is fixed by a kind of ſuſpenſory ligament; below to the urethra, to which it is united by a looſe cellular tiſſue.

It reſembles the penis in its acute ſenſibility: "ſenſus mire vehemens eſt, ut tota crura ab ejus particulæ ſollicitatione contremiſcant, feminæque totæ extra ſeponantur, nihilque poſſint proco negare. Quæ extra venerem, in caſta femina parva fuerat, ſed etiam modo arrigit et intumeſcit, ut prepoſteræ veneri inſervire poſſit, multoque uſu ejus turpitudinis denique moles ejus augetur, ut omnia membra ſolent, quibus multum utimur. Quæ cauſa videtur fuiſſe, cur orientales populi, accurati caſtitatis muliebris cuſtodes, hanc particulam in nuper natis puellis amputaverint, aut certe ferro decurtaverint." Element. Phyſiol. lib. 28. § 20. We have made ſome obſervations, concerning the occaſional increaſe in ſize of this part, in the remarks on hermaphrodites.

The nymphæ are two membranous folds, connected above to the preputium clitoridis, and deſcending about as far as the middle of the aperture of the vagina. They are thin and flattened, broadeſt in the middle, and narrower at the two extremities. Their external ſurface correſponds to the inſide of the labia, while the internal, approximating above to that of the oppoſite ſide, correſponds below to the meatus urinarius and orifice of the vagina. Their adherent edge is tolerably thick; while the looſe margin is thin and convex: the latter is ſometimes wrinkled or notched, ſo as to have occaſioned a compariſon of the part to a cock's comb. The ſuperior extremity ariſes from the preputium or glans clitoridis: the inferior ends at the ſide of the vagina. They are ſmooth and of a red colour in young women, and acquire a darker hue in older ſubjects, and particularly ſuch as have had children. They are formed of duplicatures of the membrane lining the vulva, filled internally with a cellular ſubſtance, free from fat: and they contain ſebaceous glands, the excretory ducts of which form very obvious pores: they differ very much in ſize. Ordinarily, they are completely covered by the labia, when approximated. Sometimes they form ſcarcely perceptible prominences, while at others they are very large, and hang down between the labia, ſo as to form an inconvenient obſtruction to the ſexual functions; in this caſe their ſurface is irregular, being grooved and tuberculated. Such formations are more frequent in the inhabitants of warm climates, where it is not unuſual to cut off ſome part of them; and the operation is even occaſionally practiſed in European countries. Frequently one is larger than the other. They poſſeſs conſiderable ſenſibility. The chief uſe aſſigned to them is that of aſſiſting, by their developement, the enlargement of the vulva during parturition: the diſtention of the parts by the paſſage of the child deſtroying the fold. The name of nymphæ was given to them from a ſuppoſition that they regulate the jet of urine; but as women evacuate this fluid with the thighs apart, and as the direction of the ſtream ſeems to depend ſo entirely on that of the urethra, we cannot adopt this ſuppoſition. And we are further confirmed in rejecting the opinion by the exiſtence of theſe folds in many animals where they can have nothing to do with the ſtream of urine.

We have nothing further to ſay concerning the veſtibulum, except that the ſurface is ſmooth, and that it is terminated below by the opening of the urethra, which is about three quarters of an inch, or an inch from the clitoris. The deſcription of this canal, and its termination, will be found, together with that of the female bladder, under the article Kidney.

Immediately under the orifice of the urethra is the entrance of the vagina, called ſometimes the os externum uteri; the diameter and appearance of which vary very conſiderably in different individuals. In virgins this opening is very narrow; it is broader after the ſexual act has been performed, and moſt ample in women who have had many children. The narrowneſs in the firſt caſe ariſes from the preſence of a duplicature of the mucous membrane, called the hymen, which contracts the opening ſo conſiderably, that marriage cannot be conſummated without its being ruptured; hence, after this laceration, the entrance of the canal is more free. As the parts are vaſcular and ſenſible, more or leſs bleeding and pain generally attend this dilatation of the aperture; and theſe circumſtances are expected in ſome countries as the neceſſary proofs of virginity in the bride. However, they do not always attend the firſt coition; and it ſhould ſeem, by the following quotation, that the exiſtence of the hymen hangs by a very ſlender thread; "L'hymen, pendant le premier âge, eſt très mince, ſe rompt facilement et ſe detruit, lorſqu'on eſſuie avec trop peu de ménagement les parties éxtérieures de la génération, ſoit lorſque l'enfant lui-même, avec ou ſans intention, contracte des habitudes Leſbiennes, prépare et diſpoſe ainſi aux plaiſirs ſolitaires, des organes qui ſont á peine ébouchés." Moreau Hiſt. de la Femme, tom. 1. p. 53.

The hymen is a duplicature of the ſame membrane which lines the entrance of the vagina, and has the ſame texture and properties. It is ſoft, red, vaſcular, and ſenſible. The poſterior ſurface is reticulated, as the columns of the vagina terminate on it. Its ſize and figure vary very conſiderably. Generally it has the ſhape of a creſcent, with the concavity turned upwards or forwards. The convex edge is attached, the concave looſe; the former is fixed to the inferior part and ſides of the vagina, the latter is turned towards the urethra. The orifice of the vagina, in the virgin, is the ſpace bounded in front or above by the meatus urinarius, below or behind, and at the ſides, by the looſe concave edge of the hymen. The dimenſions of this opening muſt depend therefore on the breadth of the hymen, which differs much in different individuals: ordinarily, it will admit the little finger without any ſtretching. This creſcented or falciform figure of the hymen is ſeen only when the labia are drawn apart, and the ſides of the vagina gently ſtretched; for in the ordinary attitudes, the membrane is thrown into longitudinal folds, the ſides of the vagina coming into contact with each other, ſo that the entrance of the canal is completely ſhut. However, the ſpace left between the urethra and the edge of the membrane will always allow the eſcape of the menſtrual diſcharge. The lower part of the hymen is the broadeſt, and the horns of the creſcent, where they advance along the ſides of the aperture, grow gradually narrower, until they are completely loſt.

Sometimes the hymen is continued under the orifice of the urethra, ſo as to form a complete membranous circle, perforated in the middle, inſtead of a creſcent. Indeed Haller, and many other very accurate anatomiſts, have found the fold, when the parts were carefully examined in water, generally continued under the urethra; but very narrow at that part. In more rare caſes the hymen is an imperforate circular membrane, attached to the edge of the orifice of the vagina in every part, ſo as to cloſe the canal completely. Such females have been termed *atrotæ*, by a word derived from the Greek, and ſignifying imperforate. As there is no aperture in ſuch caſes for the diſcharge of the menſtrual fluid, it accumulates in the uterus and vagina, and muſt be evacuated by a ſurgical operation, conſiſting of a puncture of the hymen. For the various appearances which this part exhibits in different individuals, the reader may conſult J. G. F. Tolbeng, de varietate hymenum, Hal. 1791, 4to.

It has generally been aſſerted, that the hymen does not exiſt in quadrupeds; but the ſtatement of Cuvier, in his Leçons d'Anat. comparée, tom. 5, leçon 29, ſect. ii. art. 2, renders this point very doubtful. The general opinion of its non-exiſtence in the other mammalia beſides man, and the circumſtance of its being found in women only, at a particular period of life, and even then not univerſally, have led many anatomiſts to deny its exiſtence in the human ſubject. But the fact is ſo clearly proved by the concurrent teſtimonies of all modern anatomiſts, who have enjoyed conſiderable opportunities of diſſection, that we wonder to find Buffon ſtill conteſting the point; any of his anatomical friends might ſurely have convinced him by ocular proof. Though we are fully convinced, by repeated obſervation, that Buffon's opinion is incorrect in point of fact, we cannot help admiring the eloquence with which he inveighs againſt the diſgraceful opinions and practices which have prevailed on this ſubject. "Les hommes," ſays he, "jaloux des primautés en tout genre, ont toujours fait grand cas de tout ce qu'ils ont cru pouvoir poſſeder excluſivement et les premiers: c'eſt cette eſpèce de ſolie, qui a fait un être réel de la virginité des filles. La virginité, qui eſt un être moral, une vertu qui ne conſiſte que dans la pureté du cœur, eſt devenue un objet phyſique dont tous les hommes ſe ſont occupés; ils ont établi ſur cela des opinions, des uſages, des cérémonies, des ſuperſtitions, et même des jugemens et des peines; les abus les plus illicites, les coutumes les plus déſhonnêtes ont été autoriſées; on a ſoumis à l'examen de matrones ignorantes, et expoſé aux yeux de médecins prévenus, les parties les plus ſecrètes de la nature, ſans ſonger qu'une pareille indécence eſt un attentat contre la virginité; que c'eſt la violer que de chercher à la reconnoître; que toute ſituation honteuſe, tout état indécent, dont une fille eſt obligée de rougir intérieurement, eſt une vraie déſloration. Je néſpère pas réuſſir à détruire les préjugés ridicules qu'on s'eſt formés ſur ce ſujet; les choſes, qui font plaiſir à croire, ſeront toujours crues, quelque vaines et quelque déraiſonnables qu'elles puiſſent être; cependant, comme dans une hiſtoire on rapporte non ſeulement la ſuite des evènemens, et les circonſtances des faits, mais auſſi l'origine des opinions et des erreurs dominantes, j'ai cru que dans l'hiſtoire de l'homme je ne pourrois me diſpenſer de parler de l'idole favorite à laquelle il ſacriſie, d'examiner quelles peuvent être les raiſons de ſon culte, et de rechercher ſi la virginité eſt un être réel, ou ſi ce n'eſt qu'une divinité fabuleuſe."

It is not ſo eaſy to explain the uſe or purpoſes of this membrane, as to eſtabliſh the fact of its exiſtence. The partiſans of final cauſes have been much puzzled in attempting to diſplay the wiſdom or goodneſs of the Creator, as evinced in this part of our anatomy, and have as yet aſſigned no rational explanation of it. We ſubjoin from Haller a ſtatement of the commonly received notions, which, however, appear to ourſelves entirely unſatisfactory. "Vix tamen dubites, cum ſolo in homine ſit repertus, etiam ad morales fines ei eſſe conceſſum ſignum pudicitiæ, quo et vitium illatum cognoſcatur, et pura virgo decus ſuum poſſit tueri, et ipſe maritus de caſtitate ſponſæ facile convincatur, eo facilius, quod præterea in illibata virgine vagina anguſta ſit. Etſi enim poſſit fieri, ut laxus, ut parvus ſit hymen, atque prima venus aliquando abſque ſanguine abſolvatur, neque hymen rumpatur; etſi artificii porro in parum pudica femina ſanguis poſſit elici; etſi teneræ virgines aliquando etiam in altero coitu ſanguinem reddant, et menſes fluentes vaginam laxant; tamen in univerſem debet prima venus cruenta eſſe, eoque ſigno pudor virgineus adſeri, cum vix poſſit plena venus obtineri, quin ſuperior margo partis majoris hymenis laceratur. Quare et moſaicæ leges, et multorum populorum conſuetudo, hoc ſignum ſervatæ caſtitatis et requirunt et oſtentant, et de exemplis in virginibus etiam pene trigenariis certus ſum, quæ inſignem in prima venere ſanguinis jacturam ſunt paſſæ." Elem. Phyſiol. lib. 28, ſ[illegible] 2, [illegible]

After the hymen has been torn, the entrance of the vagina preſents ſome fleſhy prominent tubercles, called carunculæ myrtiformes, and varying in number and ſize. Theſe are generally conſidered to be the remains of the lacerated membrane; "et corruptæ adeo pudicitiæ indicia." The carunculæ are generally largeſt at the ſides of the vagina, where the hymen is narroweſt; ſo that all theſe prominences cannot well be referred to the origin juſt mentioned. Some are found behind the hymen, and exiſt previouſly to the laceration of that membrane: theſe are the prominent, obtuſe, and callous apices of the columns of the vagina. Laſtly, there are projections at the termination of the mucous ducts, which may be enumerated among theſe carunculæ: and warts are ſometimes formed in this ſituation. Whatever their origin may be, we find from two to five or ſix rounded and firm, or thin and looſe prominences, of a red or livid colour, about the entrance of the vagina.

The frenulum, or fourchette, is a cutaneous fold of a creſcent ſhape, with the concavity upwards, placed behind and below the entrance of the vagina, viſible in the virgin ſtate, when the ſides of the vulva are drawn apart, but not well marked when the parts are collapſed. It lies between the two labia, not quite at the lower extremities, and is extended almoſt to the nymphæ, protecting in ſome degree the entrance of the vagina. It is near to the hymen, which it reſembles in ſome reſpects. The act of copulation does not injure it, but repeated parturitions entirely efface it. A very manifeſt tranſverſe cavity, named the foſſa navicularis, is intercepted between the frenulum, the hymen, and the labia; and this cavity is loſt of courſe when the frenulum diſappears, ſo that it may not be recognizable in married w[illegible]

A mucous membrane, by which the genital and urinary organs are united in the female, is continued over all the parts contained in the vulva, and even forms many of them. It ariſes on the looſe convex edges of the labia, and at their commiſſures; covers the internal ſurface of theſe folds, the ſpace below their anterior commiſſure, and the foſſa navicularis, then forms the nymphæ and preputium clitoridis, covers the veſtibulum, is continuous with the lining of the urethra, and with that of the vagina, after forming the hymen or carunculæ myrtiformes. It is connected to the ſubjacent parts by a copious and looſe cellular texture, in which, generally ſpeaking, there is very little fat. Its colour is of a tolerably bright red in young women; but it aſſumes darker ſhades in more advanced ages, particularly when the ſexual functions have been much exerciſed. The texture of the integuments changes gradually into this mucous ſurface, ſo that there is no abrupt line of diſtinction, and an epidermis can be diſtinctly demonſtrated at its origin. The colour proves that it is copiouſly ſupplied with blood. The membrane is ſoft on its ſurface, and plentifully bedewed with a mucous fluid, poured out from ſmall tubes, which commence by open orifices, and run into the ſubſtance of the membrane, where they terminate by cul-de-ſacs. Theſe, which are called lacunæ, are ſimilar to what we have deſcribed in the male urethra, and they have been very minutely inveſtigated by Haller. He deſcribes ſome ſmall ones, to the number of ſeven or eight, between the clitoris and urethra; and others conſiderably larger, on each ſide of the urethra, admitting a fine probe for the length of ſome lines. There are alſo two or three large lacunæ on each ſide of the vagina, admitting briſtles for half an inch or more. Nothing of a glandular ſtructure can be detected about theſe parts; the lacunæ ſeem to produce the mucus here as in the male urethra. Theſe parts, together with other lacunæ ſituated in the urethra, are the ſources of the fluid by which the female organs are lubricated: the circumſtances, under which it is effuſed, are thus mentioned by Haller; "mucus, quam feminæ in venerem ardentes profundunt, aut in coitu, aut a turpi frictione, aut demum, nam reperiuntur mulieres ejus naturæ, ad conſpectum formoſi amatique juvenis." Elem. phyſiol. lib. 28. p. 88.

This membrane enjoys a high degree of ſenſibility, and appears in part to be the ſeat of that peculiar modification of ſenſation experienced in coition. Its extraordinary dilatation in parturition, and the recovery of its former ſize, ſhew that it poſſeſſes extenſibility and contractility.

Sometimes the labia are united at their convex edges, and the urine eſcapes by a ſmall opening towards their upper end. The line of ſeparation can be eaſily recognized in ſuch a caſe, and a very ſlight inciſion is ſufficient to bring the parts to their ordinary ſtate. The nymphæ may be ſimilarly circumſtanced.

We have mentioned already, that the women of hot countries generally have large nymphæ; it would not be right to paſs unnoticed the peculiarity of formation aſcribed to the Hottentot women. Travellers have related that the ſexual organs are covered, in theſe females, by a natural kind of apron, *i. e.* by an extenſion of the ſkin from the pubes. Ten Rhyne, who had opportunities of perſonal obſervation, explains the fact by an unuſually large ſize of the nymphæ (de promontorio bonæ ſpei, p. 33.); but this does not agree with the ſtatement of Le Vaillant, who ſeems to have taken conſiderable pains to aſcertain the truth. He repreſents it as an enlargement of the labia, produced by artificial means, from a whimſical notion of beauty. "Theſe organs," ſays he, "may be extended to the length of nine inches, according to the age of the individual, or the perſeverance with which ſhe endeavours to bring to perfection this very ſingular perſonal decoration. I ſaw a young girl, fifteen years old, in whom they were already four inches long. They are brought to that ſize by rubbing and drawing them, which is the beginning of the proceſs; the affair is completed by ſuſpending weights from the parts. I have ſaid that it is a peculiar taſte, a ſtrange kind of whim; in the horde, where I was, there were only four women, and the young girl, whom I have juſt mentioned, in this ridiculous ſtate." The account given by Meſſrs. Peron and Leſueur, in a memoir addreſſed to the national inſtitute, ſeems to differ ſomewhat from the ſtatement of Le Vaillant, but this perhaps ariſes only from the mode of deſcription. They ſay that the part is an appendage of the labia, $8\frac{1}{2}$ centimetres in length in an adult, adhering above, where it is narroweſt, to the ſuperior commiſſure of the labia, in front of the clitoris, and divided into two lobes, which, approximated to each other, cover the vulva. It conſiſts of a ſoft, wrinkled, and very extenſile ſkin, entirely free from hair, rather redder than the reſt of the integuments, and ſuſceptible of corrugation, like the ſcrotum of man." (Cuvier, tom. 5. p. 125.) Steller mentions ſome peculiarity, ſimilar to that of the Hottentots, in the Kamtſchatkan women. See his Beſchreibung von Kamtkhatkan, p. 300.

The internal Organs of Generation.—The *vagina*, or canalis uteri, is a membranous canal, extending with a very ſlight obliquity from below upwards, and from before backwards, from the vulva to the neck of the uterus. Its anterior poſition is nearly tranſverſe; the poſterior aſcends towards the uterus. It lies in the middle of the inferior aperture of the pelvis, between the urethra and bladder, which are in front of it, and the rectum which is behind. The ordinary length of the canal is from five to ſix inches, and the breadth one inch; but as it is very extenſile, theſe dimenſions are ſubject to change. It is narrower, but at the ſame time longer in the virgin, than in married women; during parturition its ſize is equal to that of the child's head; it is very capacious after delivery, ſo as to be three inches in diameter; but it ſoon regains its previous ſize, never however returning to the narrowneſs of the virgin ſtate. Its form is nearly cylindrical, but ſomewhat flattened towards its anterior extremity. It is ſlightly bent towards the pubes; its two extremities are obliquely truncated, ſo that the anterior ſurface is ſhorter than the poſterior. We ſhall deſcribe in it an external and an internal ſurface, and two extremities.

The external ſurface may be divided into an anterior, a poſterior, and two lateral regions. The anterior, ſloping upwards and ſlightly concave, correſponds to the bladder and urethra, being connected to the former by a looſe cellular texture, and very intimately united with the latter by a denſe and firm ſubſtance. The poſterior region, ſloping from above and behind downwards and forwards, is gently convex, and correſponds to the rectum; its ſuperior half, being covered by the peritoneum, is ſimply contiguous to the inteſtine; while the inferior part, poſſeſſing no ſuch covering, is connected to the inteſtine by cellular ſubſtance. This connecting medium is much looſer above than below; and in the latter ſituation it is difficult to ſeparate the two organs without cutting one or the other. The lateral regions are narrower than the parts juſt deſcribed, and ſurrounded by much cellular ſubſtance. They correſpond to the ureters, to the plexus formed by the blood-veſſels of the uterus and vagina, and below to the levatores ani. The internal ſurface of the organ preſents a vaſt number of folds and prominences, which make it irregular throughout. Theſe callous rugoſities exhibit a moſt elegant arrangement in the fœtus and in the virgin; they are confuſed and partially obliterated by parturition, but are very ſoon reſtored, and may often be very diſtinctly obſerved even in old women. In ſome ſubjects, however, the whole vagina is nearly ſmooth. The half of the canal next to the uterus contains the feweſt and leaſt remarkable irregularities; the folds here are ſoft, moſtly tranſverſe, but ſometimes partly oblique. Theſe prominences are jagged laminæ, ending in a thin edge, turned towards the opening of the vagina, differing in ſize and variouſly interwoven with each other. On the anterior half of the canal are raiſed two prominent *columns*; an anterior and a poſterior one. Theſe are beſet with hard and nearly cartilaginous warty prominences, cloſely arranged, of a roundiſh figure, and circumſcribed by grooves. The anterior column is the largeſt, and correſponds to the orifice of the urethra. Frequently this is bifid towards the front, and its two portions, joined by tranſverſe rugæ, end in the hymen. The front end of this column ſometimes projects like a papilla at the orifice of the vagina. The poſterior ſmaller column is exactly oppoſite to the anterior, and correſponds to the rectum; ſometimes it is hardly diſtinguiſhable. This ends alſo in the hymen, and in ſome inſtances projects anteriorly like the anterior column, but leſs conſiderably. From each of theſe columns, hard, cartilaginous, tranſverſe or oblique folds are extended; they project downwards, have a jagged edge, and are mixed with verrucæ and other leſs prominent laminæ in various directions. Between the two columns is a reticulated ſurface, formed from the tranſverſe productions. The uſe of this ſtructure does not ſeem very obvious. It may poſſibly facilitate the dilatation of the organ. "Voluptatem et ateritum augere crederes, niſi in uteri cervice ſimiles valvulæ redirent. Arctant tamen eminendo vaginam; et inferior columna parti glandis frenulo vicinæ occurrit. Senſilem vaginam etiam facere credas, quæ ob has valvulas et ipſa magis confricetur. Inſenſilem tamen fuiſſe lego." Haller, Elem. Phyſiol. lib. 28.

All the generative apparatus abounds with mucus, and this moiſture is obviouſly convenient in many of the functions of the part. In the fœtus it appears as a whitiſh milky kind of fluid; and it is a true mucus in the adult. The fluor albus and gonorrhœa ſeem to be merely a diſeaſed ſtate of this ſecretion. Round livid ſpots are frequently obſerved on the ſmooth part of the vagina, near the uterus; their cauſe and nature are unknown. Numerous pores are obſervable among the folds and rugæ of the vagina. Euſtachius noticed ſinuſes in the membrane; *i. e.* tolerably large ſlits, ſometimes ramified, and containing mucus. No glands can be diſcovered in the organ.

The ſuperior extremity of the vagina is united to the inferior part of the neck of the uterus. It embraces the latter organ obliquely, ſo that the anterior ſurface of the vagina is nearer to the os uteri, and the poſterior is more remote from it; and the vacuity between the vagina and the neck of the uterus extends higher behind than before. The inferior extremity occupies the lower and poſterior portion of the vulva, in front of the anus, and ends there by the orifice which we have already deſcribed. The ſides of the vagina poſſeſs conſiderable thickneſs and ſtrength. The upper half of its poſterior ſurface is covered by peritoneum. The chief ſubſtance of the canal is a thick, cloſe, and firm texture of a greyiſh colour, poſſeſſing large veſſels, and having fibres in various directions, ſo as to give it ſomewhat of a muſcular appearance. It appears to be continuous above with the ſubſtance of the uterus. Below it is ſurrounded by a kind of corpus cavernoſum, of about an inch in breadth, and two lines in thickneſs, compoſed apparently of veins, and called the plexus retiformis. A determination takes place to this part at the time of copulation, and it experiences a kind of ſwelling analogous to erection. On the whole, the membrane of the vagina is not ſo thick, as the diſtention which it experiences in parturition might lead us to expect. Excepting where it is covered by the peritoneum, and by the plexus retiformis, the ſurface is ſurrounded by a copious cellular ſubſtance, containing many vaſcular ramifications.

The vital properties of the ſides of the vagina are not well underſtood. Some aſcribe to it a contractile power, exerciſed, as it is ſaid, in coition, and felt by the hand when introduced in the proceſſes of midwifery. The phenomena of parturition ſhew that it poſſeſſes in a high degree the powers of extenſion and ſubſequent contraction.

The internal ſurface of the canal is lined by a mucous membrane, to which the peculiar tiſſue of the vagina already mentioned adheres very cloſely. It is continuous with the membrane of the vulva; and, after lining the vagina, is extended over that portion of the cervix uteri, which projects into the canal, and communicates, at the os tincæ, with the lining of the uterus. This mucous lining forms all the inequalities already deſcribed; it is thicker near the vulva, and grows manifeſtly thinner towards the uterus. At the entrance of the canal it has a red colour, which changes farther into a grey or whitiſh caſt, diverſified near the cervix uteri by the livid ſpots already mentioned, which give it a marbled appearance. The almoſt cartilaginous hardneſs of the membrane in ſome parts is peculiar to the vagina, as well as the permanent folds in its ſtructure; in other mucous membranes the inequalities are occaſioned by ſome external cauſe, and diſappear by extenſion. Some anatomiſts aſcribe an epidermis to the vagina; but this point is doubtful. The organs, by which its mucous fluid is ſecreted, have been already mentioned.

The place of the accelerator urinæ of the male ſubject is occupied in the female by the *ſphincter vaginæ*, which covers the plexus retiformis. It deſcends on each ſide from the body of the clitoris, behind the erector; ſurrounds the anterior extremity of the vagina, immediately behind the labium, where it poſſeſſes conſiderable breadth, and terminates below, on each ſide, in the lateral fibres of the ſphincter ani. It muſt have the power of contracting the front orifice of the vagina.

The arteries of the vagina come from the internal iliac; its veins join the venous plexus, which ſurrounds the canal. The lymphatics are not well known; the nerves come from the ſacral trunks.

The *uterus* is the organ in which the fœtus and its coverings are contained until the time of parturition. It is almoſt always ſingle; in ſome rare caſes there have been two uteri. There is ſome variety in theſe inſtances; either there may be two uteri and two vaginæ; or a ſingle vagina divided by a ſeptum in its whole length, or only in its upper half; or one of the uteri may open into the rectum, and the other into the vagina. In ſome caſes the uterus is divided internally by a longitudinal ſeptum, either confined to the neck, or prolonged to the orifice of the vagina. Sometimes the uterus is altogether deficient. A vaſt number of references to authors who have related examples of all the above-mentioned unuſual formations may be ſeen in Voigtel's Pathologiſche Anatomie, b. iii. p. 452—456.

This organ is ſituated in the pelvis, behind the urinary bladder, before the rectum, below the convolutions of the ilium, and above the vagina. Its ſituation is oblique, the fundus being placed upwards and rather backwards, the neck downwards, and ſlightly inclined forwards. Two broad folds of peritoneum, named the ligamenta lata uteri, fix it to the ſide of the pelvis. Other ligaments aſſiſt in maintaining this viſcus in its ſituation; *viz.* the round, the anterior, and the poſterior ligaments.

The broad ligaments extend from the ſides of the uterus to the ſides of the containing cavity. Together with the uterus they form a complete tranſverſe partition, dividing the pelvis into an anterior and a poſterior cavity, of which the former and ſmalleſt contains the urinary bladder, the latter and largeſt, the rectum. Theſe ligaments are flattened from before backwards and quadrilateral. Their two ſurfaces are ſmooth, and unattached; the anterior being turned directly forwards, towards the bladder, the poſterior directly backwards, towards the rectum. The upper edge is divided into two prominent lines; of which the anterior and higheſt contains the Fallopian tube, the poſterior, the ovary and its ligament. The three other margins are adherent; the inferior, to the lower part of the pelvis; the external, to the ſide of the cavity; and the internal to the lateral margin of the uterus. Theſe ligaments are formed by two layers of peritoneum, between which are placed the veſſels and nerves of the uterus, the ovaria and their ligaments, the Fallopian tubes, and ſome cellular ſubſtance. They fix the uterus in its ſituation, and give it a covering, in proportion as it increaſes in ſize during pregnancy; they conſequently become much narrower at the time; in the latter months, indeed, they are almoſt entirely effaced, ſo that the tubes and ovaries, which they contained before the enlargement of the uterus, are now applied immediately to the lateral and inferior parts of the uterus, in conſequence of the manner in which this organ has ſeparated the two layers of peritoneum.

The anterior ligaments are two ſmall folds formed by the peritoneum, as it is reflected from the back of the bladder to the front of the uterus. They are viſible only when the two viſcera are ſeparated from each other, and they appear under the form of creſcents, with the concavities directed upwards. The poſterior ligaments are two other folds of the ſame membrane, where it is continued from the back of the uterus to the rectum. They reſemble the former in every reſpect. The round ligaments are two whitiſh cords, extended from the upper angles of the uterus, in front and rather below the Fallopian tubes, to the groins. They paſs firſt outwards and rather upwards, in the broad ligaments, on the front ſurface of which they form a remarkable prominence, they then paſs on the inner ſurface of the iliac veſſels, behind the peritoneum, to the upper opening of the abdominal ring. They traverſe that canal in a direction obliquely downwards and inwards, juſt as the ſpermatic cord does in the male ſubject, and eſcape at the lower orifice. They then ſeparate into ſeveral threads, which are loſt in the cellular ſubſtance of the mons veneris and labia. Theſe ligaments are ſlightly flattened in their whole extent, and broader at their two extremities, than in the middle. They are arched, ſo as to deſcribe altogether a ſemicircle.

The round ligaments are compoſed of longitudinal fibres, conſiſting apparently only of a denſe cellular tiſſue, very ſlightly ſuſceptible of extenſion, of blood-veſſels and lymphatics, and nerves. As they are ſwelled in pregnancy, and in ſome affections of the uterus, this circumſtance has been employed to explain the pains in the groins experienced by females on ſuch occaſions. They contribute to fix the uterus in its poſition, and to limit its motions.

The ligaments, which we have juſt particularized, are ſo diſpoſed, as to allow to the uterus, in its natural ſtate, a certain degree of mobility. Hence its ſituation may be ſlightly changed in all the conſiderable motions of the abdominal viſcera in general; coming to the ground on the feet with much force, a violent exertion in raiſing a conſiderable weight, a deep, forcible, and long continued inſpiration, all tend to force the uterus downwards into the vagina, and thereby to produce the affection termed prolapſus or deſcent of the uterus. Diſtention of the bladder, or of the rectum, occaſions changes in the poſition of the uterus. But age and pregnancy produce the moſt ſignal effects in the poſition of this organ.

In an adult and unimpregnated female, its length is about 2½ inches, its thickneſs one inch, its breadth at the fundus 1½ or 2 inches, and at the cervix about 10 lines. Although it returns after parturition to its original ſize, it never becomes again ſo ſmall as it was in the virgin. Its figure on the whole is triangular, with the baſe upwards, and the apex downwards, and flattened from before backwards. It is divided into two parts, a ſuperior and broader, named the body; an inferior and narrower, called the neck. The body of the uterus is nearly oval externally, with the greateſt diameter tranſverſe. We obſerve in it an anterior and a poſterior ſurface, a ſuperior, an inferior, and two lateral ſides. The anterior ſurface, ſlightly convex, ſlopes gently downwards and forwards, and correſponds to the bladder. The poſterior, more convex, is inclined in the ſame direction, and is contiguous to the rectum. The ſuperior edge, which is named the fundus, and which extends from one Fallopian tube to the other, is gently convex, and ſupports the convolutions of the ſmall inteſtine. At the ends of this upper edge angles are formed between the fundus and the lateral ſides of the viſcus. To theſe angles of the uterus the round ligaments, the Fallopian tubes, and the ligaments of the ovaries are attached. The inferior edge, much ſhorter than the ſuperior, is continuous with the neck of the organ; and indeed the line of ſeparation is imaginary. The lateral ſides are very ſhort, ſlightly convex, and converging: they give attachment to the broad ligaments, and are concealed by them.

The neck of the uterus reſembles a cylinder, ſlightly flattened from before backwards, and continued downwards from the body. Its long axis is perpendicular to the tranſverſe diameter of the body. We deſcribe in it an anterior and poſterior ſurface, two lateral margins, and a ſuperior and inferior extremity. The two ſurfaces are convex and ſmooth; the former correſponds to the bladder, and the latter to the rectum. To the ſides, which are ſtraight, the broad ligaments are attached. The ſuperior extremity is continuous with the body of the organ; the inferior is obliquely embraced by the vagina, in which it projects, more conſiderably on the interior than on the poſterior part. This extremity is perforated by an oval opening, with its long diameter placed tranſverſely, named the os uteri, os internum, or os tincæ. The latter name has been given to it from a compariſon to the mouth of the tench; the end of the uterus is obtuſe, and as the aperture is tranſverſe, there is ſome reſemblance to two thick lips. In a newly born child, the length of the opening is two lines; in a girl of twenty years, three lines; in women, who have had children, five to eight lines. The orifice is always naturally gaping, but it is more or leſs ſo, in proportion as women have had many children, or none. Inſtead of being exactly in the middle it is rather behind; ſo that the anterior lip of the orifice is the thickeſt. That portion of the cervix uteri, which projects into the vagina, and forms the os tincæ, is about four or five lines long in front, and rather more behind: it meaſures about eight or nine lines tranſverſely, and ſix or eight from before backwards, being ſlightly flattened in that direction. This part of the uterus is ſometimes much longer and thicker, without any diſplacement of the organ, or ſwelling of its neck. In women who have had many children, the neck of the uterus is generally thicker, and more rounded. Its orifice is almoſt always very gaping, and the lips more or leſs irregular, preſenting generally one or more grooves or chops, ſeparated by a kind of tubercles. The os uteri may however be as regular in its figure in women who have had children, as in others: and, on the contrary, it may preſent in the latter thoſe irregularities which are more uſual in the former. Hence the inferences drawn from the ſtate of this part, in inſtances where infanticide is ſuſpected, or where parturition is ſuppoſed to have been concealed, are very liable to uncertainty.

The cavity of the uterus is proportionate to the bulk of the organ when it is empty; the parietes are contiguous, and leave between them no farther vacuity than ſuffices to hold a little mucous fluid. In this hollow the menſtrual diſcharge flows, and the produce of conception is received. It is divided into two parts, one belonging to the body, the other to the neck of the organ. Of theſe, the former is the largeſt: its figure is nearly triangular, eſpecially when the uterus has experienced no alteration in its bulk. We have to notice in it an anterior and a poſterior ſurface, three edges and three angles. The two ſurfaces are ſmooth and contiguous to each other. On each of them a ſlightly prominent longitudinal line may be obſerved, dividing them into equal right and left parts. Of the three margins one is ſuperior, and two lateral: they are ſlightly concave, particularly in women, who have had many children. The ſuperior, which makes the baſis of the triangle, and is continued from one Fallopian tube to the other, is uſually the ſhorteſt: ſometimes, however, it is the longeſt. Of the three angles, two are ſuperior, and one inferior. The former may be conſidered as two ſlender appendages of the cavity, terminating at the Fallopian tubes. The inferior angle preſents an opening of about four lines in extent, communicating with the cavity of the cervix. The cavity of the body of the uterus is lined by a mucous membrane, on which the veſſels that furniſh the menſtrual blood terminate.

The cavity of the cervix uteri is a kind of canal, flattened from before backwards, and more capacious at the middle than at the two extremities; ſo that it has the figure of two cones, joined by their baſes. Such is the figure which it conſtantly exhibits in women who have never borne children; but, from the time of conception, that extremity of the canal, which opens into the vagina, is dilated; and after parturition has once taken place, it is always found much wider than before. It then repreſents a cone, with the baſis towards the vagina, and the apex towards the uterus. The cavity of the cervix uteri has an anterior and poſterior ſurface, and a ſuperior and inferior orifice. A great number of hard, and as it were callous rugoſities, differently diſpoſed in different ſubjects, may be obſerved on each of the ſurfaces. In order to ſee their arrangement to advantage, the uterus of a newly-born child, or of one not very old, ſhould be ſelected. They will then be obſerved in an arboreſcent form (*arbor Morgagni*) on each ſurface. A hard ridge extends along the middle of each ſurface, and ends above in a flattened point, which is often continued with the line dividing the correſponding ſurface of the body of the uterus. The inferior end is prolonged to the os tincæ. From this kind of trunk laminæ are extended laterally on each ſide; the ſuperior ones forming nearly half right angles, and the inferior more open angles. The number of theſe plates may amount to about 15. They are continued outwards, deſcribing a curve, of which the convexity is always towards the uterus, and the concavity towards the vagina. Their margin is grooved, except towards the outer end, which is ſmooth. The breadth of the laminæ diminiſhes inſenſibly, and they diſappear on the ſides of the cavity, where the anterior and poſterior ones are confuſed with each other. The ſuperior are broader than the inferior. Theſe laminæ are not ſimple, they produce other ſmaller ones. More or leſs deep grooves ſeparate the plates from each other: in the bottom of theſe are obſerved ſmall eminences, like the teeth of a comb, paſſing from one lamina to another.

The diſpoſition of theſe wrinkles is regularly ſuch as we have deſcribed in newly-born infants; but, when the cervix uteri is enlarged in pregnancy, the eminences are flattened, and the whole ſtructure is confuſed; this is ſtill more remarkably the caſe juſt after parturition; the laminæ are then nearly deſtroyed, and the arboreſcent appearance almoſt entirely effaced.

The ſuperior opening of the cavity communicates with that of the body, ſo that they form indeed but one. The inferior has been already deſcribed under the name of os tincæ.

In the cervix uteri we may notice the openings of numerous lacunæ or ſhort ducts ending in cul-de-ſacs, concealed among the rugoſities already deſcribed. Moſt of theſe are ſmall; ſome are larger and longer. There are ſix or ſeven juſt above the os tincæ, the fundus of which is towards the inferior end of the uterus. Theſe are large, and receive the terminations of ſeveral ſmaller ones. They are filled with a mucous fluid, which can be ſqueezed out, and they will often admit of a fine briſtle for a certain length. They are beſt ſeen in a woman who has juſt been delivered, or who has died in the latter periods of utero-geſtation; the prominences being flattened, the lacunæ are more expoſed. Theſe organs ſecrete the mucous fluid, with which the cervix uteri is moiſtened.

We ſee alſo ſometimes in this cavity a conſiderable number of round or oblong, larger or ſmaller follicles, formed of a thin membrane, filled with a clear mucous fluid, and not poſſeſſing any excretory duct. They adhere to the trunk or branches of the arboreſcent ſtructure already deſcribed, and their number is not conſtant. Sometimes they are half buried in the ſubſtance of the uterus, ſometimes they are completely iſolated, and hold only by a pedicle. Their nature and uſe are not known. Probably they are one ſource of the mucous ſecretions of the part although we cannot explain how the ſecreted fluid is evacuated.

The thickneſs of the ſides of the uterus varies from four or ſix lines to fifteen; but it is not uniform in all parts of the organ. It is much the ſame on the ſurfaces and edges. The fundus is generally the thickeſt; and this is thicker in the middle than towards the angles. The neck is rather thinner than the body. The ſubſtance of the organ is of a greyiſh colour, and a firm conſiſtence, eſpecially towards the neck, which is more compact than the reſt of the organ. It conſiſts of an external membrane, of a proper tiſſue, of an internal membrane, of arteries, veins, lymphatics, and nerves.

The external membranous covering is contributed by the peritoneum, which is reflected from the poſterior ſurface of the bladder over the uterus, of which it covers the anterior ſurface, the fundus, and the poſterior ſurface, is continued to the upper half of the poſterior ſurface of the vagina, and is reflected from that viſcus to the rectum. It adheres every where to the proper tiſſue of the uterus by means of a very fine and cloſe cellular texture, without any fat. It is very difficultly ſeparable, particularly at the fundus.

The proper tiſſue forms nearly the whole thickneſs of the organ. It is a greyiſh, denſe, and very compact ſubſtance, very reſiſting to the ſcalpel or ſciſſars, cutting almoſt like cartilage, and containing numerous ſmall veſſels. This ſubſtance, which appears cellular, ſpongy, and to contain fluids, is manifeſtly fibrous: but the order and arrangement of the component fibres cannot abſolutely be determined in the unimpregnated ſtate, on account of their being ſo inextricably interwoven. They are paler and more condenſed in the cervix than in other ſituations, where they are ſofter and more red. Although in the empty ſtate of the organ theſe fibres have ſcarcely any of the characters of muſcularity, their nature ſeems to be ſufficiently pointed out by the contractile powers which they exhibit in parturition.

The external membrane of the uterus is continuous on one ſide with the mucous lining of the vagina; and gives origin, on the other, to two prolongations, which enter into the Fallopian tubes. It is extremely thin, and ſo cloſely united to the proper tiſſue of the organ, that it ſeems to form one ſubſtance with it. It is reddiſh in the body of the uterus, and whiter in the neck. It is perforated by an infinite number of pores, which are merely the extremities of exhaling veſſels, and give iſſue to the menſtrual diſcharge.

Appendages of the Uterus.—Under this name are included the round ligaments which have been already deſcribed, the ovaries, and the Fallopian tubes.

The *Fallopian* or *uterine tubes* are two (a right and left) conical, tortuous, and vermiform canals, ariſing from the ſuperior and lateral parts of the uterus. They float looſely in the cavity of the pelvis, being enveloped in the upper and anterior edge of the broad ligament, and fixed by their inner extremities. Their length is four or five inches ; and the direction of their courſe very uncertain : it may be ſtated in general that they go tranſverſely outwards, and that they bend backwards at their outer ends, ſo as to turn towards the ovaries. But, as they are in great meaſure looſe, and as the edge of the broad ligament reſtrains them but ſlightly, the inteſtines, when diſtended with air or aliment, may diſplace them in different directions. The calibre of the tube is ſo narrow towards the uterus, that the orifice by which it communicates with this viſcus will only admit a hog's briſtle. It enlarges gradually to the middle, where it is ſlightly contracted, and dilates again to terminate by an aperture which communicates with the cavity of the abdomen. The tube is conſiderably broader at its end than at the uterus, but rather narrower than in the portion immediately preceding. The internal membrane of the tube, together with the external, which is formed of peritoneum, is produced to ſome length beyond this orifice, and forms round it a fringed and radiated kind of ornament, called the fimbriæ (pavillon de la trompe ; morceau frangé). When this part is examined in water, it has a very beautiful appearance, and ſeems compoſed of ſmall ſeparate leaves, like ſome flowers. The breadth of this membranous fringe is not equal at all parts : its circumference has ſomewhat of an oval figure. All the portions into which it is divided are not of the ſame length : the longeſt extends to the ovary, and is firmly fixed to its outer extremity, ſo that the fringed end of the tube is conſtantly retained near to that body. The fimbriæ are conceived to poſſeſs a muſcular ſtructure.

The Fallopian tube is compoſed : 1ſt. Of an external membrane, furniſhed by the peritoneum, which covers it as it does the inteſtines ; 2. Of an internal, ſoft and pulpy membrane, the ſurface of which preſents every where more or leſs prominent longitudinal lines, conſidered by ſome authors to be muſcular fibres. Indeed the office of the tubes ſeems to require the exiſtence of contractile fibres in their compoſition ; 3. Of a ſpongy tiſſue, compared to that of the urethra and corpus cavernoſum, but the real nature of which is not underſtood. Very numerous blood-veſſels are diſtributed in this ſubſtance, which appears to ſwell and experience a kind of erection in the act of copulation : in conſequence of this the fimbriæ are applied to the ſurface of the ovary ; 4. Of blood-veſſels, derived from the ſpermatic arteries and veins, of lymphatics, and nerves furniſhed by the renal plexuſes.

That the office of the tubes is immediately connected with the buſineſs of generation, and that they convey the germ from the ovarium to the uterus, cannot be doubted : but we do not underſtand how they execute this function. We may obſerve that they form a communication between the uterine cavity and that of the abdomen : and, as the former communicates externally through the medium of the vagina, the ſerous membrane of the abdomen has thus a continuity with the ſurface of the body :—a circumſtance that is obſerved in no other inſtance.

The *ovaries*, called by the ancients the female teſticles, are two oblong, flattened, and whitiſh bodies, placed at the poſterior ſurface of the broad ligaments, in which they are included. They nearly equal the ſize of ſmall pigeons' eggs in the adult ; but their flattened form gives them a different figure. Their long diameter is placed tranſverſely. They preſent two ſurfaces, two edges, and two extremities. The ſurfaces and the upper edge are looſe, and preſent nothing remarkable except ſlight tubercular riſings. The inferior margin adheres to the poſterior edge of the broad ligament. The external extremity is connected to the longeſt of the Fallopian fimbriæ ; and the ligament of the ovary is attached to the internal end. This ligament is a ſmall fibrous cord, about 1½ inch long, contained in the poſterior part of the broad ligament, and fixed to the angle of the uterus behind the Fallopian tube. Some old anatomiſts regarded it as a canal deſtined to convey into the uterus the ſemen, which they ſuppoſed to be ſecreted by the ovaries ; but it is in reality a ſolid faſciculus, ſimilar in its nature to the round ligament, and having no other office than that of fixing the ovarium in its place. Yet the latter organ poſſeſſes conſiderable mobility ; its ſituation in the broad ligament, which is itſelf moveable, gives it a power of motion. The inteſtines and the urinary bladder may make it change its poſition ; and we know that it has ſometimes been contained in a rupture.

The ovaria are compoſed ; 1ſt. Of an external membrane, derived from the peritoneum forming the broad ligament ; 2. Of a proper membrane, of a white colour, and firm fibrous texture, hardly ſeparable from the proper tiſſue of the organ ; 3. Of a fleſhy ſubſtance, which is denſe on the outſide, more ſoft on the inſide, where it is greyiſh, and in ſome degree cellular and ſpongy. In this ſubſtance are lodged ſome ſmall, roundiſh veſicles, amounting in number to between fifteen and twenty. Scarcely viſible in infancy ; theſe are very apparent in adult and fruitful women. Generally, in old women, theſe veſicles are no longer viſible, and their place is occupied by hardiſh tubercles. The veſicles are not all of the ſame ſize : thoſe which are near the ſurface of the organ are as large as hemp-ſeeds ; while the others, being more deeply ſeated, are conſiderably ſmaller. Theſe bodies are placed in the cellular or ſpongy ſubſtance of the ovary, in which they may be ſaid to be enchaſed ; but they form for the moſt part ſmall prominences under the external membrane. Others are completely elevated on the ſurface of the organ, and others again are concealed in the interior. They are not ſuſpended by ſtalks, nor do they form any particular cells different from the cellular matter compriſing the parenchyma of the ovary. They were very particularly deſcribed by De Graaf, and have often been called, after him, ova, or ovula Graafiana. They are generally regarded as ſo many germs, or rudiments of new beings. They are compoſed of a ſimple and very thin membrane, ſmooth internally, and containing a clear, ſometimes yellow or reddiſh liquor, coagulable by heat and alcohol, and forming white threads, like the albumen of an egg.

The arteries of theſe parts are derived from two ſources ; *viz.* the ſpermatic branches of the aorta, and the uterine branches of the internal iliacs. The former are more tortuous than the correſponding veſſels in the male ; they paſs between the two layers of peritoneum, which form the broad ligaments, and are chiefly diſtributed to the ovaries. But they ſend numerous ramifications to the Fallopian tubes ; others to the ſides of the uterus, and ſome along the round ligaments, which communicate with ſmall branches of the epigaſtrics. The chief arteries of the uterus are the uterine branches of the internal iliac trunks ; the right and left. This artery firſt runs downwards, then turns up at the neck of the uterus, and enters between the layers of the broad ligament. It gives large branches to the vagina, then runs along the ſide of the uterus, from the neck towards the fundus, producing numerous arteries, which ramify over the organ in every direction. Theſe have a tortuous courſe, and communicate freely with each other, and with thoſe of the oppoſite ſide.

Some aſcend to the upper edge of the broad ligament, are diſtributed in the Fallopian tube and round ligament, and communicate with the ſpermatic.

The veins, like the arteries, may be referred to two diviſions; the ſpermatic and uterine. Numerous branches come from the uterus, ovary, and Fallopian tube, and form a large venous plexus in the upper part of the broad ligament; under the name of corpus pampiniforme, this aſcends towards the loins, and terminates in forming a ſingle vein, which has the ſame termination in the male ſubject. A great number of venous ramifications accompany the arteries all over the viſcus, but are in general leſs tortuous. They communicate freely with the ſpermatics. They form a large plexus running along the ſide of the uterus, with the uterine artery, and end in one or more conſiderable venous trunks, which join the internal iliac.

The uterus poſſeſſes numerous lymphatic veſſels, which are divided into three orders: one of theſe aſcends with the round ligaments, and goes to the inguinal glands; another joins thoſe of the vagina, and paſſes to the pelvic glands; and the third, together with thoſe of the ovary and tube, aſcends with the ſpermatic veſſels, to terminate at the glands in front of the aorta and vena cava near the kidneys.

The nerves come from the great ſympathetic (the hypogaſtric and ſpermatic plexuſes), and from the ſacral pairs.

Vital Properties of the Uterus.—Until the period of impregnation, this organ ſeems to poſſeſs only that modification of ſenſibility and contractility, which are neceſſary for the purpoſes of nutrition, and the menſtrual evacuation. It ſeems doubtful whether or no it is endowed with animal ſenſibility in its healthy ſtate. It has been imagined, and aſſerted, that the contact of the glans penis with the os tincæ, in copulation, is one ſource of the phyſical ſenſation experienced by the female on that occaſion: this we conceive to be problematical. Haller ſtates, that a wound of this organ by a leaden bullet produced very violent ſymptoms; *viz.* repeated faintings, and ſpeedy death. It muſt be doubtful how far this could be referred to the uterus merely, as much other injury muſt have been inflicted in ſuch a caſe. Animal ſenſibility is certainly developed in the uterus by diſeaſe, whether it exiſt in the natural ſtate or no. The ſame obſervations may be applied to the vital properties of the Fallopian tubes and the ovaries. However obſcurely the vitality of theſe organs may be exhibited, when not immediately engaged in the exerciſe of their important functions, it is manifeſted in a much more ſtriking point of view by the ſympathies eſtabliſhed between them and other parts of the body. We have already ſhewn, that the removal of the ovaries at an early age entirely changes the ſubſequent characters of the animal; affecting even the organization of the bony and muſcular parts of the frame. From the time of puberty, when the organs now under conſideration acquire a fitneſs for exerciſing their particular functions, we ſhall find that their condition and various changes affect in the moſt ſtriking manner all the other vital phenomena of the female conſtitution. The previous ſymptoms, the commencement and periodical returns of menſtruation; the firſt impulſes of love; the change to a new temperament; pregnancy and its various epochas; parturition and its conſequences; laſtly, the ceſſation of the ſexual life, and the ſymptoms of the critical age, are ſo many remarkable changes in the organization of the female, keeping up a conſtant alternation of ſuffering and diſeaſe, of lively impreſſions, nervous and ſpaſmodic affections, the influence and general reſult of which muſt be carefully attended to in appretiating the nature of woman, and the part which ſhe has to fill in ſociety. When we conſider theſe facts, and reflect that the inclinations, the appetites and taſtes, in a word, all thoſe qualities which impreſs the diſtinctive character on any animal, flow from the conformation and predominating influence of certain organs, and are modified by their degree of perfection, and the energy of their functions, we ſhall have little heſitation in referring the peculiarities of the female frame and conſtitution to the action of the generative organs taken altogether; an opinion which is expreſſed in a more limited way by Van Helmont, "propter uterum ſolum, mulier eſt id quod eſt."

Developement of the female Organs of Generation.—Theſe, like the correſponding parts in the male, are very early in their original formation; but they grow leſs rapidly in proportion towards the latter periods of geſtation. This muſt be underſtood of other internal parts; for the vulva, which beſtows the diſtinctive external ſexual character, aſſumes a more decided figure towards the time of birth. From the various parts compoſing it we muſt except the clitoris; for although it poſſeſs in a fœtus at the full time a conſiderable ſize compared to its magnitude, when the formation of the generative apparatus is complete, it is nevertheleſs much leſs developed at the time, in proportion, than at the third or fourth month: and we may obſerve, in general, that it is more prominent in proportion as the fœtus is younger.

Although the female organ preſent no phenomenon analogous to the deſcent of the teſtis in the male, the round ligament is ſometimes accompanied by a ſmall cul-de-ſac of peritoneum, ſimilar to that which forms the tunica vaginalis. The exiſtence of this canal was firſt recogniſed by Nuck, who called it a diverticulum, deſcribed it as being about half an inch in length, and by no means conſtant: (Adenographia curioſa, cap. 10. De peritonæi diverticulis novis.) The fact was queſtioned by ſome; but the ſame circumſtances have been obſerved by other accurate anatomiſts. Camper found the canal in three out of fourteen newly born children: and Le Cat obſerved, in a woman of 46, a canal of the ſize of a gooſe's quill, leading through the ring into a ſmall canal that would admit the finger. (Phil. Trans. v. 47.) Wriſberg has particularly inveſtigated theſe diverticula. In nineteen out of two hundred female ſubjects, he found an opening, generally on both ſides, but ſometimes on one only, leading through the ring into the groin or labium, lined by peritoneum, and placed over the round ligament. Theſe canals, in different inſtances, would admit a probe, a quill, or the finger. (De teſticulorum deſcenſu, &c. in the Göttingen Commentaries for 1778.) We do not know that this canal is cloſed before birth, as the tunica vaginalis is in the male, nor that its exiſtence in the adult at all favours the occurrence of herniæ.

At the time of birth, there is a conſiderable proportion of fat under the integuments of the pubes; the labia are very well formed, and the clitoris is proportionally larger than it will be in the ſequel. The latter circumſtance, which is very ſingular and unaccountable, has ſometimes occaſioned miſtakes in the ſex of newly born children. The nymphæ are ſo broad as to exceed the level of the labia, and are remarkably thick and long: they do not in general end by a point, as in the adult, but by a rounded extremity. The foſſa navicularis is large. The entrance of the vagina, although the hymen exiſt conſtantly at this time, is larger in relation to the diameter, which it preſents at puberty, when the parts have experienced no unnatural violence. The opening does not appear to participate in that developement which the reſt of the vulva undergoes after birth. The vagina, conſiderably advanced in its formation in compariſon with the uterus and its appendages, is particularly remarkable for its length. Its inner membrane, of which the rugoſities are very well marked, is nearly white, and does not exhibit thoſe ſucceſſive ſhades which, at a more advanced age, diſtinguiſh its orifice, its middle, and its poſterior extremity. In the newly born child, and during the firſt years of life, the uterus does not occupy the cavity of the pelvis: together with the ovaria and tubes, it is placed above the ſuperior aperture. At this time it is very ſmall, and has a very different figure from what it preſents when perfectly developed. The neck is larger and thicker than the body, which narrow, and elongated, has not the triangular figure. The parietes of both are thin, and the cavity very ſmall. The tubes are proportionate in length to their future ſtate.

From birth till puberty, the generative organs of women experience ſtill fewer changes than thoſe of men: yet they grow in proportion as the body encreaſes; and thoſe, which at firſt were remarkable for their ſize, as the clitoris and nymphæ, gradually loſe this diſtinction. The uterus appears leſs elevated above the pubes, in proportion as the pelvis changes its form and proportions, and as the ſuperior aperture becomes leſs inclined. It encreaſes principally in breadth and thickneſs, but its growth is not very rapid. The changes which occur at the time of puberty, conſidered in an anatomical point of view, are not conſiderable: there is a remarkable revolution in the vital powers of the generative ſyſtem, rather than any conſiderable increaſe of the organs. The internal parts, however, at this time, have acquired their complete ſize, and the external organs become covered, in the ſituations already particularized, with hairs.

In extreme old age, the generative organs of the female, already reduced for a conſiderable time to complete inaction, bear the marks of decrepitude common to the whole frame. The vulva preſents the moſt remarkable changes; this is the part moſt affected by the performance of the ſexual functions, and many parts of it partake the general emaciation. The prominence of the mons veneris is nearly effaced, and a great part of the hair, which covered it, is loſt; the remainder becoming grey and ſtraight. The labia and nymphæ are ſoft and flaccid; the latter ſometimes can ſcarcely be ſaid to exiſt: the mucous membrane is whitiſh, or at leaſt very pale in its colour. The ſtate of the vagina preſents nothing very remarkable. The volume of the uterus is diminiſhed, its parietes having become thinner. The tubes and round ligaments are alſo in ſome degree reduced. The ovaria do not exceed half the ſize which they had in the adult age; they are ſometimes very denſe, and marked with deep grooves, ſo as to render the ſurface tubercular; in other inſtances, their ſubſtance is removed, ſo that they are reduced to a very thin appearance. The veſicles contained in their parenchyma are no longer diſcernible.

State of the Generative Organs during Pregnancy.—The uterus, intended to ſerve as a receptacle for the fœtus, dilates after it has received the germ from the ovary, and enlarges in proportion as this is developed: its blood-veſſels bring an additional quantity of fluid, from which the fœtus draws its ſupport: laſtly, at a certain period, fixed by the laws of nature, it diſcharges the produce of conception by virtue of the vital properties, with which it has been endowed, during the remarkable change of its organization. Such are the threefold objects, to the attainment of which are directed the new diſpoſitions acquired by this organ during geſtation.

The anatomy of the gravid uterus has been moſt fully elucidated by Dr. William Hunter, whoſe ſplendid and beautiful plates form an epocha in the hiſtory of our knowledge of this ſubject. "The anatomical Deſcription of the human gravid Uterus and its Contents," London, 4to. 1794, drawn up by Dr. Baillie, from the papers of Dr. Hunter, contains a very clear account of the ſubject; this, with the plates already mentioned, is the ſource from which the following deſcription is principally derived. The obſervations, unleſs where it is otherwiſe expreſſed, apply to the ſtate of the organ as it is found in the 9th month.

Conſiderable variety exiſts in the ſize of the organ. The child and placenta may be twice as large in one caſe as in another: there may be ſix or eight times more water in one caſe than in another: not to mention the differences ariſing from there being only one child or twins, &c.

The developement of the uterus appears to be immediately produced by the general diſtention of the liquid ſurrounding the fœtus, and not by the fœtus itſelf, ſince the latter does not come in contact with the organ. The ſize of the part depends principally upon the quantity of the liquor amnii. For, though women who have twins, or a very large child, are commonly obſerved to be very big, yet the greateſt number of thoſe who are really very much ſwelled out, are ſo only from a vaſt quantity of water. In ſuch caſes there is frequently but one child, and that very often a ſmall one.

The general figure of the uterus is oviform; the fundus anſwering to the largeſt extremity of the egg, and the cervix and os uteri to the ſmall end: but the fundus is larger and more flat, or leſs pointed, in proportion to the lower extremity of the uterus, than one end of an egg is to the other; and the whole uterus ſeems more or leſs compreſſed, ſo as to be broader from right to left, than it is from the forepart backwards. Beſides theſe more conſtant deviations, the figure of the uterus differs from the regular oviform, from a variety of accidental cauſes, as it adapts itſelf to the neighbouring parts, to the attitude of the body, and to the poſition of the contained child. In order to conceive theſe varieties more eaſily, we muſt remember that in moſt caſes the uterus is not ſo completely filled as to be upon the full ſtretch. Were it out of the body, and filled artificially, it would eaſily contain more than it actually does. Thus the uterus, like a bladder of water not quite full, is plaſtic, and moulds itſelf into various ſhapes from accidental circumſtances. The figure of the organ, in particular ſituations, is modified by the preſſure of the ſurrounding parts: the brim of the bony pelvis has the effect of a belt girding the lower part of the organ, and the projections of the ſpine, and of the pſoæ muſcles and iliac veſſels, mould the outſide of the uterus into correſponding cavities. The attitude of the body influences the figure of the uterus, as the parts againſt which it reſts vary in different poſtures. The poſition of the child is another cauſe influencing the figure of the uterus. Not only in dead bodies do we ſee the parts of the child making various different projections on the outſide of the uterus; but we can frequently obſerve the ſame variety in the living ſtate, by examining the outſide of the abdomen. The round projecting ball, made by the child's head or buttocks, is commonly very perceptible, and in many inſtances ſmaller parts, as the knees or elbows, can be diſtinctly felt. Dr. Mackenzie met with a caſe of twins, where the uterus, inſtead of making one compacted oval body, had ſtretched into two diſtinct bags, for containing the reſpective fœtuſes; ſo that its outſide was marked by a notch, dividing it into two apartments, as deep and diſtinct in proportion, as that in the heart repreſented on cards. The organ often ſtretches unequally in the correſponding oppoſite parts; ſo that either the right or the left half may be conſiderably larger than the other. It may ſwell unequally on the front or back part, ſo that the diſtance between the inſertions of the Fallopian tubes may be much ſmaller either before or behind than in the oppoſite directions. In the unimpregnated ſtate, it has commonly one triangular cavity: but it is ſometimes ſubdivided, at its upper part, into two lateral cavities, ſo as to bear ſome analogy to the two horns of the uterus in a quadruped. This peculiar conformation may explain the unequal extenſion of the two ſides in ſome caſes of pregnancy; and may elucidate the above-mentioned caſe of Dr. Mackenzie.

The ſmall or lower end of the organ is placed in the cavity of the pelvis. This generally contains the greater part of the child's head, and fills up the cavity ſo completely, as to preſs the bladder againſt the pubes, and the rectum againſt the ſacrum. The os uteri is directed againſt the coccyx, or the lower part of the ſacrum. The body and fundus, which contain the reſt of the child and the placenta, are ſo placed in the front of the abdomen, from the brim of the pelvis upwards to the epigaſtric region, as to be under and before all the other bowels, and in immediate contact with the parietes abdominis, and to occupy the whole ſpace from one hip-bone to the other, and a proportional extent from theſe bones upwards. As it riſes up from the cavity of the pelvis into the hypogaſtric and umbilical regions of the abdomen, the looſe connections of the inteſtines and omentum eaſily account for theſe parts being puſhed up before it.

The axis of the uterus is oblique, its lower end being turned backwards, and the upper proportionally forwards. This obliquity is changed by the attitude of the body, and by many other cauſes. In the erect poſture, the weight of the uterus preſſes the forepart of the organ into a greater rotundity, and its axis then approaches the neareſt to a tranſverſe or horizontal line. In the recumbent poſture, the contrary ſituation is exhibited. In a firſt pregnancy, the uterus ſtretches itſelf higher up in the epigaſtric region, and its axis comes nearer to the longitudinal or vertical direction, becauſe the parietes of the abdomen do not eaſily give way: but in a woman who has had many children, the abdomen, by repeated diſtention, is rendered more looſe and pendulous, and the uterus extends forwards rather than upwards. This poſition is more remarkable in very ſhort ſubjects; becauſe in them the cheſt is ſo near the pelvis, that the uterus is ſtopped in aſcent. The ſame circumſtance happens, and for a ſimilar reaſon, when the pelvis is very narrow: as no part of the organ, in ſuch a caſe, can be lodged in the pelvis, it muſt be placed proportionally higher. In a very ſhort and crooked woman, on whom the cæſarean ſection was performed, the fundus uteri was not only turned forwards, but even a little downwards. As ſhe lay upon the table, the navel could not be ſeen, as it was placed on the poſterior and inferior part of the abdominal tumour. In order to expoſe that part of the abdomen to the ſurgeon, it was neceſſary to lift up the fundus uteri, without which the hypogaſtric region would have been inacceſſible. The deviation of the organ towards the right or left ſide cannot, in general, be very conſiderable; as it poſſeſſes nearly the whole ſpace between the hip-bone, and its lower extremity is fixed to the pelvis. A ſmall lateral obliquity is very common; and we can eaſily ſuppoſe, that in a reclined poſture, the projection of the lumbar vertebræ will throw rather more than one-half of the uterus into the lateral cavity between the ſpine and one hip-bone. We know, indeed, that in all the laſt months, the abdomen is often more full on one ſide than on the other. Women ſay in ſuch a caſe, that the child lies on one ſide, and they judge rightly. Where the child lies the bulk muſt be both more conſiderable and more permanent, but where there is only uterus, placenta, and water, the ſwelling will be ſofter, and project leſs. The preſſure of the child, when it lies more in one ſide than in the other, makes the limb of that ſide weaker, more benumbed, and more liable to cramps, and œdematous ſwellings.

Of the Ligaments, Tubes, and Ovaria of the Pregnant Uterus.—It has been commonly obſerved that the ligaments and tubes of the pregnant uterus are attached lower upon the ſide of the organ than they were in the unimpregnated ſtate; and the reaſon is very obvious. The peritoneal coat of the uterus makes the broad ligament on each ſide, much in the ſame manner as the analogous membrane of the inteſtinal tube makes the meſentery. When the woman is not pregnant, the ligament is of conſiderable breadth, the ſpermatic veſſels paſs between its two laminæ, the round ligament runs downwards and outwards, on its anterior ſurface, and the tube runs in looſe ſerpentine turns on its upper edge. But in proportion as the circumference of the uterus grows larger, the broad ligaments become narrower, their poſterior lamella covering the poſterior ſurface, and their anterior lamella the anterior ſurface of the uterus itſelf. We obſerve now, that the round ligaments do not run down on the forepart of the broad ligaments, but upon the forepart of the body of the uterus itſelf. In proportion as the fundus riſes upwards, and increaſes in ſize, the upper part of the broad ligament is ſo ſtretched, that it clings cloſe to the ſide of the uterus, ſo that in reality the broad ligament diſappears, no more of it remaining than its very root; namely, its upper and outer corner, where the group of ſpermatic veſſels paſſes over the iliacs, to the ſide of the uterus. In this ſtate, although the ſmall end of the tube opens into the ſame part of the uterus, as before impregnation, yet the tube has a very different direction; inſtead of running horizontally outwards, it paſſes downwards, cloſely attached to the ſide of the uterus. Behind the fimbriæ lies the ovarium, alſo connected to the uterus. The fimbriæ and ovarium are commonly placed upon the iliac veſſels, or fleſhy brim of the pelvis, behind the group of ſpermatic veſſels.

The round ligaments run almoſt perpendicularly downwards from the fundus uteri to their paſſage through the muſcles; they are conſiderably enlarged in thickneſs, and are ſo vaſcular, that when injected they ſeem to be little more than a bundle of arteries and veins. Their arteries are all convoluted. Both their arteries and veins proceed principally from the ſpermatics, and anaſtomoſe evidently with the external veſſels in the groin or upper part of the labia. Even in this enlarged ſtate of the round ligaments, it is very difficult to ſay how they terminate in the groin; they appear to be inſenſibly loſt. The tubes are more fleſhy, vaſcular, and ſoft in their ſubſtance, and are leſs convoluted than in the unimpregnated ſtate. The fimbriæ and internal rugæ are larger and much more beautiful, eſpecially when their veſſels are well injected. The ovaria, excepting that which contains the corpus luteum, ſeem to have undergone no remarkable change. The latter body can be diſtinguiſhed by a rounded fullneſs, and frequently a conſiderable prominence, ſenſible both to the ſight and touch, upon the middle of which there is a ſmall pointed cavity or indentation, like a cicatrix. Upon ſlitting the ovarium at this part, the corpus luteum appears a round body, of a very diſtinct nature from the reſt of the ovarium. Sometimes it is oblong or oval, but more generally round. Its centre is white, with ſome degree of tranſparency; the reſt of its ſubſtance has a yellowiſh caſt, is very vaſcular, tender and friable, like glandular fleſh. The larger veſſels appear round its circumference, and ſend ſmaller branches inwards. A few of the larger veſſels are ſituated at the cicatrix or indentation on the outer ſurface of the ovarium; and are there ſo little covered, as to give that part the appearance of being bloody, when ſeen at a little diſtance. When there is only one child, there is only one corpus luteum; and two in caſe of twins. There may be, in the latter caſe, two diſtinct ones in one ovarium, or one in each ovarium. The ſex of the fœtus has no relation to the corpus luteum being formed in the right or left ovary.

Thickneſs of the Uterus.—Thoſe who ſay that the uterus grows thicker in proportion as its bulk is increaſed, have probably been deceived by examining the uterus of a woman who died ſome hours or days after delivery. In that contracted ſtate the uterus is often found even two inches thick: but in the natural diſtended ſtate, though there may be ſome difference, the thickneſs, in general, is but little more conſiderable than before impregnation. When not injected, its ordinary thickneſs is from one to two-thirds of an inch; when its veſſels, and particularly the veins, are pretty well filled with wax, its thickneſs is thereby conſiderably increaſed, more eſpecially where the placenta is fixed, on account of the number and ſize of the veſſels at that part. For this reaſon only, perhaps, the uterus is thickeſt at that part, and for the ſame reaſon it is thicker towards the fundus than near the cervix. Much variety may be obſerved with reſpect to thickneſs: and ſuch inequalities in the ſame individual, that even where the placenta did not adhere, the uterus may be almoſt twice as thick at one part as at another. On opening the organ, its thickneſs is generally found more conſiderable than external examination would have led us to expect. For its ſubſtance is ſoft, and a fluctuation, like that of water in a thin bladder, may be felt.

Blood-veſſels.—There is no circumſtance, in which the gravid uterus differs more from the unimpregnated, than in the ſize and termination of its veſſels. The arteries, both ſpermatic and hypogaſtric, are very much enlarged. There are infinite numbers of anaſtomoſing arteries through the whole ſubſtance of the part, ſo that the whole ſyſtem makes a general net-work, and the branches are convoluted or ſerpentine in their courſe. None of the larger ramifications are ſeen for any length of way upon the outſide of the uterus. As they branch from the ſides, they diſappear by plunging deeper and deeper into the ſubſtance. The arterial branches, which are much enlarged, are thoſe which run towards the placenta; ſo that, wherever it adheres, that part appears evidently to receive by far the greateſt quantity of blood; and the greateſt number, both of the large and ſmall arteries at that part, paſs through to the placenta, and are neceſſarily torn through upon its ſeparation. The veins of the uterus appear to be ſtill more enlarged, in proportion, than the arteries. From the ſides of the uterus they ramify through its ſubſtance, running deeper and deeper as they go on, and without following preciſely the courſe of the arterial branches. They form a plexus of the largeſt and moſt frequent communications which we know of among the veſſels of the human body. And this they have in common with the arteries, that their larger branches go to, or rather come from that part of the uterus to which the placenta adheres; ſo that, when the venous ſyſtem of the uterus is well injected, that part is evidently the chief ſource of the returning blood. Here, too, both the large and ſmall veins are continued from the placenta to the uterus, and are always neceſſarily broken upon the ſeparation of theſe two parts. The veins are without valves, and are therefore eaſily injected. In injecting them, we obſerve that at firſt they become turgid, and project on the outer ſurface of the uterus; but in proportion as we throw a greater quantity of wax into theſe veſſels, they grow more flat and obſcure; becauſe the uterus itſelf becomes more filled and tenſe, which has the effect of compreſſing the veins that run in its ſubſtance. On account of the large ſize of theſe veſſels, and the appearance of cavities, which they exhibit on a ſection, the name of *ſinuſes* has ſometimes been given to them.

The *lymphatics* are more numerous, and many of them larger than could have been imagined. They pervade the ſubſtance of the organ univerſally. Its peritoneal coat appears, like that of a calf's ſpleen, to be interwoven with a crowded plexus of theſe veſſels; and where they get to the ſides of the uterus, when filled with mercury, ſome of them are even larger than a gooſe's quill. Some are remarkably varicous, or enlarged at particular places.

We do not know that any change takes place in the nerves of the uterus during pregnancy.

Muſcular Fibres of the Uterus.—The ſubſtance of the organ is rendered remarkably ſoft and looſe in its texture by pregnancy; ſo that, when an inciſion is made into it, the wound can be eaſily made to open wide; or if a narrow ſtrip be cut out, it can readily be extended to at leaſt twice its original breadth. This laxity appears to depend on two cauſes; *viz.* the great quantity of large veſſels in its compoſition; and the looſe connection between the faſciculi of its fibres. When we ſpeak of the muſcular fibres, it is difficult to treat the ſubject with preciſion. We neither know their external appearance, nor their internal compoſition. They only manifeſt themſelves to our ſenſes, where numbers of them are collected into bundles, and make what we commonly call muſcular faſciculi. In the quadruped, as, for inſtance, the cat or rabbit, the muſcular action of the uterus is ſeen as evidently as that of the inteſtines, when the animal is opened immediately after death. In many parts, particularly of the internal ſurface of the uterus, theſe fibres have the ſame ſtriking faſciculated appearances as we obſerve in common muſcles; yet they are of a paler colour and harder texture. Dr. Hunter examined the fibres very carefully in a woman who died ſeven days after delivery. He ſtretched it gradually in warm water, and then inverted it, to have a full view of the inner ſurface. The remains of the decidua had paſſed off with the lochia, ſo that the faſciculated ſtratum of muſcular fibres appeared to be bare, and to make the internal ſurface of the uterus. In many places, but particularly where the placenta had been fixed, the faſciculi left oval ſpaces between them, for the paſſage of arteries and veins, ſomewhat like thoſe ſeparations in the tendinous fibres of the abdomen and loins, where veſſels paſs out to the cellular membrane and integuments. The cervix uteri, where the rugæ are ſituated, had not ſuch regular nor ſo large faſciculi as the reſt of the uterus. In the body of the organ the fibres were very regularly circular. The fundus was made up of two planes of concentric fibres, at the very centre of which was the orifice of the Fallopian tube. When this internal ſtratum was removed, the faſciculated appearance and regular direction of the fibres was leſs and leſs apparent, in proportion as the diſſection was continued outwards; which ſeemed to be owing in great meaſure to the infinite number of branches and communications of the large veins. Afterwards, ſays the doctor, I had the moſt favourable occaſion that could be deſired, for examining the fibres on the inſide of the uterus. It was in a woman who died at the end of the ninth month, without being in labour, and without having any flooding or diſcharge of waters. When I had examined, and taken out all the contents, I attended particularly to the internal ſurface of the uterus. I found it every where covered with a thin ſtratum of the decidua, through which the muſcular fibres appeared, but with ſome degree of obſcurity. Upon rubbing off this tender membrane with a cloth, it gave me pleaſure to ſee how exactly the above deſcription agreed with the appearances.

The exiſtence of muſcular fibres in this organ has not, however, been univerſally acknowledged. "Reſpecting the alleged muſcular texture of the uterus," ſays Blumenbach, "I muſt obſerve that all the human uteri, which I have carefully examined both in the pregnant and unimpregnated condition (and I have had opportunities of ſuch inveſtigations, not merely in preparations, but in the moſt recent ſtate after death) have not exhibited any thing that could be taken for genuine muſcular fibres. The advocates for the muſcularity of this organ muſt allow that the fibres differ moſt remarkably from all others in the body. I am more and more convinced every day that the uterus poſſeſſes no true irritability; but that it poſſeſſes, if any part of the body can be ſaid to poſſeſs, a peculiar modification of vitality (vita propria) correſponding to its peculiar motions and functions, and not referrible to the common laws of irritability. Theſe functions appeared ſo ſingular and peculiar to the old phyſicians and philoſophers, that they called the uterus an animal contained in an animal." Inſtitut. Phyſiolog. p. 422.

The mouth of the uterus differs conſiderably in the different times of utero-geſtation. For the greateſt part of the nine months, that is, till the cervix uteri be fully diſtended, there is a projection of both the anterior and poſterior lip of the os tincæ; and in ſome women this continues till the very time of labour. But in moſt women, when they are at their full time, or very near it, the os uteri is flat, and makes only a ſmall rugous hole, often not readily diſcoverable by the touch on the lower or poſterior part of the rounded lower end of the uterus. The border of this orifice, and the internal ſurface of the uterus, for an inch or more all around, is full of little irregular cavities. Theſe contain a tough gluten, which ſhoots acroſs, and plugs up the inner part of the orifice. This gluten is commonly ſqueezed out from all the lacunæ, by the dilatation of the os uteri in the beginning and progreſs of the labour; and ſo loſing its hold, it falls out. In the dead body, when the part is kept ſome days in water, the gluten ſwells out more and more from all theſe cavities, and then ſeparates entirely. Then the innumerable lacunæ, which contained it being empty, are very viſible. And if the gluten be thus carefully taken away, and be floated in water, its external ſurface is ſeen beautifully ornamented with all the proceſſes which were drawn out of the innumerable lacunæ.

Dr. Hunter gives us the following account of the uterus in the earlier months of pregnancy. "In the third and fourth months, the ſubſtance of the uterus is become more ſoft than before conception, and all its veſſels being proportionably enlarged, it appears to be much more vaſcular. We may, therefore, reaſonably believe, even if we knew nothing from diſſections of quadrupeds, that the uterus changes its nature in that reſpect from the time of conception, and receives a greater quantity of blood. Its thickneſs is only a little increaſed in its natural ſtate, but conſiderably when the veins and arteries are artificially diſtended with any fluid. At this time the conception is lodged entirely in the fundus uteri, or in that part which in the unimpregnated ſtate has a ſmooth internal ſurface; no portion of the conception ſtretching then down into the cervix uteri, or that part of the uterus, which is narrow and rugous within.

"The cervix uteri remains contracted and hard in its ſubſtance, and contains a tough and firm jelly, which cements and fills up its cavity ſo completely, that upon attempting to puſh a probe through it, the probe will as readily force its way through the hard ſubſtance of the uterus itſelf, as through the cementing jelly. When the uterus is kept a conſiderable time in water, ſix or eight days perhaps, this cementing jelly ſwells, grows in proportion ſofter, and at laſt comes away, or falls off in one maſs. Then the internal ſurface of the cervix exhibits a moſt beautiful appearance; being variegated with projecting rugæ, and innumerable intermediate narrow, but deep cavities, which lodged ſo many proceſſes of the jelly. In ſeparating the jelly, when by previous maceration it had been fit for ſuch an operation, I have ſeen thoſe proceſſes drawn out of the little cavities as diſtinctly as we can ſee a hand drawn out of a glove: and when the jelly is carefully ſeparated and floated in clear water, it preſerves its figure, and exhibits a moſt elegant appearance, produced by the proceſſes that ſhoot out from its ſurface all around.

"The os uteri, or very extremity of the uterus, is in ſome women narrow or pointed, with a very ſmall orifice, that will juſt admit the point of a very ſmall finger; and in ſome it is large, ſoft, or ſpongy to the touch, granulated upon its ſurface, and the orifice ſo wide as to admit the end of the finger full half an inch up with great eaſe. There the paſſage becomes narrow, and is cloſed with the gelatinous cement. The os uteri, all around its paſſage, is crowded with ſmall cavities, containing the ſame ſort of jelly, which by maceration ſwells, puſhes out from the cavities, and comes away, leaving the cells void. This, no doubt, is part of the jelly which naturally comes away in labour. Some women have much more of it than others; and, in comparing different diſſections, I have obſerved more of the jelly within the cervix uteri, and more likewiſe in the cells round the os uteri, in one ſubject than another.

"The uterus, at the time of three or four months, is by no means ſo tightly filled but that it would eaſily contain more. It is like a bladder therefore, ſo filled with water, that it would eaſily contain a third part more. Hence it is ſoft and ſwagging, and eaſily changing its ſhape, accommodates itſelf to the neighbouring parts.

"The ſituation of the uterus, which at firſt is in the cavity of the pelvis, but afterwards gradually riſes up into the cavity of the abdomen, and the changes which its ligaments undergo, may be eaſily conceived by any perſon acquainted with the ſtate of thoſe parts before conception, and who has conſidered what has been already ſaid about the ſame things in the ninth month of pregnancy.

"The peculiarities of the ovarium are very different at the different periods of utero-geſtation. In the earlier months the corpus luteum is conſiderably larger and more vaſcular; and within it there is a conſiderable and evident cavity containing a fluid. When the uterine veſſels have been injected, I have obſerved that the wax very eaſily extravaſates into that cavity. On the outſide of the ovarium there is a little pit, which looks like a hole, leading into the cavity of the ovarium. But in the caſes which I have ſeen, no briſtles would paſs; it appeared to be an obliterated duct, or paſſage grown together."

The ſerous covering of the uterus, derived from the peritoneum, undergoes very conſiderable extenſion during the enlargement of the uterus in pregnancy. We have already ſhewn that the broad ligaments nearly diſappear at this time, but there is no acceſſion of the ſame kind either before or behind, as the bladder and rectum ſtill continue to be covered to the uſual extent by that membrane. The increaſed ſurface of the peritoneal coat muſt be aſcribed therefore to an extenſion of the membrane.

As the mucous ſurface of the organ is the medium of communication between the uterus and the ſecundines, its changes refer to the purpoſes accompliſhed by this connection. In the natural ſtate, it exhibits merely the fine orifices of exhaling-veſſels, but after conception a large number of conſiderable arteries and veins paſs from it to the ſurface of the ovum; and theſe are more numerous and large in the ſituation of the placenta than elſewhere. Theſe communicating veſſels have been deſcribed already in the article Embryo. Towards the latter periods of geſtation the vulva becomes ſwoln and relaxed, aſſuming a ſtate which favours its dilatation in the act of parturition.

The vital properties of the uterus, as well as its organization, are conſiderably altered after conception. The organ acquires animal ſenſibility; hence women feel the motions of the child, and even experience very conſiderable pain in particular poſitions of the fœtus; hence too the ſharp pains felt in parturition. We do not know whether much pain is experienced by the inciſion of the uterus in the cæſarean ſection. But, ſuppoſing that it is not, the fact would not prove that the organ is not poſſeſſed of animal ſenſibility. Its powers may render it ſuſceptible of ſome ſtimuli and not of others. When no circumſtances interrupt the ordinary phenomena of pregnancy, we have no proof, until the natural period of this condition arrives, that the organ poſſeſſes ſo ſtrong a contractile power as that which we ſee exerted in parturition. We might even believe that this property is not developed until the end of pregnancy; but there is no epocha of geſtation, from the firſt preſence of the germ in the uterus, at which this contraction may not be excited by the action of particular cauſes, which, under certain circumſtances, are powerful enough to produce the expulſion of the child. Violent contuſions of the abdomen, and penetrating wounds affecting the uterus, are frequently followed by abortion. Violent paſſion may cauſe this premature expulſion of the fœtus. The ſame effect is produced by the evacuation of the waters of the amnios, independently of any other cauſe; the uterus, when no longer diſtended, contracts, and abortion enſues. This contractile power, with which the uterus becomes endowed on the change of its organization, partakes of the characters of animal contractility and of irritability. The inactivity of the uterine parietes, until the termination of utero-geſtation, reſembles, in ſome reſpects, the quieſcent ſtate of the voluntary muſcles, when they are not excited by the influence of the brain; and the contraction, by means of which this organ expels its contents, can be compared only to the exertion of thoſe muſcles. On the other hand, the contractility of the uterus is independent of the cerebral influence, and its exerciſe is abſolutely involuntary; this circumſtance particularly characterizes irritability in thoſe organs which poſſeſs it in the moſt remarkable degree, as the heart. Like the latter power, it may be ſympathetically rouſed, when the action of the uterus is ſuſpended during or after parturition; and it continues for ſome time after apparent general death.

The attention of phyſiologiſts has been much occupied in inveſtigating the immediate cauſe of parturition; that is, the cauſe which calls into action the contractile power of the uterus at the end of utero-geſtation. Many adopt the following explanation. They admit a ſpecies of oppoſition between the body and neck of the uterus, during geſtation, the reſiſtance of the latter overcoming the tendency of the former to contract. As the neck is gradually obliterated, its oppoſition is diminiſhed, and it then gives way to the contractions of the body and fundus. Againſt this explanation we may urge that the ſuppoſed ſtruggle between two oppoſing forces is purely hypothetical, that there is no evidence of any contraction or attempt at it during pregnancy, and that it comes on quite ſuddenly at the expiration of the term. It is this ſudden exerciſe of the contractile power, at the end of the ninth month in the human ſpecies, that marks the term of geſtation, and for which we can aſſign no other cauſe than the immutable laws by which the operations of nature are regulated. However this queſtion may be decided, it is clear that the contraction of the uterus alone does not accompliſh the expulſion of the fœtus. The diaphragm and abdominal muſcles aſſiſt in the operation; and hence parturition is in ſome degree voluntary, is accelerated in ſome caſes by the courage of the individual, while in others it cannot be concluded without the aſſiſtance of art, in conſequence of the ſtrength being exhauſted. Yet this action of the abdominal muſcles is not ſo indiſpenſible, but that the uterus can get rid of its contents without ſuch aid. We know the extraordinary facility with which parturition takes place in ſome women, who, in conſequence of particular circumſtances in their condition, exert themſelves even to retard the proceſs; and the expulſion of the child is ſometimes completed at the approach of death, when the abdominal muſcles can hardly be ſuppoſed to contribute.

After the expulſion of the child, and of the ſecundines, the action of the uterus ſtill continues, and the organ is gradually reduced in its bulk. For a ſhort time its parietes are in a ſtate of increaſed thickneſs; the veſſels, being compreſſed by this permanent ſtate of contraction, pour out but a very ſmall quantity of blood, notwithſtanding the preceding dilatation of their orifices. This blood, effuſed very ſlowly, is ſoon ſucceeded by an abundant ſecretion of mucus from the ſurface of the uterus, conſtituting a ſpecies of diſcharge peculiar to women recently delivered, and known by the name of lochia. This evacuation laſts for a longer or ſhorter time, and probably does not ceaſe altogether, until the uterus has regained its original ſtate. The contraction of the organ is owing at firſt to the evacuation and contraction of its veſſels; but ſoon nutrition is carried on in it with leſs activity, while abſorption proceeds vigorouſly until the exceſs of matter depoſited for its developement has been removed.

Phyſiology of the Female Organs of Generation.

Puberty and Menſtruation.—From the uterus of every healthy woman (at leaſt with very rare exceptions) who is not pregnant, or who does not give ſuck, there is a diſcharge of blood at certain periods, from the time of puberty to the approach of old age (during a period in general of about 30 years); which, from the periods or returns of the diſcharge, is called the menſes or catamenia, and, from the general regularity of its appearance, is termed in French les regles. The commencement of menſtruation is coëval with that ſignal revolution in the female conſtitution, which indicates the power of executing the generative functions, and may be regarded as the developement of the ſexual life. It is therefore one of thoſe circumſtances which, taken altogether, mark the period of puberty in females. At the ſame time their complexion is improved, their countenance is more expreſſive and animated, their attitudes graceful, and their converſation more intelligent and agreeable; the tone of their voice becomes more harmonious, their whole frame, but particularly the breaſts, are expanded and enlarged, and their minds are no longer engaged in childiſh purſuits and amuſements. Theſe phenomena have been deſcribed very elegantly by Harvey: "nec minus notum eſt, quanta virgini alteratio contingat, increſcente primum et tepefacto utero; pubeſcit nempe, coloratior evadit, mammæ protuberant, pulchrior vultus renidet, ſplendent oculi, vox canora, inceſſus, geſtus, ſermo, omnia decora fiunt."

The whole human race is ſubject to this law, and the accounts of ſome travellers, ſtating that the Braſilian or Samoied women are exempt, have not been confirmed by more recent and accurate inquiries. It is a general and eſſential phenomenon in the life of woman, and if different climates, or the varieties of the ſavage and civilized ſtates, are capable of modifying the phenomenon, their influence is not ſufficient to annihilate it altogether, even in the frozen and inhoſpitable regions, where ſome writers have ſuppoſed that it does not occur in a conſtant and regular manner. It is hardly neceſſary to refute an opinion, which has prevailed very generally, that whole nations, particularly Americans, are not liable to this diſcharge. In their viſits to thoſe countries, Europeans ſaw numerous females in a ſtate of nakedneſs, without obſerving any ſigns of the diſcharge, which may be accounted for by two circumſtances. The women at that time are generally ſuppoſed to be in an impure ſtate, and to communicate a malignant influence; they are conſequently compelled to ſhun ſociety while the diſcharge laſts, and to avoid the ſight of man by hiding themſelves in ſolitary huts. Travellers have alſo obſerved that their ſcrupulous attention to perſonal cleanlineſs, and to the modeſt attitude of the lower extremities, would prevent the ſpectator from diſcovering any traces of the catamenia. The diſcharge is peculiar to the female of the human ſpecies, which, in the language of Pliny, is the only "animal menſtruale." Many naturaliſts, ſays Blumenbach, and among others Buffon, have aſcribed a periodical flux of this kind to ſome other animals, particularly of the monkey kind. But having had the opportunity of obſerving ſeveral individuals for many ſucceſſive years, I diſcovered that theſe ſuppoſed catamenia did not exiſt at all in ſome, while in others there was a ſmall occaſional uterine hæmorrhage appearing at no regular intervals. (Inſtitut. Phyſiolog. ſect. 37.) There is a great determination of blood to the organs in animals when they are in heat; this is attended with a mucous ſecretion, and ſometimes even blood has been diſcharged, ſo as to give riſe to the erroneous notion of their being ſubject to the menſtrual flux. Such a caſual and unfrequent occurrence can by no means be compared to the regular periodical diſcharge obſerved in women almoſt without an exception. On the other hand there are examples of women who have never menſtruated, and of others, in whom this diſcharge has not appeared through long periods of their lives, without any ill conſequence. Dr. Denman knew two inſtances in which the menſes had never been diſcharged; the individuals married, but had no children. (Introd. to the Pract. of Midwifery, 4to. p. 115.) Some continue to menſtruate during the time of ſuckling, and the circumſtance is not very rare, although it is the general rule that the diſcharge ſhould ceaſe at this time. The vital powers are differently employed, and their exerciſe has a different object and direction. Pregnancy almoſt invariably interrupts the proceſs. The important functions carried on in the uterus at this time require all the powers of the mother; and the adheſion of the ovum to the uterus ſeems to form an inſuperable mechanical obſtacle to the diſcharge. Hence Mr. Denman ſtates that he has never known an inſtance of menſtruation during pregnancy. The ceſſation of the diſcharge without the preſence of any unhealthy cauſe, is the only ſign by which women know that they have conceived. Authors relate many examples, however, where the catamenia have flowed during geſtation; but very ſtrong evidence would be neceſſary to prove a circumſtance ſo unlikely in itſelf.

The menſes may appear prematurely in ſome women, from peculiarity of organization, as the phenomena of puberty have occurred at unnaturally early periods in men; and the circumſtance muſt be referred to original difference of conſtitution. Haller knew a girl of good family, nine years of age, well conſtituted both in mind and body, who had been ſubject to the regular periodical return of the catamenia for ſome years, without any other apparent diſadvantage than that of being rather ſhort and delicate in her make. He mentions another inſtance in Switzerland of a girl having a child by her uncle at nine years. Many of the accounts of menſtruation in early infancy muſt be deemed morbid or ſymptomatic diſcharges, and cannot be referred to the catamenia. When the female conſtitution from any cauſe is diſpoſed to, or requires a ſanguineous diſcharge, it is commonly made from the veſſels of the uterus.

The early or late appearance of the menſes may depend upon the climate, the conſtitution, the delicacy or hardineſs of living, and upon the manners of thoſe with whom young women converſe. In general, the warmer the climate the ſooner the menſes appear. In Greece, and other warm countries, girls begin to menſtruate at eight, nine, and ten years of age. According to Thevenot and Chardin they even marry and bear children at eight and nine years of age in ſome parts of Aſia. The diſcharge does not appear in Europe until the female has nearly attained her full growth. Haller mentions the twelfth and thirteenth years as the uſual periods in Switzerland; the diſcharge appears ſooner in the more ſouthern countries of Europe, and later as we approach to the north. According to Linnæus, in his "Flora Lapponica," the women of Lapland do not menſtruate until a maturer age, and then in ſmall quantities, at long intervals, and ſometimes only in the ſummer. But if the proceſs does not go on according to the general prevailing rule in the country, they ſuffer equal inconveniences as in warmer climates, where the quantity diſcharged is much greater, and the periods ſhorter. In this country girls begin to menſtruate from the fourteenth to the eighteenth year of their age, and ſometimes at a later period, without any ſigns of diſeaſe; but if they are luxuriouſly educated, ſleeping upon down beds, and ſitting in hot rooms, menſtruation uſually commences at a more early period.

The variety in the time at which women arrive at puberty has given riſe to ſome moral deductions. It has been aſſigned as the reaſon why women in hot climates are almoſt univerſally treated as ſlaves, and why their influence is ſo powerful and extenſive in cold countries, where perſonal beauty is in leſs eſtimation. In hot climates, women are at the height of their beauty when they are ſtill children in underſtanding; and, when their underſtanding is matured, they are no longer the objects of love. In temperate climates their perſons and their minds acquire perfection at the ſame time, and the united power of their beauty and faculties is irreſiſtible.

At the approach of old age women ceaſe to menſtruate, but the time of the ceſſation is commonly regulated by the original early or late appearance of the menſes. About the fortieth year, a little ſooner or later, the regular periods of the catamenia are interrupted; and before the fiftieth year, profuſe diſcharges occur followed by long intervals; about the time juſt mentioned, the catamenia generally ceaſe, and the power of reproduction is loſt. With thoſe who began to menſtruate at ten or twelve years of age, the diſcharge will ſometimes ceaſe before they arrive at forty; but if the firſt appearance was protracted to ſixteen or eighteen years of age, independently of diſeaſe, ſuch women may continue to menſtruate until they have paſſed the fiftieth, or even approached the ſixtieth year of their age. In this country, the moſt frequent time of the ceſſation is from the forty-fourth to the forty-eighth year, after which women never bear children. By this conſtitutional regulation of the menſes the propagation of the ſpecies is, in every country, confined to the moſt vigorous part of life, and, had it been otherwiſe, children might have become parents, and old women might have had children, when they were unable to ſupply them with proper or ſufficient nouriſhment. Yet the rules juſt mentioned are not free from all exceptions. The catamenia, with powers of fecundity, have continued in particular inſtances much beyond the age we have ſpecified. Some of theſe have had regular catamenia; in others, after a long ſuppreſſion, the diſcharge has returned. We muſt be careful, however, here, as in the caſe of premature appearance, not to confound with the menſes accidental and morbid hemorrhages. A relation of Haller's had two ſons after her fiftieth year, and in colder countries, where the acceſs of puberty is late, children have been born when the mother was even above 60.

The proper menſtrual blood is generally preceded, ſometimes even for ſome months, by a whitiſh ſerous fluid. Symptoms of more or leſs violence, indicating the accumulation of blood about the hypogaſtric veſſels, ſuch as pain in the loins and about the pelvis, laſſitude with painful affection of the lower extremities, and various nervous and hyſteric feelings, are then obſerved. Pains in the head, fluſhing of the cheeks, and even pimply appearances in the face ſometimes take place. In younger virgins theſe ſymptoms are milder, and in the firſt inſtances often go off ſpontaneouſly: but they return with greater intenſity, attended with conſiderable colic pains, and quick and ſtrong pulſe, until a bloody ſerum, and then more genuine blood flows more or leſs rapidly from the vulva. The duration of the flux is uncertain; it may be accompliſhed in three or four days, or be protracted till the ſeventh or eighth. The quantity is ſubject to no ſettled law: it is greater in warm countries, where it may amount to a pint or more; while in colder regions it does not exceed five, four, or three ounces. "Yet," ſays Dr. Denman, lib. cit. p. 118, "there is a common quantity, to which, under ſimilar circumſtances, women approach, and it may be eſtimated in this manner. Suppoſing the quantity to be about eighteen ounces in Greece, and two ounces in Lapland, there will be a gradual alteration between the two extremes, and in this country it will amount to about ſix ounces." Manners and way of life make a conſiderable difference. Luxurious and laſcivious women have a more copious diſcharge: while thoſe who take much exerciſe, or are weak or inſufficiently nouriſhed, furniſh a more ſparing quantity. The pain ſubſides as the diſcharge proceeds; the inflammatory ſymptoms about the uterus go off as the determination to that organ ceaſes, the pulſe is diminiſhed, and the blood is followed by a ſerous fluid. Signs of debility ſucceed, with a hollowneſs about the eye, and a dark circle ſurrounding the organ. The firſt appearance in a young girl is generally followed by an interval of ſome months, and this period approaches gradually to a ſolar month; ſo that a healthy woman, in whom the diſcharge is eſtabliſhed, will have it return on the ſame day of the month for many ſucceeding years. If ſeven or eight days are occupied by the flow of the catamenia, there is an interval of twenty-two or twenty-three, making up the menſtrual period. Such is the courſe obſerved in healthy temperate ſubjects, whoſe bodily and mental powers are not abuſed or overſtrained. Improper regimen and manners may precipitate or retard the diſcharge. Luxurious manners, with high living, may occaſion returns after fifteen days: under various other circumſtances there is a ſimilar protraction of the period, which recurs however at regular intervals. Similar ſymptoms to thoſe which attend the firſt menſtruation, but in a milder form, accompany each return. In this reſpect conſiderable varieties are obſerved; the affection recurring with conſiderable violence, at every period, in ſome women, while others do not ſeem to ſuffer at all.

The nature of the diſcharged fluid has not been aſcertained by any accurate inveſtigations, but its obvious characters are ſo exactly like thoſe of blood, that it has been generally conſidered and called blood. This remarkable difference, however, at leaſt, ſeems to diſtinguiſh the two fluids; *viz.* that the catamenia do not coagulate. They are blood deprived of fibrine. Coagula are ſometimes ſeen, but are conſidered to denote unhealthy menſtruation, as they occur when the proceſs is obviouſly diſturbed, and attended with great pain, &c. Opinions have been very generally received that the menſtrual diſcharge poſſeſſes ſome peculiar malignant properties. Theſe notions ſeem to have originated in the Eaſt; they appear in all their force in the ordinances of the Jewiſh legiſlator, were adopted by the Arabian phyſicians, and have been credited in moſt countries. The ſevere regulations which have been made in ſome countries, for the conduct of women at the time of menſtruation, the expreſſions uſed, the diſpoſal of the blood diſcharged, or of any thing contaminated with it, the complaints of women attributed to its retention, and the effects enumerated by grave writers, indicate the moſt dreadful apprehenſions of its baneful influence. The following quotation exhibits theſe abſurd notions in very elegant language. "Penis cum menſtruata concumbentis excoriatur; ſi novella vitis eo tangatur, in perpetuum læditur; ſteriles fiunt tactæ fruges; moriuntur inſitæ; exuruntur hortorum germina; ſi mulier prægnans alterius menſtrua ſupergrediatur, aut illis circumlinatur, abortum facit; ei autem, quæ ultro non geſtat, concipiendi ſpem adimit; purgantis ſpiritus, et vapor ab ore, ſpecula atque eboris nitorem obſcurat. Guſtatus hic ſanguis canes in rabiem agit, homines vero diris cruciatibus affligit; comitialem morbum, pilorum effluvium, aliaque elephanticorum vitia inducit; idcirco a veteribus inter venena relatus; pari malignitate exiſtimatur, atque ſanguinis elephantici potus." De Graaf.

Under peculiar circumſtances of health, or ſtates of the uterus, particularly in hot countries, if cleanlineſs be not obſerved, and the evacuation take place ſlowly, the diſcharge may eaſily become acrimonious and offenſive. But there is nothing of this kind belonging to healthy menſtruation in a cleanly woman, where the effuſed fluid differs from any other blood only in the circumſtances already mentioned. Nay, when the catamenia are retained in the body for many months, in caſes of imperforate vaginæ, they produce no ill effect whatever, and are diſtinguiſhed by no particular odour or offenſive qualities when diſcharged by an operation. We have, therefore, no reaſon for thinking otherwiſe than that this diſcharge is of the moſt inoffenſive nature.

That the catamenia come from the uterus is tolerably evident from the change in the lining of that organ during the period of their flow. Its mucous ſurface is rendered ſofter and more villous; and exhibits bloody ſpots, with numerous pores, from which the fluid may be expreſſed. The appearance of the menſtrual blood in its cavity during the period is a further proof: to which we may add the ſuppreſſion of the diſcharge in various morbid conditions of the uterus, and in pregnancy, where its ſurface is occupied by the adheſion of the ovum. Direct evidence of the fact is furniſhed in caſes of prolapſus, where the fluid may be actually ſeen diſtilling from the os tincæ. To theſe arguments we may add the obvious connection of the menſtrual flux with the functions of the uterus. Some have contended that the vagina is partly or wholly the ſource of the catamenia; but the opinion reſts on no ſufficient ground: the ſtructure and functions of the vagina, as well as the direct evidence of facts, ſtrongly oppoſe the opinion.

Whether the menſes come from the arteries or veins of the uterus has been a point of diſcuſſion with phyſiologiſts; and alſo whether it be a ſimple efflux of blood from the veſſels or a ſecretion. The ſtructure of the organ reſembles that of glands, and the appearance of the fluid, on many occaſions, differs widely from mere blood; which indeed it never reſembles entirely in the healthy ſtate; ſo that we are diſpoſed to conſider it as a ſecretion performed by the uterus like fluids that are formed by any other glands. A circumſtance is ſometimes obſerved in this proceſs, which muſt be referred to the ſecretory action of the uterine veſſels. This is the diſcharge of a membranous ſubſtance, of the figure of the uterine cavity, ſmooth on one ſurface, and flocky on the other, and much reſembling the decidua on the whole. The fact is mentioned by Dr. Denman, who firſt ſaw it in married women, and afterwards in unmarried ones under circumſtances which proved undoubtedly that it was formed independently of connubial communication. The menſtruation has been painful in all theſe caſes, and conception has never occurred while the habit remained.

The efficient cauſe of menſtruation has afforded an ample field for thoſe who delight in ſpeculations and hypotheſes. As the periods of the moon agree nearly with thoſe of the diſcharge, the influence of this body has been reſorted to in explanation of the occurrence. If we admit the ſolution, the effect of lunar attraction ought to be very different in the various relative poſitions of the moon and earth: but the obſervation of ſeveral individuals will immediately ſhew that there is no day of the month in which ſeveral do not begin to menſtruate, and that the moon's apogee or perigee has no influence at all in this reſpect. We ſhall ſee, too, that the diſcharge begins in ſome, is diminiſhed or entirely ended in others, at the very ſame time; conſequently that the moon can have nothing to do with the matter. Moreover, as the menſtrual period rather follows ſolar time, the ſame woman menſtruates at one time in the new moon, and at another in the full moon. The exiſtence of ſome ferment, cauſing an inteſtine motion in the veſſels of the part, meets now with no advocates. Local or general plethora have been aſſigned as the reaſons of the menſes, and many of the circumſtances which accelerate or increaſe, or on the contrary retard and diminiſh the flow, favour theſe opinions. But we ſtill cannot adopt the opinion; the loſs of ſeveral times the quantity of blood previous to or in the very act of menſtruation, from the arm, or any other part of the body, does not prevent or interrupt the flowing of the menſes; and in thoſe complaints which ariſe from their obſtruction, greater relief is afforded by a few drops of blood from the uterus itſelf, than by ten times the quantity from any other part. A curious circumſtance muſt be noticed reſpecting the effects ſometimes produced by obſtructed menſes; *viz.* that their place is ſupplied by periodical emiſſions of blood from various other parts of the body, as the noſe, lungs, ears, eyes, breaſts, and almoſt every other part. Theſe probably ſhould be deemed in many caſes rather as diſcharges belonging to ſome diſeaſe under which the patient may labour, than as connected with menſtruation. Hemorrhages of every kind, in either ſex, are frequently obſerved to be periodical.

That the catamenia are a ſecretion from the mucous lining of the uterus, of which we cannot underſtand the direct mechaniſm, any more than the method in which any other ſecretions are performed; and that we are ignorant of the cauſes which determine their appearance to the monthly period, ſeem to be nearly the ſum of our knowledge on this ſubject. It is clear that the proceſs, being a part of the healthy operations of the organ, and therefore indicating its general condition, is neceſſary to preſerve the uterus in a ſtate fit for conception. Obſervation has fully proved that women, who do not menſtruate from the uterus, or who are not in a ſtate diſpoſed to menſtruate, cannot conceive, even though they ſhould have a periodical diſcharge of blood from any other part of the body. All animals, at the time of their being ſalacious, or in a ſtate fit for the propagation of the ſpecies, have a diſcharge, analogous and perhaps equivalent to menſtruation, which is generally mucous, but in ſome inſtances, in any hot ſeaſons and climates, becomes ſanguineous.

That the menſtruous blood contributes to the formation or nutriment of the fœtus may be reaſonably doubted. The time of the diſcharge is not the moſt favourable to conception, which occurs moſt readily juſt after the period. Since all animals, whether they menſtruate or not, ſupply the offspring of conception with nouriſhment of a proper kind, and in a ſufficient quantity to bring it to perfection, we may conclude that the end is accompliſhed by ſome more common principle. The mucous diſcharge from the generative organs of animals, proves that they are in a ſtate favourable to the propagation of their ſpecies, and the catamenia prove the ſame circumſtance in women.

From the time when the phenomena of puberty announce the aptitude of the female for the exerciſe of her ſexual functions, the generative organs exert an influence which modifies the whole organization, and beſtows on woman the moſt ſtriking traits of her phyſical and moral character. The various revolutions to which her conſtitution is ſubject, the nervous affections, the frequent returns of indiſpoſition and ſuffering, the ſtrange and unaccountable anxieties and caprices, and ſometimes the increaſed acuteneſs of the imagination and judgment; all depend on this influence; and if it be true that man is male only at certain times, while woman is female during her whole life, it muſt be attributed chiefly to this cauſe. It is this that conſtantly recals woman to her ſex, and marks her whole exiſtence with ſo characteriſtic a phyſiognomy. We ſhall not be ſurpriſed to find, that a cauſe of ſuch power and extenſive influence is liable to irregularities which have very marked effects on the conſtitution. When the new powers with which the organs are endowed exceed the juſt ſtandard, and deviate into a kind of unnatural irritability, they affect ſympathetically the whole frame, and particularly the nervous ſyſtem. This, in an extreme degree, conſtitutes furor uterinus. Generally, however, this exceſſive vitality of the ſexual organs, without going to ſuch an extent, produces various ſpaſmodic and nervous ſymptoms, conſtituting what are called hyſterical diſorders, and ariſing evidently from the artificial and forced ſtate of celibacy. Theſe affections are removed by marriage, which re-eſtabliſhes the balance of the various functions by giving its natural employment to an organ, whoſe exceſſive ſenſibility deranged the whole ſyſtem. Other and very various phenomena may be referred to the ſame cauſe; and thoſe phyſicians who have collected, in particular works, obſervations on the diſeaſes occaſioned by celibacy, or by the imperfect and unnatural enjoyments of the cloiſter, preſent us with an alarming catalogue. "Ut reliqui ſtimuli a natura dati inobſequioſos puniunt, ita et veneris abſtinentiam, ut naturæ inimicam, hæc ipſa ulciſcitur. Ipſa animalia ex deſiderio veneris languent et pereunt. Cyprini ex retentis ovis laborant. In ſacris ædibus, de quibus ſevera religio venerem arcet, multa, parum cognita, neque ſanabilia morborum genera vigere idoneus auctor exſtat. Frequenter eæ potiſſimum, quæ veneris dulcedinem deguſtarunt, quia nunc privantur, in chloroſin, in hyſterica mala, in convulſiones,

ſiones, in maniam, in furorem uterinum incidunt; quam nec ſemel vidi; inque earum feminarum apertis cadaveribus ſchirri, et ſteatomata, & hydropes ovarii reperiuntur. Quare, niſi morum cuſtodia vetuerit, ea mala pleraque, et furor uterinus, et vera mania, veneris uſu ſolvuntur." Haller, Elem. Phyſiol. t. 8. p. 14. We may affirm, in ſhort, that from the time when the organs, which characterize theſe amiable and ſenſible beings, are fully endowed with all their vital powers, woman is conſtantly ſubject to their influence, until the period arrives when ſhe is no longer capable of the life of the ſpecies, when ſhe has paſſed through the revolution of her latter age, and enjoys quietly her individual life, during the remainder of which women differ much leſs, in every reſpect, from the other ſex.

A delineation of the effects, which the phyſical changes occurring at the time of puberty produce on the moral character and ideas of women, may be ſeen in the eloquent work of Cabanis, "Rapports du Phyſique et Moral de l'Homme." The various morbid derangements of the menſtrual proceſs will be conſidered in the medical department of this dictionary.

The generative proceſs is ſubject to very different laws in animals and in the human ſpecies. In the former, particular ſeaſons of the year are appropriated to theſe functions, and the organs undergo certain phyſical changes, by which they are rendered fit for the proceſs. It is a peculiarity belonging to the human race, that they are confined to no ſeaſon in exerciſing theſe functions. Moſt animals, and particularly birds, copulate in ſpring: and that warmth has much influence in the affair is evident from this, that animals of warmer countries ſeldom copulate or are fecundated in Europe. Perhaps women conceive rather more frequently in ſpring; at leaſt accoucheurs have obſerved that there are moſt labours in the months of December and January.

As the effect of ſexual communication is ſo important, it cannot be indifferent to the deſign of nature to what part of the uterine ſyſtem the ſemen ſhould be conveyed. It admits of no doubt, that it either remains in the vagina, paſſes into the uterus, or elſe extends its courſe along the Fallopian tubes to be applied to the ſurface of the ovaries, which it ſtimulates, and from which the new animal derives its exiſtence; but the queſtion whether it be one or other of theſe, has given birth to more phyſiological controverſy than perhaps any other operation of a living animal. Thoſe who have entered the liſts have ranged themſelves either on the ſide of application of the ſemen to the ovaries, by means of the tubes; or on that of the inutility of this proceſs. Theſe latter contend for an abſorption of this fluid by the vagina, and a peculiar excitement of the whole frame as a conſequence, of which excitement the changes produced on the ovaries are to be regarded as the local effects. The advocates for the firſt opinion allege, that the ſemen has been ſeen both in the uterus and tubes, and quote as their authority the obſervations of Morgagni for the former, and Ruyſch for the latter. When ſeen in this laſt ſituation, ſome have thought that it was conveyed thither by the muſcular power of theſe parts, in the manner of a periſtaltic motion, beginning at the uterus, and ending at the fimbriated termination of the tube; and when at this laſt, it was ſuppoſed that the ſemen was applied to the ſurface of the ovaries, and impregnated them by actual contact. Various analogies, drawn from the animal and vegetable kingdoms, have been adduced for and againſt theſe different opinions: but ſuch arguments muſt be received with caution. Where different inſtruments are employed to produce the ſame ultimate effect, we may reaſonably conclude that the means uſed are eſſentially different. On this principle no direct concluſions can be drawn reſpecting the human ſpecies, from obſervations either on vegetables, or even on frogs, toads, and newts. The impregation of birds, being effected by ſemen conveyed into the body, reſembles that of the human ſubject more than the former; but they differ ſo widely in the mode of perfecting the fœtus from the ovum, that we cannot reſt with much confidence on their general analogy.

To the obſervations of Morgagni and Ruyſch a numerous train of facts has been oppoſed, aſcertained by the experimental labours of Harvey, De Graaf, Haller, and others, in which no ſemen was ever ſeen beyond the vagina in animals, examined at various periods after coition. One experiment of Haller, on a ſheep, conſtitutes a ſingle exception to this obſervation: he once ſaw ſemen in the uterus forty-five minutes after coition. Theſe facts bring the advocates for the neceſſity of a contact of ſemen with the ovaries into a dilemma, from which they attempt to extricate themſelves by contending, that fecundation does not require the application of ſemen to the ovaries in a palpable form; but that there is exhaled from it a ſubtile fluid in a vaporific ſtate, called aura ſeminalis, and that the contact of this vapour is fully ſufficient to impart to the ovaries their due quantity of ſtimulus.

The opinion, that the preſence of the ſemen in the vagina alone was ſufficient to account for impregnation, was defended by the ſtatement of caſes, in which, from ſome anatomical peculiarities, it ſeemed almoſt impoſſible that the fecundating fluid could be conveyed into the uterus; yet in ſeveral of theſe caſes impregnation really took place. Thoſe who hold a contrary opinion either cavil at the accuracy of the ſtatement, or draw a different concluſion. In order to throw ſome light on this ſubject by direct arguments, Dr. Haighton undertook a ſeries of experiments, the reſults of which are detailed in the 87th vol. of the Philoſophical Tranſactions. He divided the tubes which form the cornua uteri in rabbits, and admitted them to the male, when they had completely recovered from the experiment; but this operation ſeemed to deſtroy entirely not only the power of conception, but alſo the diſpoſition to employ the means. After ſeveral ineffectual trials, he varied the experiment by dividing one tube only, and in many inſtances the animals conceived afterwards. Corpora lutea were found on both ſides of the body, but fœtuſes only on the ſound ſide. If the former bodies are produced only after conception, which the doctor aſſumes, then conception muſt have taken place here, although the direct acceſs of ſemen to the ovarium was interrupted; for the operation in queſtion completely obliterates the tube. It muſt be acknowledged that the proof is incomplete in theſe caſes; we cannot juſtly aſſert that conception has taken place, when no fœtus was formed. Dr. H. attempts to elude this objection, by ſhewing that the diviſion of the tube at any period after coition, but before the paſſage of the germs from the ovary, will equally prevent the appearance of fœtuſes; accordingly no fœtuſes were ſeen in the tube, when it was divided as late as forty-eight hours after coition. But if the operation be deferred until the time at which the rudiments of the new animal have paſſed into the tube, the actions of the parts ſuffer no interruption, and fœtuſes are formed in the tube of the mutilated ſide. "If," adds the Dr. "the ovaries are ſuſceptible of their proper excitement only from the contact of ſemen, how did it happen that the effects of that excitement were not more obvious where nothing had been done to intercept its courſe for 48 hours, than in thoſe where all communication between the uterus and ovary had been cut off before the means of impregnation had been employed? I think it muſt appear, on tracing nature's ſteps through the different ſtages of this work, that they are the product of that law in the conſtitution, which is called ſympathy or conſent of parts. That the ſemen firſt ſtimulates the vagina, os uteri, cavity of the uterus, or all of them. By ſympathy the ovarian veſicles enlarge, project, and burſt. By ſympathy the tubes incline to the ovaries, and having embraced them, convey the rudiments of the fœtus into the uterus. By ſympathy the uterus makes the neceſſary preparation for perfecting the formation and growth of the fœtus. And, by ſympathy the breaſts furniſh milk for its ſupport after birth."

Phyſiologiſts have certainly not yet aſcertained, by direct obſervation, whether or no the ſemen enters the uterus and tubes; and conſequently all explanation of the mode in which it co-operates in conception muſt be, in a great meaſure, hypothetical. If we cannot ſpeak from actual knowledge on a point, which muſt be ſo important as the preſent, in the generative proceſs, and the determining of which muſt be ſo eſſential towards forming right notions of the nature of the buſineſs, how uncertain muſt our repreſentation be of the more intricate and obſcure parts of the ſubject!

Haller's work furniſhes us with the following account of "quæ feminis in coitu accidant." Primum voluptas eſt. Eam pleræque nullam fatentur, et etiam eæ, quæ poſſunt abſque dedecore fateri, confirmant, ſe abſque grato ſenſu concepiſſe. Sinceriores aliæ et appetunt venerem, et ſe ea delectari agnoſcunt. Poteſt autem is ſenſus in alia et alia muliere major eſſe minorve. Cum ea voluptate congeſtio humorum ad partes genitales & calor conjungitur. Dixi oſtium internum uteri ſentire. Clitoris ſenſu eſt acerrimo, ſed in venere parum afficitur. Vaginæ columnas putes eſſe ſenſu acriori; neque carent papillis, ut neque vulvæ oſtium, neque nymphæ. Poteſt in his partibus voluptas locum habere, et ab ea ſanguis in organa genitalia concieri, ut caleant, turgeant & acrius ſentiant. Certum eſt tamen in iis puellis, quæ cum voluptate coeunt, vaginam tumeſcere, ut maritum propius amplectatur. Id poteſt partim muſculi ſphincteris officio fieri, quem vis nervoſa ad contractionem irritat, partim ex tumentibus vaſis plexuum venoſorum, et corporum cavernoſorum vaginæ et clitoridis." Elem. Phyſiol. 8. p. 23.

The circumſtances juſt deſcribed do not appear to be eſſential to the buſineſs of fecundation; they contribute to the important object of reproduction in a ſecondary manner. The ſtrong deſire implanted in all animals, and the phyſical gratification experienced in its indulgence, enſure the union of the ſexes, and conſequently the continuation of the ſpecies. The celebrated Spallanzani has given to the world a very intereſting ſeries of experiments, by which it is proved that impregnation in many caſes may be effected by artificial means. He proved the firſt in the caſe of various amphibia, as the frog, newt, and toad: and afterwards in the bitch. He experimented on a ſpaniel bitch, which had before had whelps. He confined her very cloſely until ſhe was in heat, and then proceeded in the following manner: "A young dog, of the ſame breed, furniſhed me, by a ſpontaneous emiſſion, with 19 grains of ſeed, which were immediately injected into the matrix, by means of a ſmall ſyringe introduced into the vagina. As the natural heat of the ſeed in animals of warm blood may be a condition neceſſary to render fecundation efficacious, I had taken care to give the ſyringe the degree of heat which man and dogs are found to poſſeſs, which is about 30°. Two days after the injection, the bitch went off her heat, and in twenty days her belly appeared ſwollen, which induced me to ſet her at liberty on the twenty-ſixth. Meanwhile the ſwelling of the belly increaſed; and ſixty-two days after the injection of the ſeed, the bitch brought forth three lively whelps, two male, and one female, reſembling in colour and ſhape not the bitch only, but the dog alſo from which the ſeed had been taken." (Diſſertations, vol. ii. p. 250.) The experiment was repeated with ſucceſs by Dr. Roſſi, ibid. 476. We have an account of a ſimilar trial in the human ſubject, made at the ſuggeſtion of Mr. Hunter. It was in an inſtance of malformation, where the urethra opened in the perineum. "Under theſe circumſtances the perſon married. When he had connection the emiſſion was complete, which proved that the teſticles were perfect, but the ſemen always paſſed out at the perineum. The late Mr. Hunter was conſulted to remedy, if poſſible, this inconvenience, and to enable the perſon to beget children. He adviſed that the huſband ſhould be prepared with a ſyringe fitted for the purpoſe, previouſly warmed; and that, immediately after the emiſſion had taken place, it ſhould be taken up by the ſyringe, and injected into the vagina, while the female organs were ſtill under the influence of the coitus, and in the proper ſtate for receiving the ſemen. This experiment was actually made, and the wife proved with child. On a ſubject of this kind it is proper to ſpeak with caution; but, from all the attending circumſtances, no doubt was entertained by Mr. Hunter, or the huſband, that the impregnation was entirely the effect of the experiment." Home on Hermaphrodites, in Philoſ. Tranſact. for 1799.

Various circumſtances have been enumerated, as proofs that conception has taken place; as peculiar feelings during coition, horripilation, and even ſtridor dentium, &c. Haller's ſenſible remarks on this ſubject ſeem to us to be nearer the truth. "Hæc omnia quidem mihi nimia videntur, et difficillima expertu. Neque enim femina, dum maritum admittit, otioſo eſt ad experimentum animo: neque, niſi longo abhinc tempore norunt fere ſe concepiſſe, quando jam ejuſmodi phenomena de memoria elapſa ſunt. A feminis certe, a quibus verum poteram expectare, nihil de horripilatione, neque de dolore potui diſcere." Ibid.

The opinions concerning the effuſion of a ſeminal fluid by the female, and its mixture with that of the male, are altogether imaginary. That a mucous fluid is ſometimes poured out in coition, from the apparatus already deſcribed in the external organs and the vagina, is undoubted; but this happens only in laſcivious women, or ſuch as live luxuriouſly; it conſiſts merely of mucus, and is diſcharged externally, inſtead of paſſing into the uterus.

Circumſtances do not admit of the internal changes which accompany and follow copulation and conception, being accurately aſcertained in the human ſubject; and, conſequently, theſe have been inveſtigated in various animals. Mr. Cruikſhank gives the following deſcription of the parts in a rabbit at heat. The orifice and internal ſurface of the vagina are as black as ink from the great determination of blood. The ovaria had, under their external ſurfaces, a great number of black, round, bloody ſpots, ſomewhat leſs than muſtard-ſeeds. Theſe black ſpots are the calyces or cups which ſecrete the ova; they are extremely vaſcular; the ova themſelves are tranſparent, and carry no viſible blood-veſſels. Theſe calyces, on the expulſion of the ova, enlarge and become yellow, projecting above the external ſurface of the ovaria, and form the corpora lutea: a certain mark of conception in all quadrupeds, and in women themſelves, whether the embryo is viſible or not. The uſe of the corpora lutea is not yet made out; but the orifice, through which the ovum burſts into the Fallopian tube, is often extremely manifeſt, and always has a ragged border, as lacerated parts uſually have. The Fallopian tubes, independent of their black colour, were twiſted like wreathing worms, the periſtaltic motion ſtill remaining very vivid; the fimbriæ were alſo black and embraced the ovaria (like fingers laying hold of an object,) ſo cloſely and ſo firmly, as to require ſome force, and even laceration, to diſengage them. Haller and other obſervers ſupport this ſtatement of the erection of the tube, and its cloſe application to the ſurface of the ovarium. But Dr. Haighton ſeems not to have found it ſo until a later period. He examined a female rabbit in high ſeaſon a few minutes after coition, and found the fimbriæ in their natural ſituation. He found, moreover, from a regular ſeries of obſervations made on different rabbits, at every hour between the firſt and the ninth, that the fimbriæ remained nearly in their uſual ſituation; and the only difference he noticed in the laſt hours was a greater turgeſcency of veſſels, as if preparatory to ſome important action. That the prominent veſicles or calyces of the ovaria, already mentioned, burſt, and allow ſomething to eſcape into the Fallopian tube, which conveys it into the uterus, is what all obſervers ſeem to agree in: and they concur, moreover, in repreſenting the corpora lutea as produced by a particular proceſs carried on in the empty ovarian calyces, and conſequently, as exhibiting inconteſtible proofs of impregnation having been effected. Theſe circumſtances have all been aſcertained by the obſervations of animal bodies, and transferred by analogy to the human ſubject; in which, indeed, the formation of a corpus luteum is very evident, although the earlier ſtages of the proceſs have not been traced. Obſervers by no means agree as to the time at which theſe changes are effected. Mr. Cruikſhank repreſents the burſting of the calyces as following a fruitful coition very ſpeedily. "I opened," ſays he, "a female rabbit two hours after ſhe had received the male: the black bloody ſpots juſt mentioned now projected much above the ſurfaces of the ovaria, *ſome of the ruptured orifices were juſt viſible;* but in many of theſe ſpots there was not the leaſt veſtige of an orifice; whence I conclude that they heal very quickly in general." The narrative of Dr. Haighton's experiments would lead us to conclude that this eſcape of the germs from the ovarian calyces does not take place till a much later period. In twelve hours after coition "ſeveral of the veſicles evidently projected; they had loſt their tranſparency, and were become opaque and red. When punctured a fluid of the ſame colour eſcaped. The corpora lutea, which are formed by the thickening of the parietes of the veſicles, were not very evident." At 24 hours after coition the fluid in the veſicles was ſimilar to that of the laſt experiment. They projected more evidently, and their thickened parietes, manifeſting the commencement of corpora lutea, were become more apparent. At 48 hours paſt coition, *the veſicles ſeemed to be in the very act of burſting*, and a ſemi-tranſparent ſubſtance of a mucus-like conſiſtence was beginning to protrude from ſome of them; others, indeed, were leſs advanced. The fimbriated extremities of the Fallopian tubes were preparing to receive their contents, as appeared by their having quitted their uſual poſition, and embraced the ovaries in ſuch a degree, that only a ſmall portion could be ſeen until the tubes were taken away. Sections being made into the thickened veſicles, the formation of corpora lutea appeared to have made further advances. From the appearance of an incipient rupture of the veſicles in this experiment, it was but reaſonable to expect that their contents would ſoon have eſcaped. In two days and twelve hours after coition the fœtal rudiments had eſcaped; but the cavity of the ovarian veſicles had ſuffered but little diminution. Briſtles were eaſily introduced by the ruptured orifices. In this experiment the advances towards the formation of a perfect corpus luteum were ſuch as the period of examination would naturally lead us to expect. The contents of the veſicles having eſcaped, it was but reaſonable now to look forwards to a ſpeedy obliteration of the cavity. I therefore examined theſe parts, under ſimilar circumſtances, on the 3d, 4th, and 5th days. In the laſt experiment there was but little veſtige of cavity, conſequently the corpora lutea might be conſidered as perfectly formed."

That a ſomething, which is the germ of the future animal, and is ſuppoſed to be of a veſicular figure, eſcapes from the ovarium after conception, is received into the Fallopian tube, and conveyed by it into the uterus, is rendered highly probable by the facts juſt related: and various additional proofs may be adduced on this ſubject. Almoſt the whole animal kingdom poſſeſs ovaries, in which the rudiments of the future being are obviouſly contained previouſly to impregnation; and it is the development of theſe rudiments after impregnation that forms the future animal. The formation of the germ in the ovary, and its paſſage into the oviduct, are particularly clear in birds and reptiles; and analogy ſtrongly leads us to aſſign to the ovaries of the mammalia the ſame function of producing theſe germs. The removal of theſe bodies renders the woman completely ſterile; and Mr. Hunter has ſhewn that the extirpation of one has a very marked effect on the fecundity of the animal. In the Philoſophical Tranſactions for 1787 he has detailed the reſult of "an experiment to determine the effect of extirpating one ovarium on the number of young produced." He ſelected two ſows of the ſame colour and ſize, and one boar from the ſame farrow, and removed one ovarium from one of the ſows. About the beginning of the year 1779, they both took the boar; but the one which had been ſpayed earlier than the perfect female. The diſtance of time, however, was not great, and they continued breeding at nearly the ſame times. The ſpayed animal continued to breed till Sept. 1783, when ſhe was ſix years old, which was a ſpace of more than four years. In that time ſhe had eight farrows, conſiſting of 76 pigs; but did not take the boar afterwards. The perfect animal continued breeding till December 1785, when ſhe was about eight years old, a period of almoſt ſix years, in which time ſhe had thirteen farrows, conſiſting of 162 pigs. "From this experiment," ſays Mr. Hunter, "it ſeems moſt probable, that the ovaria are from the beginning deſtined to produce a fixed number, beyond which they cannot go, though circumſtances may tend to diminiſh that number; that the conſtitution at large has no power of giving to one ovarium the power of propagating equal to two; for, in the preſent experiment, the animal with one ovarium produced ten pigs leſs than half the number brought forth by the pig with both ovaria. But that the conſtitution has ſo far the power of influencing one ovarium, as to make it produce its number in a leſs time than would probably have been the caſe, if both ovaria had been preſerved, is evident from the above recited experiment." Certain irregularities in the proceſs throw much light on the ſubject, and tend to ſtrengthen the argument juſt adduced. Fœtuſes may be detained in the ovarium, and developed there to a certain point. Or, the germ may eſcape from the ovary, and not be admitted into the Fallopian tube; in which caſe it has often become attached to ſome part of the abdominal cavity, inſtead of the uterus, conſtituting what is termed a ventral extra-uterine fœtus. After it has attained a certain degree of developement, labour pains come on, but parturition cannot be effected; and the bones of the child are, perhaps, diſcharged through an abſceſs, or gain admiſſion into the alimentary canal, and are voided per anum. Laſtly, the germ may be detained in the Fallopian tube, without arriving at the uterus. The ſtructure of the part does not allow it to dilate ſufficiently to contain a full-ſized child, and it accordingly burſts, in general, long before that time, and the patient periſhes from bleeding.

We muſt allow, that the eſcape of any thing from the ovarium in the human ſubject, or other mammalia, is rather inferred than directly proved; and that we cannot ſee the germs in the Fallopian tube, on their paſſage to the uterus; in ſo obſcure a ſtate are the rudiments of the future animal at the time, and immediately after conception.

We have repreſented the corpus luteum as the conſequence of a fruitful copulation; but there is ſome doubt whether the latter circumſtance be an eſſential condition of its production. It is well known that birds lay eggs without the concourſe of the male, and ſuch eggs are unproductive. Valiſneri aſſerts, that he has ſeen corpora lutea in the ovaries of virgins; and Blumenbach appears, in the following quotation, to agree with him in opinion on the ſubject. "Porro autem non minus verum eſt innuptas aves ejuſmodi ova ſubventanea ex mechanica titillatione genitalium concipere poſſe, quod quidem phyſiologiæ comparatæ, adeoque omnis zoologiæ vere ſcientificæ parens Ariſtoteles, et preterito ſeculo oculatiſſimus Harveius animadvertit, quorum hic adeo libidinoſas interdum aves eſſe aſſeruit, ut ſi dorſum earum manu ſolum leniter tangas, ſtatim procubant, et orificium uterinum nudent et exporrigant, quod ſi blande digito demulſeris, vago murmure, alarumque geſticulatione, gratam veneris dulcedinem eaſdem exprimere; quin etiam femellas ova inde concipere, in turdo, merula, aliiſque ſe eſſe expertum. Idem de pſittaco refert, quem uxor ejus diu in delitiis habuerat, ſæpe hunc ludibundum et laſcivum ſedentis gremium adiiſſe ubi dorſum ſibi demulceri geſtiverit quaſſatiſque alis et blando ſtrepitu ſummam animi ſui lætitiam teſtatus fuerit. Non diu autem poſt blandas has contrectationes eundem ægrotaſſe, crebriſque tandem convulſionibus obortis exſpiraſſe. Diſſecto itaque cadavere ovum fere perfectum ſe in utero ejus reperiiſſe; ſed, ob defectum maris, corruptum. Ignoſcunt mares iſtarum virginum, ſi lutea in earum ovariis corpora non abſimilem originem agnoviſſe ſuſpicor; utpote qui in puellari corpore, non minus quam in turdis et merulis eundem æſtri venerei in ovarii veſiculas effectum eſſe reor, ſitve is viri amplexu, ſitve leſbio quodam artificio excitatus. Quadrant in eam ſuſpicionem, quas diximus circumſtantiæ, ſub quibus corpora lutea in innuptis obſervârunt auctores; ætas ſcilicet, a decimo quarto inde anno, hyſterica quarundam affectio, &c. Num climati quoque aliquid tribuendum, decidere non audeo, annotans tantummodo, quotquot mihi hactenus apud auctores occurrerunt ejuſmodi haud inficiandi caſus, eos non niſi in Italicis virginibus obſervatos fuiſſe." Specimen phyſiologiæ comparatæ, Goetting, 1789, p. 4—9.

Phyſiologiſts have queſtioned whether a ſecond impregnation can take place after a fruitful copulation. Inſtances of twins, born with different degrees of developement, have been conſidered as proofs of ſuperfetation. The reaſoning does not ſeem very concluſive, the fact does not clearly prove that the two fœtuſes were conceived at different and diſtant periods, ſince the growth and developement of one germ may have been prevented by various cauſes. The queſtion is, whether a woman, having only a ſingle uterus, can conceive two or more months after a fruitful copulation; and at preſent we have no facts to prove the affirmative, while preſumption is ſtrongly againſt it. The thing appears more eaſy, if we ſuppoſe the two conceptions to be ſeparated by a very ſhort interval. Thus we can conceive that the American lady mentioned by Buffon, who received the embraces of her huſband, and of a negro ſlave, in the ſame morning, may have brought forth twins of different colours.

On the ſubjects of the preceding paragraphs, the reader may refer to the ample collection of facts, in the eighth volume of Haller's Elementa; to Spallanzani's diſſertations relative to the natural hiſtory of animals and vegetables, vol 2d.; to Haighton's experimental inquiry concerning animal impregnation, in the Philoſophical Tranſactions for 1797; to Cruikſhanks's experiments, in which, on the third day after impregnation, the ova of rabbits were found in the Fallopian tubes, and on the fourth day after impregnation in the uterus itſelf, with the firſt appearances of the fœtus; ibid.

The various opinions concerning the ſource from which the new animal is derived, and the manner in which its formation is effected, form the laſt ſubject of the preſent article. In the ſcience of life, as in all others, the ſpeculations and hypotheſes concerning any matter are in an inverſe ratio to the number of aſcertained facts; and perſons are diſpoſed to talk more, in proportion, as they know leſs. Hence the vaſt abundance of theories of generation, which almoſt exhauſted the patience even of Haller, and extorted from him the following very ſenſible obſervations. "Iterum ingratiſſimum mihi impendet opus, ſcribere de iis, quæ multis a natura circumjectis tenebris velata, ſenſuum luci inacceſſa, hominum agitantur opinionibus; erit de iis ferenda ſententia, in quibus quod diſpliceat, quod infirmum ſit, ubique ſe offert, id autem parciſſime, in quo animus, tanquam in firmo aliquo fundamento, adquieſcat. Erunt libranda cum phænomenis contraria phænomena, cum argumentis contraria argumenta, ut demum nihil doceam certius, quam nihil me docere. Et eſt tamen etiam in deſperatione de problematis ſolutione ſua utilitas, proximumque eſt vero, nihil docere, quod falſum ſit." The firſt ſubject of our inquiry will be, from what quarter the materials of the new animal are derived; then, by what cauſes theſe materials are formed into an animal, ſuch as we have ſhewn to be produced in the female by conception. The opinions concerning the ſource of the offſpring may be reduced to three; one gives to woman only the humble office of affording a proper nidus for the due evolution of the fœtus, which, according to this theory, already exiſts in the male ſemen, and requires only a fruitful habitation. Another directly reverſes this poſition; it puts the female in poſſeſſion of every requiſite for the formation of a new animal, and conſiders the male a mere ſtimulating engine, to call the latent powers of the female into life. The third gives not pre-eminence to either ſex, but, with the mutual embrace, ſuppoſes a mutual effect to be produced; it regards both the male and female, as concurring eſſentially in the work of reproduction, by each affording a ſomething, which, when united under proper circumſtances, becomes the proximate cauſe of impregnation.

The ancients admitted a ſeminal liquor in both ſexes, and concluded, not unnaturally, that the fœtus was formed by the union of theſe. Hippocrates and Ariſtotle held this opinion, and conceived that the ſex of the offspring depended on ſome predominance in quality of one or the other fluid. However obſcure the mode of this mixture may ſeem, ſpecious arguments are not wanting in ſupport of the opinion. The neceſſity of the co-operation of the two ſexes, in producing a fœtus, in almoſt every inſtance in the animal kingdom, may be alleged in favour of the doctrine. Alſo the exiſtence of different ſexes in almoſt all plants; the fecundating power of the male duſt, and the perpetual preſence of the ſeed before fecundation; which, however, remains unfruitful without the influence of the former. The reſemblance of the fœtus to both parents in the human race, in animals and even in plants, may be urged in ſupport of the ſame doctrine.

The old opinion, which ſuppoſes that males are produced by the right teſtis and right ovary, and are contained in the right ſide of the uterus, while females are formed on the left, is deſtitute of all foundation. A male with one teſtis has produced children of both ſexes; and male or female fœtuſes are ſeen indifferently in the right and left cornua uteri of animals.

The hypotheſis of Hippocrates and Ariſtotle was adopted by Buffon, and is preſented in his natural hiſtory with all the advantage it can derive from his warm imagination and eloquent diction. But figurative language recompenſes us very imperfectly in ſcientific matters for want of obſervation, and haſty generalizations; and the theory of Buffon is ſo deſtitute of foundation, that we can hardly think it worthy of notice. He conceives that there is a matter in nature, compoſed of incorruptible molecules, always living and active, and deſtined to the nutrition and evolution of all organized beings. Theſe particles are received in the food, and are applied to every part of a plant or animal. Every animal is an interior mould, by which theſe particles are faſhioned to their particular ſhape. When there is more of this matter than is required for purpoſes of nutrition, the overplus is conveyed from all parts of the body to the teſticles of each ſex, which are its reſervoirs. It exiſts here in a liquid form, and contains molecules analogous to all parts of the frame, ſufficient to form a ſmaller being, exactly ſimilar to the large one, from which it is produced. The molecules compoſing the new being are analogous to thoſe of all parts of the body, from which they have been conveyed to the teſtes, and may be deemed a kind of extract of the old body. This matter, having paſſed through the interior mould, and finding the uterus in a favourable ſtate, generates a new animal. We ſhall not abuſe our reader's patience by the further detail of ſuch vague chimeras; they more than juſtify the ſarcaſm of Voltaire in his "Homme aux quarante ecus." "Ah! monſieur le ſavant, ſays the man aux quarante ecus, could not you inform me how children are made? no, my friend! replies the ſavant; but I will tell you what philoſophers have imagined on this ſubject, or, in other words, how children are not made." This jeu d'eſprit contains a lively ironical account of the various theories of generation, which the reader will find much more entertaining, and quite as inſtructive as the original accounts of theſe reveries.

Of thoſe, who conſider that the father has the principal ſhare in producing the child, Leeuwenhoeck is the foremoſt. He conſiders the ſpermatic vermiculi as men in miniature; and conceives that one of theſe crawls in ſome way or other into the ovarian veſicle, and is there developed.

That the fœtus is produced by the mother has been more generally ſuppoſed; and ſeems more probable on the firſt glance, ſince the child moſt certainly comes from the mother, although it is by no means clear that it ever went to her from the father. The analogy of almoſt all animals, and of plants, favours this opinion. The generation of the aphides has been adduced in its ſupport; where a ſingle fecundation ſuffices for ſeveral generations. In the frog and toad, and in the bird, it is very clear that the fœtus pre-exiſts in the ovarium; and that the contact of the ſemen produces at firſt no perceptible change in its appearance. Indeed the wonderfully ſmall portion of fecundating fluid neceſſary to produce the requiſite effect in the frog or toad would lead us to conclude that it cannot excite any very great change at the firſt moments of its application; and this circumſtance, together with the obvious exiſtence of the ſomething, which is afterwards evolved into a tadpole, in the ovarium before copulation, clearly proves the pre-exiſtence of the germ in the females of this ſpecies of animals. "A quantity of ſeed," ſays Spallanzani, "far more inconſiderable than we ſhould ever have imagined, is ſufficient to animate a tadpole. We have ſeen that it is not neceſſary to cover the fœtus completely with this prolific fluid: a drop will ſuffice. Further, three grains mixed with twelve, and even with eighteen ounces of water, communicate to every part of it the power of fecundation, ſince tadpoles placed in any part of the mixture are fecundated. The three grains of ſeed muſt therefore have been diffuſed through the whole maſs of water. But, what an enormous diviſion of its particles muſt ſuch a diffuſion occaſion! How ſmall a ſhare of prolific liquor muſt fall to the ſhare of each tadpole! Yet there are facts which prove that the ſemen ſtill retains its virtue after this exceſſive diviſion; for I have found a globule 1-50th of a line in diameter, taken out of a mixture of three grains of ſeed with eighteen ounces of water, was often capable of fecundating a tadpole. Deſirous of knowing the proportion, which the tadpole (that of a frog is 2-3ds of a line in diameter) bears to the particles of ſeed diffuſed in a drop of this dimenſion, I have found, on calculation, that it is as 1064777777 to 1. How infinitely ſmall, therefore, is the quantity of ſeed in compariſon with the bulk of the fœtus, which it fecundates! This deduction led me to calculate the weight of the particles of ſemen diſperſed in this drop of water: it is [illegible] of a grain. That I might view theſe particles under every poſſible aſpect, I reduced their bulk to cubic lines, when it appeared to be about equal to [illegible] of a cubic line." Diſſertations, vol. ii. p. 212. The reſearches of Haller, and of others on the formation of the chick, have clearly proved the pre-exiſtence of the fœtus in the female of birds.

But, although this hypotheſis appears to be ſupported by the moſt numerous and ſatisfactory proofs, there are difficulties oppoſed to its adoption. "It is very certain," ſays Haller, "that children often reſemble the parents in the human race; ſo that you may diſtinguiſh one brother by his reſemblance to another, or know a ſon by his likeneſs to the father or mother, or even grandfather or grandmother. All the individuals of ſome families are characterized by particular lines of countenance. My own family have now been diſtinguiſhed for tallneſs of ſtature for three generations, without excepting one out of many grandſons deſcended from one grandfather. Families of red-haired perſons are not uncommon: the diſagreeable colour being derived from the father or mother or grandmother. But this reſemblance of children to parents is diſcerned moſt plainly when there is any defect or peculiar formation tranſmitted from one to the other. The tranſmiſſion of diſeaſe may perhaps not be deemed ſo ſurpriſing, ſince nobody denies that the maſs of fluids is derived from the mother; but the father contributes the ſmalleſt drop poſſible, if any. Yet we find various diſeaſes, or diſpoſitions to diſeaſe, paſſing from either parent to the offspring. This is matter of common notoriety with reſpect to gout, rheumatiſm, inſanity, ſcrofula, conſumption, &c. but there is more doubt of ſome others, as cataract, hernia, aneuriſm, ſquinting, harelip, clubfoot, fatuity, &c. of which, however, authors relate many examples. We know a very remarkable inſtance of two noble females, who got huſbands on account of their wealth, although they were nearly ideots, and from whom this mental defect extended for a century into ſeveral families, ſo that ſome of all their deſcendants ſtill continue ideots even in the fourth and fifth generations. Perhaps the reſemblances of the mother are rather the moſt common. The ill-made Perſians have improved themſelves into a very beautiful nation by their repeated marriages with the celebrated Georgian females. The offspring of Negroes and Europeans partakes of the characters of both parents in colour, form of the lips, noſe, &c.; and we may obſerve in general, of all ſuch mixed breeds, that the children produced ſeem to conſtitute a mean between the father and mother. Peculiarities of formation are not uncommonly tranſmitted; as a very hollow palate, which I myſelf have ſeen, and many others. A man covered univerſally with hard, elaſtic, cylindrical, warty excreſcences, begot ſons and daughters with the ſame deformity. An exceſs in the number of thumbs (four) paſſed from the father to the children: and there are curious examples of ſimilar facts in individuals poſſeſſing five fingers on each hand. Pliny mentions that Q. Horatius, who had this ſtructure, begot two daughters reſembling him in this reſpect. A family mentioned by Reaumur is more remarkable: the grandfather had a ſupernumerary finger on each hand, and a toe on each foot. His firſt ſon produced three children with the ſame peculiarity: the ſecond, who had the uſual number of fingers, but in whom the thumb was very thick, and appeared as if compoſed of two united together, had three daughters with the ſupernumerary members: the third had the natural ſtructure. A daughter, with a very thick thumb, brought forth a boy with the additional finger. That too much influence may not be attributed in this caſe to the influence of the male, it may be obſerved that another daughter, who had large thumbs, produced ſome ſons with ſupernumerary members. Maupertuis has alſo recorded a family of children diſtinguiſhed by this character, produced by a mother with the ſame peculiarity. The thick lip in the Auſtrian family was introduced by the marriage of Mary of Burgundy with Maximilian. It is aſſerted that caſual mutilations, as blindneſs, &c. have been tranſmitted to the offſpring, in horſes: and ſome complain of the plan of employing Arabian ſtallions rather than mares for improving the breed. There is a peculiar breed of four-horned ſheep, deſcending from the female; and another of pigs with undivided hoofs. The difficulty of the ſubject is increaſed by the circumſtance that theſe defects and peculiarities do not in general paſs to the offspring. Blind, lame, or mutilated parents have perfect children. In the family with the ſupernumerary fingers, already mentioned, ſeveral individuals had the ordinary formation. Fowls without the rump breed with the common kind of chicken, both with and without that particular formation; and the ſame mother has children like herſelf and the father, and others without ſuch reſemblance." Elementa Phyſiologiæ, lib. 29, ſect 8.

The phenomena afforded by hybrid generations are curious. It is only in the caſe of animals very nearly allied in their general characters that any hybrid offspring is produced: and this has the mixed characters of both parents. The relations of women in Africa breeding with monkeys are not ſufficiently authenticated. "The mule (produced from the mare by the aſs) does not," ſays Haller, "ſeem to me to be an aſs, which however it reſembles in its tail, ears, and obſtinacy, ſince the form of the body, the ſtrength and ſize, the hocks, the hair, and colour are thoſe of the mother. The voice is more like that of the father, and there is a farther reſemblance of the aſs in the peculiar hollow of the larynx. As the mule ſeems to be ſtronger and more lively than the aſs, ſo the hinny begotten by the ſtallion on the ſhe-aſs, ſeems rather to follow the mother: it is ſaid to have the ears of the horſe, the mane and tail of the aſs; and to be ſmaller than the mule. The offspring of the common ſhe-goat with the Angora he-goat has the long hair of the father; while that of the Angora female with the European male has not that character. The fine hair of the former breed was continued in Sweden to the third generation. This fact ſhews the prevalence of the male, which, being born in a warmer region, exceeds in ſtature the European animal. The pheaſant breeds with the common hen: the offspring has the mother's colour, with the form of the father, whom on the whole it moſt reſembles. If the animal produced from ſuch a connection breeds again with the male pheaſant, the young are complete pheaſants. When theſe and various other analogous facts are compared, we remain in as much doubt as before. It appears that the offspring is affected by both parents, in ſome caſes more by the father, and in others more by the mother. And I think, that where the father is greater in ſize, his characters prevail, and *vice verſa*." Ibid.

Neither is it merely the form and external appearance that are changed in the caſes of hybrid animals; we have already obſerved that the mule has the peculiar laryngeal cavity of the aſs; and it is further known that this animal, and all other hybrids, very rarely propagate: ſo that we may conclude that ſome general internal change is effected in theſe caſes. A more accurate anatomical deſcription of hybrid animals would probably contribute to illuſtrate the ſubject: the facts at preſent in our poſſeſſion lead us to conclude that the fœtus is not produced entirely by the mother or father, that both parents contribute ſomething to the offspring, and that the new being is rather generated *de novo* than evolved.

In conſidering the powers by which the admirable ſtructure of the animal frame is raiſed, we encounter a vaſt hoſt of the moſt wild and viſionary hypotheſes: we deſcend, to uſe the expreſſion of Haller, from twilight into regions of utter darkneſs. In the firſt place we reject entirely the operation of fortuitous cauſes: the notions concerning equivocal generation have been ſufficiently refuted by modern naturaliſts, even in the lower orders of animals, where the phenomena, on a ſuperficial view, tend to confirm the vulgar opinions, and there is not even the ſhadow of probability in favour of ſuch explanations in any of the higher claſſes.

In theſe times, however, men of conſiderable reputation have not been wanting to defend opinions very much reſembling the hypotheſis of equivocal generation. Buffon has contended that all the parts of an animal are not formed at once, but ſucceſſively, by epigeneſis. His obſervations concerning the organic molecules of the ſemen have been already noticed: he even admits the formation of new beings by putrefaction and by the fortuitous concourſe of particles. His aſſociate, Turberville Needham, does not allow of equivocal generation, but ſuppoſes the exiſtence of a power, which forms the body from the ſmalleſt germ by the aſſimilation of aliment. He thinks that the primitive germs alone are created at once, but that there are no compound germs at all reſembling animals. He quotes the phenomena obſervable in vegetable infuſions; and conceives that animal and vegetable ſubſtances are the ſame in their origin, and admit of being changed into each other. The firſt germ of an organized body is very ſimple, and not yet organized, nor poſſeſſing any lineaments of the animal. Hence the ſmalleſt animalcula, as conſiſting of the feweſt germs, are formed the ſooneſt; and thoſe of a more compound ſtructure, more ſlowly. The whole affair of vegetation conſiſts of an expanſile force reſiding in matter, and a reſiſting power. The former is perfectly elaſtic, and exiſts in every ſenſible point of matter; it is aſſiſted by heat. There is a power, in every point of vegetable matter, to produce filaments, from which microſcopic animalcula may be formed. A real generating cauſe exiſts in nature. The expanſive force is increaſed, and the reſiſtance diminiſhed, when matter is elevated to a ſtate of vitality. This is effected by the developement of the active principles; it returns again to a vegetable nature, when the contrary cauſes obtain. He does not, however, admit of equivocal generation, but conceives it neceſſary, that the ſeminal fluids, both of the male and female, characterized by their peculiar properties, ſhould be preſent.

In this hypotheſis the power of the ſemen is not neglected, nor is any attraction or fortuitous concourſe of atoms admitted. But the experiments on infuſion animalcula are employed to authorize concluſions, which cannot be very eaſily admitted. We find a great difficulty in admitting how any blind force, not regulated by deſign, can form animals deſigned for certain purpoſes, and fit to fill their place in the chain of beings. Hence we find that theſe animalcula are not produced when the experiments are ſo conducted as to remove all poſſibility of the introduction of ova from without. The experiments of Spallanzani clearly prove this point.

The ſyſtem of epigeneſis met with an able defender in C. F. Wolf: ſee his Theoria Generationis, Halle, 1759, 4to. He explains the mode of growth, and the formation of parts in animals and vegetables, by the action of a power which he calls *vis eſſentialis*, without any mould or model. This power, together with the fixation or coagulation (ſoli deſcentia) of juices, accompliſhes the whole work of formation. The heat of the air in plants, and the heart in animals, are acceſſory cauſes of generation. The primordia of animals are globules, which cannot be reduced into ſmaller component parts; neither arteries, veins, nor heart exiſt in the egg at 24 hours. The vis eſſentialis, different from the power of the heart, now begins to act, and, in the globular matter of the area umbilicalis, forms grooves, which gradually grow red, and conſtitute veſſels. Theſe at firſt are large intervals of the globular matter, but gradually become ſmaller. Membranes are formed round theſe paſſages. All parts are firſt fluid and inorganic, and then formed into veſſels. Trunks are formed to the branches, and at laſt the great trunk of all, the heart. New parts are formed, from the juices of the firſt; and thus the organs appear in ſucceſſion, one after the other. Haller refutes this theory from his accurate obſervations on the formation of the chick; he ſhews that in fact parts exiſt, diſtinguiſhed by their form and other characters, when ſuperficial obſervation would lead us to infer that there was only an inorganic homogeneous maſs. The tranſparency of the whole prevents the outlines and diſtinction from being viſible, but coagulation by acids brings theſe differences into view. Becauſe the original gelatinous maſs, which forms the animal, ſeems to have no obvious ſtructure or ſmaller diſtinguiſhable component parts, we are not therefore to conclude that it has none. Spirit of wine, poured on this jelly, hardens it ſo, that we can ſee fibres, veſſels, and viſcera, where there ſeemed at firſt to be a mere tranſparent concrete. There is no eſſential power in the alcohol to model rude matter into an organic ſtructure; but the deſtruction of the tranſparency allowed the outlines of parts to be diſtinguiſhed: ſimilar explanations may be given of all his obſervations on this ſubject. Moreover, we can by no means underſtand how this ſingle power can form ſuch different parts always in the ſame place in one animal, and according to one archetype, if the materials be inorganic, mutable, and ſuſceptible of any configuration. Why ſhould this matter always produce, without any error, a chicken in the common fowl, a pea-chick in the pea-fowl? Nothing is aſſumed but a dilating force acting progreſſively; this might give origin to a vaſcular net-work, growing conſtantly larger as long as the expanſive force exceeded the reſiſtance; but how does it produce a heart, a head, brain, and kidneys? Why is a peculiar order of parts formed in each animal?

Some again have explained the formation of the body according to mechanical principles, by the power of fermentation, &c. We cannot, ſays Haller, conceive that any power, unleſs guided by intelligence, can act on matter in a manner conſtantly changing, and ſo directed, that inorganic materials are formed into bones, muſcles, veſſels, and viſcera, arranged in a certain order with reſpect to each other. All ſpontaneous productions, as for inſtance the beautiful figures ſeen in ſnow, are arranged in an uniform and invariable manner. Let any perſon, in order to eſtimate the value of ſuch hypotheſes, reflect merely on the eye. How can this organ be moulded by any expanſive force into ſuch various ſucceſſive layers, all differently fabricated, where the light paſſes through tranſparent bodies, every where ſurrounded by others perfectly opaque, and ſo arranged, that in the millions of men and animals the rays of light conſtantly converge upon the retina? Yet this blind material cauſe knows nothing of light, nor of the laws by which it is refracted, although we muſt ſuppoſe it to have adapted all the parts ſo accurately, even to the hundredth part of a line, in order to the collection of the rays in the retina. Again, this unintelligent cauſe has furniſhed the eye with eye-lids and eye-brows, and has given to the iris a power of contraction and dilatation, by which the organ is accommodated to too great or too ſmall a quantity of light.

Buffon ſuppoſes the nutritive matter to penetrate all parts of the body, and to be formed in them, as in an internal mould; and he conceives that the ſuperfluous particles are carried back to the ſemen, conveying into that fluid every thing neceſſary to the production of a new being, ſimilar to the former. The ſeminal fluid of either ſex contains the particles neceſſary for forming an individual of the ſame ſex.

Theſe muſt be mixed for the production of a new being. The generative organs are the baſis of the new animal, and theſe are firſt formed of themſelves: the other organic particles of the body are arranged round them as a centre, according to the order, which they held in the body, from which they were produced. That ſex prevails, of which the particles are the moſt numerous. The author of this hypotheſis conſiders that it explains completely the reſemblance of the offspring to either or both parents, the formation of twins, &c.

The illuſtrious name of Buffon can hardly induce us to animadvert ſeriouſly on ſuch dreams. In the firſt place, what is an internal mould or model? The authors of the hypotheſis are ſo far from ſatisfying us on this fundamental point, that they confeſs we could not underſtand it, unleſs we had a ſeventh ſenſe. How then came they to know it? So far from underſtanding what this model is, we have no heſitation in aſſerting that its exiſtence is purely ideal. But if we ſhould grant this, there are ſtill inſuperable difficulties remaining. Many children are unlike both parents, and they ſometimes have parts which both the father and the mother wanted, and with which, therefore, neither parent could have ſupplied them; this is the caſe with the offspring of mutilated individuals, and particularly with the male children of fathers who had loſt one teſtis; a caſe which was not uncommon when caſtration was an ordinary mode of treating ruptures. The mother cannot beſtow on her daughter the hymen, which ſhe has loſt; nor can we ſee the ſource from which the foramen ovale, the ductus arterioſus, and venoſus, the umbilical veſſels, the placenta, the cord, &c. are derived. The teeth too muſt puzzle us greatly. The various transformations, and every other phenomenon in the lower orders of animals, are altogether irreconcileable with the hypotheſis. The adult frog has no branchiæ, which are yet ſeen in the tadpoles. In the bee kind, the males, females, and working bees differ in ſtructure. The offspring might reſemble the father or mother, but whence do the working bees come, which reſemble neither parent, and have no generative organs. How entirely does the caterpillar differ, in all points of its organization, from the butterfly! How can the particles unite, when the male and female are ſo entirely different, as in the caſe of many inſects, where one is winged, and the other not, &c.

The ſuppoſition of the ſucceſſive fixation of parts round the generative organs is quite inadmiſſible; for thoſe very parts cannot be recognized until a comparatively late period, and after others have been ſome time formed.

This fact was confirmed, ſays Blumenbach, by an obſervation which I lately made on abortive twins of different ſexes, about ſixteen weeks old. Although theſe were remarkable for the beauty of their proportions, and were moſt perfectly formed according to the ſtandard of their tender age, the difference of the ſexual organs could be aſcertained only by the moſt careful inveſtigation: in every other reſpect, as in the figure, phyſiognomy, meaſurement of the lines, &c. they reſembled each other completely. Inſtitut. Phyſiolog. p. 387.

In reply to ſome of theſe objections it has been affirmed, that thoſe parts of the fœtus, which the parents have not, are formed by intelligent nature from the ſuperfluity of the organic molecules: that ſhe adds a ſecond teſticle from the exceſs furniſhed by the ſingle gland of the father; and that the placenta and fetal coverings are produced in the ſame way from the exceſs of nutritious molecules; but if nature can make wings, inteſtines, nerves, feet, teſtes, placenta, and membranes, &c. without any mould, why ſhould ſhe not form the whole body in the ſame way: and, whence ariſes this abundance of particles, produced by the teſtis of a man, who has only one gland, when the mould muſt be one half leſs than in a perfect individual? How came this intelligent nature to be ſo ſuddenly produced in a mere machine, when we had before heard nothing of her? Can any one underſtand how particles tranſmitted from ſo vaſt an extent as the father's whole body, can occupy ſo ſmall a ſpace, even when united to thoſe of the mother, as to be inviſible for ſeveral days after conception? In ſhort, there is no female ſemen, no corpus luteum before copulation, and conſequently no fluid from the mother to be mixed with that of the father, and convey to the fœtus the female generative organs, the mammæ and the other diſtinctions of the female ſex.

A very different theory from that which we have juſt conſidered, and a very old one, aſcribes the formation of the fœtus to a formative power of the mind or ſoul (anima ſtructrix, vis plaſtica): and ſome conceive that the object is effected by the mind of the fœtus. The partiſans of theſe opinions rely much on the effects ſaid to be produced on the body of the fœtus by cauſes operating on the mother's mind. They alledge that the ſtructure of the offspring is often materially changed and impaired by the longing of the mother, or by various violent emotions: that theſe effects are produced, not from any corporeal cauſe, but from the action of the mind on the anima ſtructrix of the fœtus: that there is a harmony between the mind of the mother and her body, and between the bodies of the mother and child. Various attempts have been made to explain the manner and nature of this influence and connection. But it would have been better to have eſtabliſhed the fact incontrovertibly in the firſt place. The records of medicine abound with inſtances of almoſt all imaginable effects produced on the fœtus from the cauſes above-mentioned:—of the likeneſs of fruits or flowers, &c. on the body, of various animals, of bruiſes;—of parts being cut, deſtroyed, or otherwiſe injured, &c. &c. That credulity and ignorance have given birth to moſt of theſe narratives, cannot be doubted. Our faith in them muſt be moſt ſeriouſly ſhaken, when we obſerve that there are endleſs examples of the moſt vehement mental diſturbances, as terrors, longing, paſſion, occurring repeatedly during pregnancy, particularly in delicate and hyſterical women, without any thing unnatural appearing afterwards in the child, even when the mother has expreſſed her ſtrong perſuaſion that her child would be mutilated. Nor can women foretel when the marks above alluded to (nævi) will appear. Deformed and monſtrous children, and others marked with nævi, have been repeatedly obſerved by the moſt judicious and accurate obſervers, when the mother was not conſcious of any ſuch cauſe as thoſe above alluded to. Children are born blind of healthy parents without the circumſtance being conſidered as extraordinary or requiring any thing accidental to account for it. When women obſerve any deformity in their offspring, they recal to their memory every thing which has happened during their pregnancy; and if they can remember any fall or fright, or ſuddenly ſeeing any uncommon animal, the carcaſe of a beaſt opened, or a wound, &c. they immediately ſet it down as the cauſe of the phenomenon. And, from the various turns which ſuperſtitious and whimſical fancies take in different countries, the ſame appearances are aſcribed to very different cauſes.

In weighing the teſtimonies of authors, we ſhall find that the moſt experienced and judicious indulge the common notions about nævi much leſs than others. In the numerous collections, where monſters and extraordinary productions of all kinds are carefully collected and preſerved, we ſee no example of a genuine nævus, according to the common notions, that is, of the reſemblance of a ſauſage, or a pig's foot, or a wound, &c. in any part of the body of a fœtus. In further ſupport of our opinions we may quote the numerous inſtances of monſters, vegetable productions, which cannot be aſcribed to any power of imagination, or any mental affection whatever. We cannot doubt that the ſeed and the ovum contain the cauſe of the future ſtructure, which is always preſerved uniform in the ſame ſpecies. That various external circumſtances, as a copious or deficient ſupply of nutrition, and many cauſes of a nature entirely unknown to us, may have an effect in altering or variouſly modifying the original fabric, within certain limits, we do not pretend to deny.

If the phenomena of nævi afford no proof of a plaſtic ſoul; if we acknowledge that the beautiful ſtructure of an animal body cannot be reared by chance, nor by any blind force with which inorganic parts may attract each other, it remains for us to conſider whether the fœtus is formed before the time of conception, according to the hypotheſis of evolution. This opinion has been chiefly held in modern times: it is ably defended by Haller, and has been ſupported by the experiments and writings of Spallanzani and Bonnet.

If, ſays Haller, the germ or original of the fœtus be contained in the mother, if it be already formed in the ovum, and ſo far perfected as to require merely a ſupply of nouriſhment for its growth, the grand difficulty of forming ſuch an artificial and complicated ſtructure from inorganic matter is overcome. In this hypotheſis, the Creator, with whom nothing is difficult, forms the machine: he has arranged dead matter, in conformity with his previous deſigns, and according to the archetype fixed by his wiſdom, before the acceſſion of the influence furniſhed by the male. In the ſame way you may have in plants a perfect flower, capſules, and well-formed ſeeds, differing from fruitful ſeeds only in the circumſtance, that they would not grow into a new plant. The metamorphoſes of inſects have been adduced in ſupport of this notion of evolution: the butterfly, ſo entirely different from the chryſalis, was entirely contained in the former, and needed only to be diſengaged by the removal of the ſkin, and have its parts unfolded. The rudiments of the tracheæ, which are to contain air in the bee, exiſt in the fatty ſubſtance of the worm from which the perfect inſect is formed, and numerous examples of a ſimilar deſcription might be adduced. The phenomenon of incubation, and the ſucceſſive appearance of various parts until the whole animal is completed, afford a convincing argument for the hypotheſis of evolution. After recounting the gradual and progreſſive unfolding of the body of the chicken, Haller obſerves, that the progreſs is nearly the ſame in quadrupeds. "In the human fœtus, which at firſt ſeems a mere unorganized maſs, Leeuwenhoeck already diſcerned, by means of his microſcopes, diſtinct organization. Thus it is clear, that an animal without any limbs, or diſcernible arrangement of parts, is gradually changed by various ſtages into a perfect being, nouriſhed by food, and ſuſceptible of voluntary motion. It may be inquired, whether the animalcule, before it can be recognized by the ſenſes of the diſſector, exiſts in the father or the mother: whether it were formed by epigeneſis, or the ſucceſſive union of particles; or ſuddenly produced. Epigeneſis is altogether impoſſible. Whoever has contemplated the ſtructure of the body with a little attention, muſt be convinced that an animal could not exiſt without a heart, ſince the principle of life and motion exiſts in that organ. But the heart muſt be furniſhed with arteries to carry the vital fluid to all parts, and with veins to carry it back again.

It is eaſily proved that the fœtus does not conſiſt of a mere ſkeleton of blood-veſſels. Viſcera muſt accompany theſe, of which, with ſome cellular ſubſtance, they are entirely compoſed. But no one has ſeen the viſcera compoſed by particles ſucceſſively depoſited: they are perfect, although ſmall, as ſoon as they can be diſcerned. Muſcles muſt have been preſent from the firſt: for the young animal, in the incubated egg, is capable of motion, and from its ſtraight ſtate bends the body. It is moreover irritable, and muſt conſequently have muſcles, although they are concealed under the appearance of a mere gelatine. The head is large, and the eyes are viſible among the firſt parts, together with the heart. The muſcles require the preſence of nerves, the brain muſt have been preſent with the head and heart." The hypotheſis then, to which theſe arguments lead, is, that the perfect animal exiſts previouſly to conception; that nothing now is generated, but that the parts, which were folded up, and contracted into a ſmall ſpace, are expanded, unfolded, enlarged, and rendered conſpicuous. In this mode of explication, we muſt, it ſeems, admit, that the germs of all the human race, as well thoſe who have already lived, as thoſe who may hereafter be born, were contained in the ovaria of Eve: a propoſition of ſo ſtrange a nature, and ſo completely unſuſceptible of proof, that we cannot value very highly the hypotheſis, which renders it neceſſary.

The pre-organized germ would remain in a kind of torpid ſtate in its ovarian receptacle, were it not ſtimulated by the male ſemen. This fluid rouſes it from its lethargy, and cauſes its growth and developement. The ſtimulating properties of the ſemen are ſuppoſed by Haller to excite the motion of the heart; and he conceives that the ſubſequent developement of the new being is eaſily underſtood.

The great reputation of Haller has not however gained to his opinions on this ſubject univerſal aſſent. The accurate and well-informed Blumenbach of Göttingen has oppoſed the hypotheſis of evolution with great effect, and has arrayed againſt it a number of objections, which its advocates will not eaſily elude. His opinions on this ſubject are, on the whole, the moſt rational that have been hitherto promulgated: the following ſtatement of them is derived from his manual of natural hiſtory, and his inſtitutes of phyſiology. "The hypotheſis of evolution has been employed, particularly in modern times, in order to explain the origin of organized bodies; it has been ſtated that no man, no other animal, and no plant is generated, but that they have all exiſted in their parents and anceſtors, in the ſtate of complete previouſly formed germs, ſince the firſt creation. The various generations have been continued, one within the other, like a ſeries of pill-boxes, and have been only gradually unfolded and brought to light by fecundation, in their reſpective turns." Haller, who was the leader of the modern evolutioniſts, roundly aſſerted, "that the viſcera, and all the bones of the future fœtus, exiſt before conception in the maternal germ, but nearly in a fluid ſtate, and therefore inviſible." This opinion muſt be deemed, on the firſt view of it, irreconcileable with reaſon, on account of the ſuppoſition involved in it, of the uſeleſs creation of innumerable germs, which are never to be evolved; and it is utterly at variance with all chaſte and ſound phyſiological reaſoning, on account of the great aid which it requires from preternatural agency, and the uſeleſs complication of natural powers which it ſuppoſes in oppoſition to all the laws of philoſophical inveſtigation. According to the unanimous repreſentations of the moſt celebrated and zealous advocates of evolution, the pre-organized germs lie ready in the mother, are rouſed at the time of fecundation, and proceed to their developement by this agency of the male ſeminal fluid. What we call conception is, therefore, nothing but the excitation of the torpid germ by the affuſion of the male liquor. Here then, in the firſt place, we muſt ſuppoſe an exciting power. But children often reſemble moſt ſtrikingly their father only: bitches, after copulating with different dogs, often have puppies reſembling their different fathers: two individuals of different races, as a Negro and an European, produce together offſpring of a middle character, or a mulatto: and, where the ſpecies of animals or plants is different, mongrels are produced, having as many characters of the father's formation as of the mother's. All theſe facts cannot be overlooked; and, in order to account for them, the evolutioniſts ſuppoſe in the ſemen, in addition to its exciting influence, a formative power, by which it can change the pre-organized germ contained in the mother into ſomething of the form of the father. Thus we find two powers in the ſemen, an exciting, and a formative one. But, by means of an artificial hybrid impregnation, repeated through ſeveral generations, we can, at laſt, change one ſpecies of organized bodies entirely into another. One ſpecies of plant, fecundated with the male duſt of another, produced ſeeds, from which hybrid fecundable plants were produced. Theſe were again fecundated with duſt of the ſame male plant; and, after this had been repeated four times, a complete metamorphoſis had taken place, by which the characters of the male were ſubſtituted for thoſe of the female plant. The ſame circumſtances will occur in the human ſpecies if the offspring of an European woman by a negro be fecundated by a negro; and the produce of that conception again by a negro, &c. Thus, at laſt, the preformation of the maternal germ, which has been preſerved ſince the creation of the world, avails nothing, but yields entirely to the formative power of the male fluid, which, according to the hypotheſis of evolution, ſhould merely excite it to action. We may affirm, in ſhort, on the whole, that of all the phenomena adduced in ſupport of this hypotheſis, not one can be eſtabliſhed ſufficiently clear to be admitted as a proof; while there are numerous unexceptionable obſervations directly oppoſing it.

But, in proportion as this hypotheſis of evolution is inconſiſtent with the phenomena, and with the rules of philoſophiſing, ſo, on the contrary, the opinion, not that any fictitious germs are evolved by means of conception, but that the new being is in fact generated, and gradually and ſucceſſively formed from the generative fluids, commends itſelf to our approbation by its ſimplicity, and its accordance with the other proceſſes of nature.

Since this affair of a true generation by ſucceſſive formation has been variouſly explained by phyſiologiſts, I conceive that we ſhall approach moſt nearly to the truth, by adopting the following propoſitions. 1ſt. The materials, of which organized bodies, and conſequently the human frame is compoſed, differ from all other matter in being regulated ſimply and excluſively by vital powers. 2d. Of theſe the moſt remarkable, and that, whoſe exiſtence and agency can be the leaſt queſtioned, is the force which acts on organized matter, when prepared for its deſtination, but not yet moulded into ſhape, and beſtows on it, according to its various natures, various but determined and definite forms. In order to diſtinguiſh this vital power properly from all others, I give it the name of niſus formativus. 3d. This niſus formativus is imparted to the materials of generation, when they are contained in a mature ſtate, under the requiſite conditions, in the uterine cavity, builds up in it the rudiments of the embryo, and gradually forms its organs to correſpond to their pre-ordained purpoſes: it preſerves the ſame ſtructure by the proceſs of nutrition, as long as life continues; and it obviates the effects of caſual mutilation, as far as that can be accompliſhed, by means of reproduction.

This gradual formation of new organized bodies can be moſt manifeſtly diſcerned in thoſe, which combine, with a conſiderable magnitude, a rapid growth, and ſuch a kind of delicate ſemi-tranſparent texture, that they can be clearly ſeen through, particularly in a ſufficient light, and with moderate magnifying powers. This is the caſe in the vegetable kingdom, with ſome ſimple aquatic productions, as the conſerva fontinalis, which is propagated in the early part of ſpring; in the bloodleſs diviſions of the animal kingdom, with the polypes (hydra); in the animal kingdom, with the incubated egg, on the firſt appearance of the chicken, and its ſubſequent daily developement.

' It muſt be obſerved here, that the expreſſion niſus formativus is employed ſimply for the purpoſe of diſtinguiſhing this from the other kinds of vital powers, and by no means with any intention of explaining the cauſe of generation. I believe the latter to be concealed by no leſs impenetrable darkneſs than that which involves the cauſes of gravitation and attraction, which are only names for effects, recognized like the niſus formativus, a poſteriori. I have employed the word niſus chiefly in order to denote that the nature of this force is truly vital, and to diſtinguiſh it as clearly as poſſible from the merely mechanical powers, by means of which ſome philoſophers formerly endeavoured to explain the buſineſs of generation. The very point on which the whole of this doctrine concerning the niſus formativus hinges, and which alone ſufficiently diſtinguiſhes it from the vis plaſtica of the ancients, the vis eſſentialis of Wolf, and other hypotheſes of the like nature, conſiſts in the combination of the two principles, by which the nature of organized bodies is explained, *viz.* the phyſico-mechanical and the teleological.

I hold it moſt probable, that in the firſt place, a definite time is required for the various fluids of each ſex, which ſeem to be united in the cavity of the uterus after a fruitful copulation, to be more intimately mingled, and brought to maturity. When the period of this preparation is completed, the mature and intimately blended fluids become animated by the niſus formativus, by which the hitherto unformed materials of generation are partly moulded into the elegant coverings of the ovum, partly into the figure of the contained embryo. Hence we can underſtand, why the ſmalleſt veſtige of a formed fœtus cannot be diſcerned, even with the aſſiſtance of the excellent modern dioptrical inſtruments, during the firſt week after conception, excepting the unformed fluids contained in the uterine cavity; while the embryo appears as it were on a ſudden in the third week.

I ſhould exceed the limits of theſe inſtitutions, if I were to recount at greater length thoſe arguments drawn from nature herſelf, by which the influence of the niſus formativus in generation ſeems to me to be rendered very highly probable. I ſhall advert very ſhortly to a few of theſe points, the force of which will be eaſily diſcovered by a more attentive conſideration. On this principle I explain the memorable experiment in the hiſtory of hybrid productions, where prolific hybrids, fecundated during ſeveral generations, by the male ſeed of the ſame ſpecies, have produced an offspring gradually deviating from the original maternal form, and aſſuming the characters of the father, until at laſt the former has been completely changed into the latter by a kind of arbitrary metamorphoſis.

The well-known fact of the great frequency of monſtrous productions in ſome ſpecies of domeſticated animals, particularly ſwine, and their rarity in the wild condition of the ſame animals, can only be explained on the principles already ſtated. The evolutioniſts are compelled to aſſert that all theſe monſtroſities muſt have exiſted in the germs from the firſt creation of things. The phenomena of re-production, taken altogether, can be much more aptly explained by the agency of the niſus formativus, than on the notion of pre-exiſtent germs; and ſome particular examples, as, for inſtance, of nails growing on the middle, after the loſs of the firſt phalanx, cannot well be ſolved on any other principle.

After conſidering, and carefully weighing the arguments on both ſides of the queſtion, it appears, that even thoſe who aſſume pre-exiſtent germs, muſt allow to the male ſeminal fluid a conſiderable formative influence, in addition to the exciting power, which they recognize in it, and conſequently that the doctrine which they defend requires, in fact, the aſſiſtance of the niſus formativus; while the latter ſufficiently explains the phenomena of generation, without the aid of pre-exiſting germs." Whatever theory of generation we adopt, we muſt ultimately aſcend to the agency of the Creator, the primary cauſe of all exiſtence.

The circumſtances belonging to the ſtate of pregnancy; the period and phenomena of parturition and its conſequences, are treated under thoſe articles of the Cyclopædia which relate to the ſubject of midwifery.

GENERATION *of Birds, Fiſhes, Foſſils, Inſects, Metals, Minerals, Muſhrooms.* See BIRD, FISH, FOSSILS, INSECTS, &c.

GENERATION *of Plants.* See FECUNDATION and GEMMA.

GENERATION *of Shells.* See SHELLS.

GENERATION *of Stones.* See STONES, SPAR, TROCHITES, and CRYSTALS.

GENERATION, in *Theology.* The father is ſaid, by ſome divines, to have produced his Word, or Son, from all eternity, by way of generation; on which occaſion the word generation raiſed a peculiar idea: that proceſſion which is really effected in the way of underſtanding, is called generation, becauſe in virtue thereof the Word becomes like to him from whom he takes his original; or, as St. Paul expreſſes it, is the figure or image of his ſubſtance, *i. e.* of his being and nature. See TRINITY and PERSON.—And hence it is, they ſay, that the ſecond perſon in the Trinity is called the Son.

GENERATION is alſo uſed, though ſomewhat improperly, for genealogy, or the ſeries of children iſſued from the ſame ſtock. Thus the goſpel of St. Matthew commences with "the book of the generation of Jeſus Chriſt, &c." The latter and more accurate tranſlators, inſtead of generation, uſe the word *genealogy.*

GENERATION is alſo uſed to ſignify a people, race, or nation, eſpecially in the literal tranſlations of the ſcripture, where the word generally occurs wherever the Latin has *generatio,* and the Greek γενεα, γενεσις.

Thus, "A wicked and perverſe generation ſeeketh a ſign," &c. "One generation paſſes away, and another cometh," &c.

GENERATION is alſo uſed in the ſenſe of an age, or the ordinary period of a man's life.

Thus we ſay to the third and fourth generation. In this ſenſe, hiſtorians uſually reckon a generation the ſpace of thirty-three years, or thereabouts. See AGE.

Herodotus makes three generations in an hundred years; which computation appears, from the latter authors of political arithmetic, to be pretty juſt. See CHRONOLOGY and POLITICAL *arithmetic.*

GENERATOR, in *Muſic,* ſignifies the principal ſound or ſounds by which others are produced. (See GENERATE.) Thus, the loweſt C for the treble of the harpſichord, beſides its octave, will ſtrike an attentive ear with its twelfth above or G in alt, and with its ſeventeenth above, or E in alt. The C, therefore, is called their "generator," and the G and E its products or harmonics. But in the approximation of chords for G its octave below is ſubſtituted, which conſtitutes a fifth from the generator, or loweſt C; and for E is likewiſe ſubſtituted its fifteenth below, which, with the above-mentioned C, forms a third major. To the loweſt notes, therefore, exchanged for thoſe in alt, by ſubſtitution, the denominations of products or harmonics are likewiſe given, whilſt the C retains the name of their "generator." But ſtill, according to the ſyſtem of Tartini, two notes in concord, which, when ſounded, produce a third, may be termed the "concurring generators" of that third.

GENERICAL NAME, in *Natural Hiſtory,* the word uſed to ſignify all the ſpecies of natural bodies, which agree in certain eſſential and peculiar characters, and therefore all of the ſame family or kind; ſo that the word uſed as the generical name equally expreſſes every one of them, and ſome other words expreſſive of the peculiar qualities or figures of each are added, in order to denote them ſingly, and make up what is called a ſpecific name.

Thus the word roſa, or roſe, is the generical name of the whole ſeries of flowers of that kind, which are diſtinguiſhed by the ſpecific names of the red roſe, the white roſe, the apple roſe, &c. The ignorance of former ages, in the true principles of natural hiſtory, has occaſioned the bodies, which are the objects of it, to be arranged into very unnatural ſeries under the name of genera; and theſe have been called by names as improper as the characters they were diſtinguiſhed by. Linnæus has done a great deal in exploding the bad generical names in botany, and Artedi has applied his rules about the formation of theſe names with very little difference to the ſubjects of ichthyology.

Many of the generical names of fiſh, till the time of this author, were ſo barbarous and obſcure, that it was not eaſy to trace them to their original, or to find whether they were truly Teutonic, Engliſh, Dutch, Swediſh, French, Italian, Spaniſh, Portugueſe, Latin, or Indian.—The ignorance of the writers on theſe ſubjects, or their too ſcrupulous adherence to the cuſtoms of their predeceſſors, ſeem to have been principally the cauſes of this, and often an entire negligence. Artedi's rules for generical names for fiſh are theſe: whatever fiſh there are which agree in the ſame generical characters, and are properly of the ſame genus, theſe ought all to be called by the ſame generical name, their differences being only expreſſed by ſpecific ones. This appears ſo plain, ſo juſt, and ſo neceſſary a rule, that it is almoſt a ſhame to lay it down; yet the writers on fiſh, till the time of this author, had very ſeldom obſerved it.

Another barbariſm and impropriety in the generical names of fiſh among the old authors, is the uſing of the ſame words to expreſs them, which are alſo the names of other animals, quadrupeds, birds, and reptiles. Theſe are ſubject to great objection; becauſe when they are uſed, it is not eaſy to ſee, in ſome caſes, whether the author is ſpeaking of a bird, a beaſt, or a fiſh. It is therefore one of the general rules of Artedi, that all theſe names are to be aboliſhed, as alſo all thoſe which are common to fiſh, and to plants, minerals, and to the tools of huſbandry, or other ſervices.

Another rule of this excellent author is, that generical names that are compoſed of two whole words, unnaturally tied together, are to be aboliſhed, it being eaſy to contrive names leſs barbarous, and as expreſſive: next to theſe are to be exploded thoſe names which are formed of two generical words before in uſe, the one broken or cut ſhort, the other preſerved entire.

Another general rule in regard to theſe names is, that all ſuch as are not of either Latin or Greek origin, are to be proſcribed and wholly rejected. This rule cuts off a prodigious number of barbarous words, with which we find the books of authors of former ages on theſe ſubjects crowded.

A ſixth rule for the regulating generical names is, that all ſuch are to be aboliſhed as terminate in *oides,* as expreſſing a reſemblance often imaginary, and often alluding to ſomething unknown, or rendered difficult to trace from the changes which the names of other things have undergone ſince the time when it was formed. Theſe words convey no idea of the character of the genus expreſſed by them, except that they are like the other thing alluded to in ſome external, though perhaps not eſſential, character: of this kind are the rhomboides, ſcorpoides, &c.

A ſeventh rule in regard to theſe names is, that all ſuch are to be rejected as are barely diminutives, and terminate in *ulus* or *ula.* Theſe convey no other idea, but that of the fiſh being like ſome other fiſh, only leſs: now bigneſs is no generical character; therefore if this genus, and that referred to, differ only in ſize, they have no generical difference at all; if they do differ otherwiſe, they ſhould be expreſſed. What makes many of theſe names alſo more intolerable is, that they allude not to fiſh, but to other things ſo different in their nature, that there muſt needs be many other more eſſential varieties between them, beſide ſize.

Another general rule is, that ſuch generical names as are pure Latin, but are mere adjectives, are to be exploded, there being no reaſon for uſing them as ſubſtantives.

A ninth general rule is, that ſuch names as are formed of Latin words, unknown to the ancient Romans, and formed by the later writers, are to be expelled as barbarous, and others of better credit placed in their ſtead.

Finally, ſuch generical names as have been given to fiſh from the places where they are caught are to be rejected; of this kind are the ſardella and ſardina from the iſland of Sardinia, and the ſturio from Aſturia, a province of Spain. Theſe ſorts of names can convey no idea of the nature of the fiſh, and may belong as well to one genus as to another. Artedi, Ichthyolog. p. 10. 69. 73. 79.

Theſe rules of proſcription baniſhed ſo many of the received generical names of fiſh, that it might be ſuppoſed the whole number was exhauſted, and all the fiſh in the world to be named anew. But this is not the caſe; the genera are in reality much fewer in number than they have been uſually ſuppoſed, and therefore fewer words will ſerve to expreſs them, and there yet remain many truly Latin words uſed by the ancient Romans, by which the far greater part of the genera may be expreſſed, and the few remaining may be beſt denominated by compound Greek words, expreſſive of their real characters.

Among the true and genuine Latin, and Græco-Latin names of the genera of fiſh, are theſe: accipenſer, amia, anthias, balæna, blennius, clupea, cobites, cyprinus, delphinus, elops, eſox, exocœtus, gobius, labrus, lamia, liparis, mugil, mullus, muræna, perca, phyſeter, priſtis, raja, ſalmo, ſalpa, ſcarus, ſcomber, ſilurus, ſparus, ſqualus, thynnus, torpedo, triton, turſio, uranoſcopus, xiphias, zeus. Theſe will go a great way toward the naming of the true genera. Artedi has merited greatly of the world, in thus reforming the names of fiſh; and the rules he has laid down, thus given at large, may, with little variation, be made to ſerve for any other author, in whatever branch of knowledge he has occaſion to write.

GENERIS SECUNDI. See SECUNDI.

GENEROSA, *a Gentlewoman.* See GENTLEWOMAN and SPINSTER.

GENEROSITY, *Order of*, an order of knighthood, eſtabliſhed in 1685, by Frederick III., elector of Brandenburg and king of Pruſſia, whilſt he was electoral prince. The badge was a gold croſs of eight points enamelled azure, bearing in the centre this inſcription "LA GENÉROSITÉ," and pendent to a blue ribband.

GENESAN, in *Geography*, a town in the Arabian Irak; 90 miles S. of Bagdad.

GENESAR, or GENESARETH, called alſo *Cinereth*, and afterwards *Tiberias*, a town of Paleſtine on the lake of the ſame name, called alſo *Sea of Galilee*, which ſee.

GENESEE, a townſhip of America, in the ſtate of New York, and county of Ontario, having 217 electors.

GENESEE *Country*, a large tract of land in the ſtate of New York, deriving its name from Geneſſee, one of its rivers, and bounded N. and N.W. by lake Ontario, S. by Pennſylvania, E. by the weſtern part of the military townſhips in Onondago county, and W. by lake Erie and Niagara river. This is a rich tract of country, and well watered by lakes and rivers, it is flattiſh, its rivers are ſluggiſh, the ſoil is moiſt, and its lakes are numerous.

GENESEE, or *Geneſſee River*, riſes in Pennſylvania, near the moſt elevated ſpot of this ſtate, where alſo the eaſternmoſt water of Alleghany river, and Pine creek, a water of Suſquehanna, and Tioga river riſe. It has ſeveral falls, which furniſh excellent mill-ſeats, that are improved by the inhabitants. After a courſe of about 100 miles, chiefly N.E. by N., it diſcharges itſelf into lake Ontario, $4\frac{1}{2}$ miles E. of Irondequat, or Rundagut bay, and 80 miles E. from the falls of Niagara. The ſettlements on this river, from its mouth upwards, are Northfield, Northampton, Hartford, Geneſſee, and Williamſburgh. When the weſtern canals and locks are completed, there will not be any carrying place between the city of New York and Williamſburgh. The Geneſee flats lie on the borders of this river, about 20 miles in length and about four in breadth. Theſe are moſtly the property of the Indians.

GENESEE, or *Geneſſee County*, is bounded N. by lake Ontario, W. by Niagara river and lake Erie, S. by Pennſylvania, and E. by the counties of Tioga and Orondago. It comprehends the counties of Ontario, Steuben, and Geneſee, and contained, in the year 1800, upwards of 17,000 perſons. This county is finely watered by the Geneſee river and its tributary ſtreams, ſeveral creeks, and alſo lakes, which are from 20 to 40 miles in length. The ſouthern part is watered by ſeveral branches of the Suſquehanna. This county is large, and comprehends the weſtern part of the ſtate of New York.

GENESIS, in *Biblical Hiſtory*, the firſt book of the Old Teſtament, containing the hiſtory of the creation, and the lives of the firſt patriarchs.

The book of Geneſis ſtands at the head of the *Pentateuch*; which ſee. Its author is held to be Moſes: it contains the relation of 2369 years, *viz.* from the beginning of the world to the death of Joſeph. The Jews are forbid to read the beginning of Geneſis, and the beginning of Ezekiel, before thirty years of age.

The Hebrews called this book *Bereſchith*, becauſe it begins with that word, which in their language ſignifies *in principio*, or *in the beginning* The Greeks gave it the name Geneſis, Γένεσις, *q. d.* production, generation, becauſe it begins with the hiſtory of the production or generation of all beings.

This book, beſides the hiſtory of the creation, contains an account of the original innocence and fall of man; the propagation of mankind; the riſe of religion; the general defection and corruption of the world; the deluge; the reſtoration of the world; the diviſion and peopling of the earth; and the hiſtory of the firſt patriarchs to the death of Joſeph. It was eaſy for Moſes to be ſatisfied of the truth of what he delivers in this book, becauſe it came down to him through a few hands: for from Adam to Noah, there was one man, *viz.* Methuſelah, who lived ſo long as to ſee them both: in like manner Shem converſed with Noah and Abraham; Iſaac with Abraham and Joſeph, from whom the records of this book might eaſily be conveyed to Moſes by Amram, who was contemporary with Joſeph.—Patrick.

GENESIS, in *Geometry*, denotes the formation of a line, plane, or ſolid, by the motion or flux of a point, line, or ſurface. See each reſpectively; alſo FLUXION and CURVE, and GENERATION.

The geneſis, or formation, *e. gr.* of a globe or ſphere, is conceived by ſuppoſing a ſemi-circle to revolve upon a right line, drawn from one extreme thereof to the other, called its axis, or axis of circumvolution: the motion or revolution of that ſemi-circle is the geneſis of the ſphere, &c. See Globe and Sphere.

In the geneſis of figures, &c. the line or ſurface that moves, is called the deſcribent; and the line round which, or according to which, the revolution or motion is made, the dirigent.

GENEST, Charles-Claude, in *Biography*, was born at Paris in 1639. Being of an unſettled diſpoſition, he reſolved to go to the Indies to ſeek his fortune, but the veſſel in which he ſailed having been captured by the Engliſh, he was brought to London, where he ſubſiſted for ſome time by teaching the French language. On his return to his own country, he obtained the poſt of preceptor to Mademoiſelle de Blois, afterwards ducheſs of Orleans, and other conſiderable offices among the great. He became a member of the French academy in 1698, and died at Paris in 1719. Though a courtier, he was ſincere and ſimple in his manners, and eſtimable in his character. He derived a taſte for natural philoſophy from the lectures of Rohault, the diſciple of Deſcartes, and for metaphyſics from the inſtructions and converſation of Boſſuet. He was an elegant ſcholar, and greatly devoted to poetry and polite literature. His works are numerous, of which the principal are "Principes de Philoſophie," in which the author adduces many arguments in defence of a God, and of the immortality of the ſoul. "Occaſional Pieces of Poetry." Several tragedies, and "A diſſertation upon Paſtorals." Moreri.

GENEST-DAMBIERRE, St. in *Geography*, a town of France, in the department of the Vienne; ſeven miles W. of Châtellerault.

GENEST-MALLISAUT, St. a town of France, in the department of the Loire, and chief place of a canton in the diſtrict of St. Etienne; four miles S. of St. Etienne. The place contains 1987, and the canton 5648 inhabitants, on a territory of 150 kiliometres, in five communes.

GENET, Francis, in *Biography*, was born at Avignon in the year 1640; here he received his grammatical learning, and having acquired a conſiderable knowledge in the Latin and Greek, he entered upon philoſophy, and was for a time a diſciple of Scotus, but he afterwards relinquiſhed his ſyſtem, and became zealouſly attached to the philoſophy and theology of Aquinas. In 1670, he was admitted to the degree of doctor in civil and canon law at Avignon, and acquired much reputation by the theſes, which he delivered on that occaſion, againſt ſimony. His talents recommended him to the notice of the archbiſhop of Aix, who for ſome time made uſe of him in the management of the eccleſiaſtical concerns of his metropolitan diſtrict. He was afterwards employed and patronized by M. Le Camus, biſhop of Grenoble, who engaged him in the compoſition of a ſyſtem of moral theology, which was afterwards publiſhed in ſix volumes 12mo. under the title of "Morale de Grenoble." This work was well received, has gone through many editions, and has been tranſlated into the Latin language. Soon after its publication, the pope, Innocent XI. created M. Genet canon and prebend of the cathedral church at Avignon, and in 1685 appointed him biſhop of Vaiſon. He diſcharged all the duties of his epiſcopal functions with exemplary watchfulneſs and zeal, till the year 1688, when he was proſecuted for having admitted into his dioceſe the religious belonging to a new convent at Toulouſe, which Louis XIV. had ſuppreſſed. By the arbitrary mandate of the king, the good biſhop was arreſted, and impriſoned for fifteen months in the iſle of Rhe, whence he was releaſed by the interpoſition of the pope. He was accidentally drowned in 1702. Moreri.

Genet, or *Jennet*, ſaid to be derived from ευγενης, *bene natus*, in the *Manege*, &c. a ſmall-ſized, well-proportioned Spaniſh horſe.

Some alſo give the name *geneta* to well-made Italian horſes.

Genet, *Order of*, an order of knighthood, inſtituted in France by Charles Martel in the year 726, for commemorating a ſignal victory, which he obtained in that year over the Arabian army, commanded by Abdiramo. The badge of the order was a genet ſeiant, enamelled azure, ſpotted or freckled gules, and collared or, on a mount vert, enamelled with flowers proper. This badge was worn pendent to a collar compoſed of three chains of gold interlaced with red enamelled roſes. This order was inſtituted for ſixteen knights, and continued in great repute till the reign of king Robert, when it was aboliſhed on his deviſing the order of the ſtar, in honour of the holy virgin.

GENETHLIA, Γενεθλιον, in *Antiquity*, a ſolemnity kept in memory of ſome perſon deceaſed.

GENETHLIACI, formed of the Greek γενεθλη, *origin, generation, nativity*, in *Aſtrology*, perſons who erect horoſcopes, or pretend to foretel what ſhall befal a man, by means of the ſtars which preſided at his nativity.

The ancients called them *Chaldæi*, and by the general name *mathematici*: accordingly, the ſeveral civil and canon laws, which we find made againſt the mathematicians, only reſpect the genethliaci, or aſtrologers.

They were expelled Rome by a formal decree of the ſenate; and yet found ſo much protection from the credulity of the people, that they remained therein unmoleſted. Hence an ancient author ſpeaks of them as "hominum genus, quod in civitate noſtra ſemper & vetabitur, & retinebitur."

Antipater and Archinapolus have ſhewn, that genethliology ſhould rather be founded on the time of the conception than on that of the birth. Vitruvius.

GENETHLIACUM, Genethliac *Poem*, is a compoſition in verſe, on the birth of ſome prince, or other illuſtrious perſon; wherein the poet promiſes him great honours, advantages, ſucceſſes, victories, &c. by a kind of prophecy or prediction: ſuch is the eclogue of Virgil to Pollio, beginning,

"Sicelides Muſæ, paulo majora canamus."

There are alſo genethliac ſpeeches or orations, made to celebrate a perſon's birth-day.

GENETIDES, in *Natural Hiſtory*, a name given by the ancients to the ſtone more generally known under the name enchymonites. This was the ſpar incruſted on the tops and ſides of ſubterranean caverns, which they ſuppoſed daily to bring forth more, and therefore gave the powder of it to women at the time of their lying-in, to promote their ſpeedy delivery.

GENETTA, *To ride à la*, is to ride in the Spaniſh faſhion, *i.e.* with the ſtirrups ſo ſhort, that the ſpurs bear upon the flanks of the horſe. This is deemed a piece of gallantry in Spain, but not among us.

Genetta, in *Zoology*, a ſpecies of *Viverra*, which ſee.

GENETTE, in the *Manege*, a Turkiſh bit, the curb of which is all of one piece, and made like a large ring, and placed above the liberty of the tongue. When they bridle a horſe, they make his chin paſs through this curb, which ſurrounds his beard. This ſort of bit was much uſed at the court of France when Guillet wrote.

GENETYLLIS, Γενετυλλις, in *Antiquity*, a ſolemnity celebrated by women, in honour of Genetyllis, the goddeſs of that ſex.

GENEVA, or Gin, a popular name for a compound water, which is, or ought to be, procured from the berries of the juniper-tree, diſtilled with brandy or malt-ſpirits. See Juniperus.

The word is formed from *genevre*, the French name of the juniper-berry.

The beſt geneva we now have, is made from an ordinary ſpirit, diſtilled a ſecond time with an addition of ſome juniper berries; but the original liquor of this kind was prepared in a very different manner. It was a cuſtom in the diſtilling of ſpirits from wort, or other fermented liquors, to add in the working ſome aromatic ingredient, ſuch as ginger, cortex Winteranus, or grains of paradiſe, to take off the bad flavour, and to give a pungent taſte to the ſpirit. Among other things uſed with this intent, ſome tried the juniper-berries, and finding that they gave not only an agreeable flavour, but very valuable virtues alſo to the ſpirit, [illegible] brought it to a general cuſtom, and the liquor ſold [illegible] the name. The method of adding the berries was to the malt in the grinding: a proper proportion was allowed, and the whole was reduced to meal together, and worked in the common way. The ſpirit thus obtained was flavoured *ab origine* with the berries, and exceeded all that could be made by any other method. Our common diſtillers leave out the juniper-berries entirely from the liquor they now make and ſell under that name. Our chemiſts have let them into the ſecret, that the oil of juniper-berries, and that of turpentine, are very much alike in flavour, though not in price: and the common method of making what is called geneva in London, is with common malt ſpirit, and a proper quantity of oil of turpentine diſtilled together. Shaw's Eſſay on Diſtill. p. 7. See Distiller.

Geneva, in *Geography*, a city of France (ſince the revolution), principal place of a diſtrict, and capital of the department Leman, but formerly capital of a republic, in alliance with the Swiſs; ſituated on the confines of Savoy, France, and Switzerland, at the ſouthern extremity of the "lake of Geneva," or "Leman lake," upon the narroweſt part of it; where the Rhone iſſues in two large and rapid ſtreams, which ſoon afterwards unite, and, paſſing through the city, divides it into two unequal parts. The adjacent country is uncommonly pictureſque, and abounds in magnificent views, formed by the town, the lake, the numerous hills and mountains, particularly the Saleve and the Mole, riſing ſuddenly from the plain in a variety of fantaſtic forms, backed by the glaciers of Savoy, with their frozen tops gliſtening in the ſun, and the majeſtic Mont Blanc rearing its head far above the reſt. Geneva, which ſtands partly in the plain, upon the borders of the lake, and partly upon a gentle aſcent, is irregularly built: the houſes are high, and many in the trading part of the city have arcades of wood, which are raiſed even to the upper ſtories. Theſe arcades, ſupported by pillars, give a gloomy appearance to the ſtreet, but are uſeful to the inhabitants in protecting them from the ſun and rain. This is the moſt populous town in Switzerland; and the inhabitants are eſtimated to be from 23,000 to 25,000. This population is owing to the induſtry and activity that prevail in this place, to its extenſive commerce, to the facility of purchaſing the burgherſhip, and to the privileges which the government allows to all foreigners. The members of this city are diſtinguiſhed into citizens and burgeſſes, inhabitants and natives, beſides a fifth claſs, eſtabliſhed after the revolution in 1782, and called "domiciliés," who receive from the magiſtrates an annual permiſſion to reſide in the city. The citizens and burgeſſes were, under the old police, admitted to a ſhare in the government; the inhabitants are ſtrangers allowed to ſettle in the town with certain privileges, and the natives are the ſons of theſe inhabitants, who poſſeſs additional advantages: theſe two laſt claſſes form a large majority of the people.

The liberal policy of this government, in receiving ſtrangers, and conferring the burgherſhip, is the more remarkable, as it is contrary to the ſpirit and uſage of the Swiſs. Here it is peculiarly neceſſary; as the territory of this ſtate is ſo very ſmall, that its very exiſtence depends upon the number and induſtry of the people; for, excluſively of the city, there are ſcarcely 16,000 perſons in the whole diſtrict of the Genevois.

Geneva boaſts, and not without reaſon, of its antiquity. The preciſe time of its commencement is not known; but it exiſted before the Chriſtian era, and is particularly mentioned by Cæſar. (De Bell. Gall. l. i. c. 1.) It belonged to the Allobroges (ſee this article), and flouriſhed under the ſucceſſors of Cæſar. The Chriſtian religion was introduced among the Genevans in the third century, and about the middle of the 4th century Geneva appears to have been the ſee of a biſhop. It ſuffered, however, in a conſiderable degree, and in common with other parts of the weſtern empire, from the incurſions and ravages of the northern barbarians. About the middle of the fifth century the Vandals, who, having ſettled in the country of Vaud, and built ſeveral boroughs, aſſumed the name of Bourguignons, or, according to modern orthography, Burgundians, had poſſeſſion of it; and in the year 620, it was transferred to the Franks. Towards the end of the 8th century, Charlemagne convened an aſſembly of his ſtates at Geneva, to conſult about a war with the Lombards, and confirmed both the civil and religious privileges of this city. In the year 1032, it was annexed to the German empire; but the authority of the emperor was little regarded in diſtant provinces, and they found it expedient to protect aſſociations of the common people, and to enlarge their liberty, in order to counteract the tyranny of the lords and clergy. In proceſs of time, the clergy acquired a great degree of ſecular power and juriſdiction in connection with their ſpiritual authority: and thus the biſhops of Geneva had obtained of the emperor the title of princes and ſovereigns over the town and the adjacent country. On the other hand, the counts of the Genevois, or of the diſtrict in the vicinity of Geneva, who were originally officers of the empire, though afterwards they became vaſſals of the biſhops, aſpired to an excluſive adminiſtration of juſtice both in the town and the country. The people availed themſelves of the conteſt between their ſuperiors in rank and power to confirm and extend their own privileges. In the mean time, the liberty of the city was menaced by a third power, no leſs formidable than either of the other two. The counts of Savoy became powerful by the ſucceſſive poſſeſſion of ſeveral provinces; and among the reſt the Genevois favoured the pretenſions of the ancient counts, and aſpired to the ſovereignty of a flouriſhing town, which was alſo a convenient and ſtrong frontier.

It would not be very intereſting to recite, in minute detail, the conteſts that were from time to time renewed between the Geneveſe and the counts of Savoy. We ſhall content ourſelves with obſerving that in the year 1415, the emperor Sigiſmund viſited Geneva, and that two years afterwards he erected Savoy into a dukedom in favour of Amadeus, the 8th count, who, in the year 1420, petitioned the pope for the ſovereignty of the city. The duke's ſuit was referred by the pope to the biſhop, who ſummoned a general aſſembly of the people, to deliberate upon the duke's requeſt, which had obtained the approbation of the pope. The inhabitants unanimouſly rejected it, and at the ſame time required the biſhop to be true to his charge, aſſuring him of their concurrence in maintaining his juſt rights, and thoſe of the city. This noble ſpirit encouraged the biſhop, and produced a moſt excellent act in favour of liberty; for he entered into a formal agreement with the people and the ſyndics, never to alter the conſtitution without their conſent. This act, having been engroſſed in Latin, and the obſervance of it ſworn to by the biſhop, the ſyndics, and the council, was ſubſcribed by all the magiſtrates, commonalty, and clergy of Geneva; and in the following year was confirmed by the emperor Sigiſmund, who declared Geneva to be an imperial city, under the title of "Nobile Imperii Membrani," and took it into his immediate protection againſt all powers, the duke of Savoy in particular. The Geneveſe, however, maintained their liberties againſt the repeated attacks made upon them by the dukes of Savoy under very great diſadvantages. Nevertheleſs, they perſevered till about the beginning of the 16th century, when an alliance was entered into between Geneva and Friburg, the conteſt continued, and was the occaſion of many acts of oppreſſion and perſecution. When the treaty was concluded, in conſequence of the active interference of a young citizen of Geneva, named Berthelier, two parties aroſe in Geneva, one of which retained an attachment to the intereſt of the duke of Savoy, and the other declared itſelf on the ſide of liberty. Thoſe of the latter deſcription were called "Eignots," which in Swiſs, or High German, ſignifies "confederates by oath," and from which the term "Hugonots" is probably derived; whilſt thoſe of the former were denominated "Mamalukes," in reference to the Egyptian ſoldiery, who being originally Chriſtians, renounced both their religion and liberty, to become ſlaves to the ſultan. The duke, irritated by this conduct, entered Geneva with an armed force, and compelled the people to renounce their new alliance, whilſt he perſuaded Friburg to withdraw from the treaty, promiſing not to injure the liberties of the Geneveſe. Berthelier, the Genevan patriot, was however ſacrificed to his vengeance, and the magiſtrates of the city were depoſed by the biſhop. In the year 1526, a new alliance was formed between the towns of Bern, Friburg, and Geneva, which the duke of Savoy was not able to prevent, and occaſioned wars of long continuance between the republic and Savoy. This alliance was confirmed by the biſhop; and may be conſidered as the true era of the independence of Geneva. Soon after this period, *viz.* in 1533, the doctrines of the reformation were preached at Geneva by William Farel, a native of Gap in Dauphiné, and Peter Viret, of Orbe; and the people, animated by the enthuſiaſm of liberty, determined to emancipate themſelves from the yoke of bondage, both eccleſiaſtical and civil. The biſhop, who had always acted a weak and deceitful part, became deſpicable both to the Geneveſe and to the duke; and by his imprudent menaces and precipitate retreat, ſerved to ſtrengthen the cauſe of the reformation. In 1535, the doctrines of the reformation were adopted in full council; and in conſequence of this deciſion, the canton of Friburg renounced the alliance. In the following year, the famous John Calvin, driven from France by perſecution, arrived at Geneva, and completed the reformation, that had been already begun by Farel and others. So great was the aſcendancy which Calvin, though a foreigner, acquired over the citizens, that he poſſeſſed conſiderable influence even in civil matters; and was eminently inſtrumental in ſettling the political conſtitution. To this end, as well as to encourage theological erudition, he prevailed upon government to eſtabliſh a public academy, the preſidentſhip of which he obtained for his friend and fellow labourer, Theodore Beza. In this new ſeminary, Calvin, Beza, and others, eminent for their ſuperior knowledge, read lectures with ſuch uncommon reputation and ſucceſs, as attracted ſtudents from all quarters. It had alſo a public library, which owed its origin about this period to the liberality of Bonnivard, prior of St. Victor, who was twice impriſoned for having aſſerted, againſt the dukes of Savoy, the independence of Geneva. He was a principal promoter of the reformation by gentle means and gradual inſtruction. He cloſed his benefactions to his beloved city, by the gift of his valuable manuſcripts and books, and by bequeathing his fortune towards the eſtabliſhment and ſupport of the ſeminary. Geneva was now regarded as the aſylum of the reformed religion: and by the acceſſion of perſecuted proteſtants from other cities and countries, its arts and commerce flouriſhed, and its population increaſed.

In 1584, Geneva concluded a treaty of perpetual alliance with Zuric and Bern, by which it formed a part of the Helvetic confederacy. The laſt attempt of the houſe of Savoy againſt Geneva took place in 1602, when Charles Emanuel attacked the town during a profound peace. The inhabitants, however, nobly defended themſelves, repulſed the enemy, and obliged him to abandon his treacherous deſign. This perfidious attack was followed by a war, which was terminated in the following year by a ſolemn treaty. Since that period, uninterrupted peace has been maintained between Geneva and the duke of Savoy; although the king of Sardinia did not, till the year 1754, formally acknowledge the independence of the republic. From that period, the hiſtory of Geneva contains little more than a narrative of contentions between the ariſtocratical and popular parties. The conſtitution of Geneva, which had then been eſtabliſhed, and which continued for ſeveral years, under a certain modification and improvement of the year 1768, was a kind of mean between thoſe of the ariſtocratical and popular cantons; more democratical than any of the former, as the ſovereign and legiſlative authority were veſted in the general aſſembly of the citizens; but more ariſtocratical than the other, becauſe the powers entruſted with the great and little councils were very conſiderable. The ſalaries of the magiſtrates were ſo inconſiderable, as not to offer any temptation of pecuniary emolument; and the revenues of government, at the higheſt calculation, generally amounted to 30,000 pounds a year. Their conſtitution, indeed, was defective, as they had no preciſe code of penal law; but that of civil law was the moſt perfect part of their government. In Geneva, as well as in all the other principal towns of Switzerland, a public granary was eſtabliſhed, and they had always in reſerve a ſufficient quantity of corn to ſupply the inhabitants during a year and a half. Geneva was the only republic in Switzerland which had no regular companies of ſoldiers in any foreign ſervice. Geneva was always more or leſs diſtracted by internal diſſenſions and tumults. In 1782, theſe had prevailed to ſuch a degree, that the kings of France and Sardinia, together with the canton of Bern, interfered, and threatened to beſiege the city. The peaſants of the territory joined the Geneveſe, and offered to ſerve in their cauſe without pay, to mount guard, and work at the fortifications. M. de Jaucourt, the commander of the French troops, threatened, in caſe of reſiſtance, to enter the town by force, and inſiſted that no perſon ſhould appear in the ſtreets, that all arms ſhould be delivered up, and that the chief of the "repreſentants," as the popular party was called, ſhould retire from Geneva, and that the depoſed magiſtrates ſhould be reinſtated. Reſiſtance in theſe circumſtances muſt have been altogether unavailing, and muſt, indeed, have terminated in the deſtruction of the city. The repreſentants, therefore, reſtored the confined magiſtrates to liberty, and left the city in a body. The Sardinians, who firſt entered the gates, found the city almoſt deſerted; and ſoon after the two other commanders made their entry at the head of their reſpective troops, with drums beating and colours flying. The ariſtocratical party celebrated their triumph with balls, feaſts and every ſpecies of public diverſion. A committee, appointed by the great and little councils, prepared, in concert with the three generals, an edict for new modelling the conſtitution, which, being approved at the courts of Verſailles and Turin, and by the canton of Bern, was confirmed by the great and little councils. Much as the Genevans ſeemed to deplore the conſequences of this revolution, the change that was made in their conſtitution, and the diminution of that liberty to which they had been accuſtomed, and to which they aſcribed the increaſe of their population and riches, the ferment ſoon ſubſided: and excepting the principal leaders, thoſe of the popular party who were baniſhed, and ſome few others who renounced their country under the influence of their political principles, the greater number of the emigrants returned, and again ſettled in the place of their nativity. According to Mr. Coxe, this revolution cauſed ſcarcely 600 perſons to leave Geneva. The emigrants principally eſtabliſhed themſelves at Bruſſels and Conſtance; where they introduced manufactures of linen and of watches. A plan was alſo formed for giving an aſylum to the Genevan emigrants in Ireland. (See *New* Geneva.) The form of government eſtabliſhed in 1782 underwent another very conſiderable change in conſequence of the revolution in 1789. The ariſtocratical party was obliged to yield, on this occaſion, to the tumultuous demands of the people; and when the ſolicitor-general, in the name of the citizens and burghers, requeſted the recovery of their ancient liberties, the permiſſion of bearing arms, the re-eſtabliſhment of the militia, and of their circles or political clubs, the removal of the garriſon from the barracks, and the recal of the repreſentants baniſhed in 1782; ſuch moderate demands were received with ſatisfaction; and the new edict of pacification, under the title of "Modifications à l'Edit de 1782," was approved by the Senate, Great Council, and General Council. In this latter council, the "Modifications" were carried by 1321 ſuffrages againſt 52. The publication of the new edict was followed by loud acclamations and general rejoicings. This new conſtitution was judiciouſly modelled into a mean between the too popular form eſtabliſhed in 1768, and the too ariſtocratical form eſtabliſhed in 1782. It is natural to imagine that the widely extended influence of the French revolution would very ſoon reach the Genevan republic. Many, ſeduced by the principles of infidelity actively diſſeminated by Voltaire, and faſcinated by the ſyſtem of general equality laid down in the "Social Contract" of Rouſſeau, whom they proudly ſtyled the philoſopher of Geneva, became the apoſtles of irreligion and democracy. Accordingly, a large party was pre-diſpoſed to admit the French doctrines; and in the beginning of 1791, a club, called the "Circle of Light," gave energy and direction to the advocates of general equality. Their efforts were oppoſed by all the friends of the conſtitution, and two parties were again formed, which threatened the renewal of paſt commotions. In this criſis, emiſſaries from France excited an inſurrection among the peaſants of the Genevois, and a large body of them marched towards Geneva, to demand the extenſion of the burgherſhip. Although this firſt hoſtile attempt proved unſucceſsful, the government, apprehenſive of another inſurrection, and anxious to remove every cauſe of complaint, granted additional privileges to the natives, and particularly general admiſſion to the burgherſhip for the ſmall ſum of ſix guineas. (March 1791.) Soon after the abolition of monarchy, the Briſſotine party, in conformity with their plan of ſurrounding France with a chain of petty republics, propoſed to ſeparate Geneva from the Helvetic confederacy, and either form it into a ſmall dependent commonwealth, or incorporate it with the French republic. Although this attempt failed, the independence of Geneva was at length annihilated, and it was incorporated, together with its territory, with the French republic in 1798; and now forms part of the department of *Leman*, (which ſee.) Geneva, according to this new diviſion, comprehends three cantons, 22 communes, on a territory of 125 kilometres, N. lat. 46° 12′ 17″. E. long. 6° 8′ 30″. Mod. Un. Hiſt. vol. xxxii. Coxe's Travels in Switzerland, vol. ii.

Geneva, a poſt-town of America, in the county of Ontario, and ſtate of New York, in the great road from Albany to Niagara, ſituated on the bank of the N.W. corner of Seneca lake, about 74 miles W. of Oneida caſtle, and 92 W. of Whiteſtown. It has nearly 100 houſes. N. lat. 42° 52′. W. long. 74° 6′.

Geneva, *Lake of*, or *Lake of Leman*, a large lake of Switzerland, which ſtretches from Geneva to Villeneuve, being in length 54 miles, in the ſhape of a creſcent; the hollow is formed by Switzerland, and the convex part by Savoy; the greateſt breadth, from St. Sulpice to Grande Rive, is 12 miles. Savoy affords a rude and awful boundary of aſpiring Alps, craggy and covered with ice of long ſtanding. From Geneva to the environs of Lauſanne the country ſlopes for a conſiderable diſtance to the margin of the lake, and is enriched with all the varieties which nature can beſtow: the long ridge of the Jura, fertile in paſturage, and varied with woods, backs this beautiful tract. Near Lauſanne the banks riſe very conſiderably, and form a moſt charming terrace. A few miles beyond is a rapid deſcent. Near Vevay begins a plain, which is continued far beyond the end of the lake, but contracting, by the approach of the mountains, towards the lake. The colour of the water is extremely beautiful, clear, and at a diſtance ſeems of a moſt lovely blue.

Near Geneva the coaſt abounds in ſmall pebbles covered with a brown incruſtation; from thence, as far as Lauſanne, the ſhores are ſandy; between that town and Chillon appear ledges of rocks, hard and calcareous; and the extremity of the lake is a marſh formed by the collected mud of the Rhone. The depth is various; M. De Luc aſſerts, that on ſounding it, he had found the greateſt depth to be 160 fathoms. The ſurface of the lake is ſaid to be 1230 feet, and its deepeſt part 837 feet above the Mediterranean; like all inland lakes encloſed within high mountains, it is ſubject to ſudden ſtorms. The ſkins of the tippet grebes, which appear in December and retire in February, becauſe this lake is almoſt totally deſtitute of reeds and ruſhes, in which they form their floating neſt, are an elegant article of luxury, and ſell for about 12 or 14 ſhillings each. This lake abounds in fiſh, remarkable both for their quality and ſize.

Geneva is alſo a lake in Upper Canada, which forms the weſtern extremity of lake Ontario, to which it is joined by a ſhort and narrow ſtait.

Geneva, *New*, a thriving poſt-town of America, on the bank of the Monongahela river, juſt below George's creek, about 18 miles N. of Morgantown; this town is rendered famous as a place of much buſineſs, partly by the glaſs-works in its vicinity, which not only ſupply the neighbourhood with window-glaſs bottles, &c. but ſend large quantities down the river. Here is alſo a paper-mill, and a manufactory for muſkets. Small boats are alſo built in this place.

Geneva, *New*, a village of the county of Waterford, Ireland, nearly oppoſite to Duncannon fort, where many good houſes were erected ſeveral years ago by government for the reception of the expatriated citizens of Geneva, but they having relinquiſhed the deſign of ſettling in Ireland, the place remains uninhabited.

Soon after the revolution of 1782, a memorial, ſigned by more than 1000 Genevans of both ſexes, who were either perſons of ſome property, or verſed in trade or manufactures, expreſſing a deſire of ſettling in Ireland, was preſented to earl Temple (marquis of Buckingham) then the lord-lieutenant of Ireland. His excellency, apprized of the advantage which would redound to Ireland from the reception of ſo many induſtrious artiſts, many of whom poſſeſſed property in the Engliſh, Iriſh, and French funds, communicated, in September 1782, the propoſal to the privy-council of Ireland for giving an aſylum to the Genevan emigrants. This propoſal, patronized by the lord-lieutenant, and unanimouſly conſented to by the privy-council, was approved by the king. The Iriſh parliament voted 50,000*l.* towards defraying the expences of their journey, and building a town for their reception; lands were purchaſed for 8000*l.* and part of the town was actually completed at the expence of 10,000*l.*; a charter was granted, with very conſiderable privileges; the ſtandard of gold was altered for the accommodation of the new manufacturers; the foundation of an academy, approved, upon an uſeful, extenſive, and economical plan; in July 1783, ſeveral Genevans landed in Ireland; and when the nation had expended near 30,000*l.* the project was ſuddenly relinquiſhed, and the ſettlement finally abandoned. The failure has been attributed to delays in the arrangement of ſo complicated a plan, occaſioned by the high demands of the Genevan commiſſioners, who, in preparing the charter, required many privileges, that were contradictory to the laws of the land, and by the building of New Geneva. In conſequence of theſe delays, and the reſentment of the Genevans, many returned and took the oaths of allegiance to the new government. The project became gradually leſs popular; the few Genevans, who prematurely landed in Ireland, were diſcontented, at not finding the new town ready for their immediate reception; and the emigrants who poſſeſſed moſt property, having withdrawn their names, the reſt wanted ſufficient capital to ſettle in a foreign country, and to eſtabliſh an extenſive manufacture without ſtill farther aſſiſtance. In conſequence of this deficiency, the Genevan commiſſioners petitioned to appropriate 10,000*l.* of the 50,000*l.* for the purpoſe of forming a capital. But, as that ſum had been voted by parliament for other purpoſes, the petition was rejected; and the Genevans, in an addreſs to the duke of Rutland, who ſucceeded lord Temple as lord-lieutenant, relinquiſhed the ſettlement, and ſoon afterwards quitted Ireland.

GENEVIEVE, St., a town of France, in the department of Paris; 6 miles W. of Paris.—Alſo, a town of France, in the department of the Aveiron, and chief place of a canton, in the diſtrict of Eſpalion; 27 miles N. of Rhodez. The town contains 1241, and the canton 6077 inhabitants, on a territory of 175 kiliometres, in 17 communes.—Alſo, a town, or village, of America, in Louiſiana, on the weſtern bank of the Miſſiſippi, 12 miles ſoutherly of fort Chartres. It contained, ſome years ago, more than 100 houſes, and 460 inhabitants, beſides negroes. N. lat. 37° 35'. W. long. 90° 44'.—Alſo, a town of Canada, on the Batiſcan. N. lat. 46° 38'. W. long. 72° 14'.

Genevieve, *St. Genevieve*, or *St. Genevieſve*, fathers or religious of St. Genevieve, the name of a congregation of regular canons of the order of St. Auguſtine, eſtabliſhed in France.

The congregation of St. Genevieve is a reform of the Auguſtine canons. It was begun by St. Charles Faure, in the abbey of St. Vincent de Senlis, whereof he was a member, in the year 1618.

In the year 1634, the abbey was made elective; and a general chapter, compoſed of the ſuperiors of fifteen houſes who had now received the reform, choſe F. Faure coadjutor of the abbey of St. Genevieve, and general of the whole congregation. Such was its beginning.

It has ſince increaſed very much, and has conſiſted of above a hundred monaſteries; in ſome of which the religious are employed in the adminiſtration of the pariſhes and hoſpitals; and in others, in the celebration of divine ſervice, and the inſtruction of eccleſiaſtics in ſeminaries for the purpoſe.

The congregation takes its name from the abbey of St. Genevieve, which is the chief of the order, and whoſe abbot is the general of it. The abbey itſelf took its name from St. Genevieve, the patroneſs of the city of Paris, who died in the year 512. Five years after her death, Clovis erected the church of St. Genevieve, under the name and invocation of St. Peter, where her relics have been preſerved, her ſhrine viſited, and her image carried with great proceſſions and ceremonies, upon extraordinary occaſions, as when ſome great favour is to be intreated of heaven.

Genevieve *Bay*, in *Geography*, a bay on the W. coaſt of Newfoundland, in the ſtraits of Belleiſle; 20 miles N. of St. John's bay.

GENEVOIS, or Duchy *of* Geneva, a province of Savoy, bounded on the N. by the Swiſs territories, on the E. by Faucigny, on the S. by Savoy Proper, and on the W. by France, from which it is ſeparated by the Rhône. Geneva and its territory formerly made a part of it. It is now annexed to France.

GENEVRAY, a town of France, in the department of the Iſere; 10 miles S. of Grenoble.

GENEURO, a mountain which divides Piedmont from the ancient Dauphiny, in the road from Briançon to Suſa.

GENGA, Girolamo, in *Biography*, a painter of very conſiderable celebrity in his day. He flouriſhed at the early period of the revival of the art, being born at Urbino in 1476. At the age of 15 he ſtudied under Luca Signorelli of Cortona, then in great eſteem, and aſſiſted his maſter in moſt of his undertakings in different parts of Italy, but particularly at Orvieto, being acknowledged the beſt diſciple of that ſchool. He afterwards ſpent three years with Pietro Perugino, at the ſame time that Raphael was under the tuition of that artiſt; and that intercourſe laid the foundation of a moſt cordial friendſhip between Raphael and Genga, which never was impaired.

He was highly encouraged by Guido-Baldo II., and his ſucceſſor, Franceſco Maria III., dukes of Urbino, in their palaces and theatres, and in deſigning triumphal arches. In Rome, Sienna, Forli, Peſaro, and many other places, he left behind him an incalculable number of works, both in painting and architecture, which were held in great eſteem, and which procured him honour and riches. He died of a fever in 1551, aged 75, leaving two ſons, one of whom, Bartolomeo, followed the profeſſion of his father in the ſame ſtyle, and was moreover an eminent ſtatuary and architect.

Genga, Bernardin, a doctor in philoſophy and medicine, was born in the duchy of Urbin. He was a teacher of anatomy and ſurgery at Rome about the middle of the 17th century; and, according to Mangetus, ſurgeon to the hoſpital of the Holy Ghoſt in that city. He was a man of firm underſtanding, and maintained the doctrine of the circulation of the blood, when it was not generally admitted in Italy; but he attributed the diſcovery of it to Paul Sarpi, He alſo ventured to accuſe Hippocrates of committing ſuch errors, in the cure of ſeveral ſurgical diſeaſes, as would not be pardoned in a ſtudent. His works are, 1. "Anatomia Chirurgica;" or "Iſtoria dell' oſſa e muſcoli del corpo umano, con la deſcrizzione de' vaſi;" Rome, 1675, 1687. 2. "Anatomia per uſo ed intelligenza del deſigno;" Rome, 1691. This work contains ſome good figures of the ancient ſtatues. Genga prepared the bodies, by diſpoſing the bones and muſcles in the forced attitudes of the gladiators in their combats: and Lanciſi added explanations of the figures. 3. "Commentaria Latina et Italica ad Hippocratis Aphoriſmos, ad Chirurgiam pertinentia;" Rome, 1694, 8vo. Bonon. 1697, 8vo. Eloy.

GENGENBACH, in *Geography*, an imperial town of Germany, in the circle of Swabia, ſituated on the Kinzig, in the Ortenau: in this town is an abbey, whoſe prelate was a prince of the empire. Among the indemnities agreed on at Ratiſbon in 1802, this town and abbey were given to the margrave of Baden; 15 miles S.E. of Straſburg. N. lat. 48° 27′. E. long. 8° 1′.

GENGOU-LE-ROYAL, St., a town of France, in the department of the Saône and Loire; celebrated for its wine; 11 miles N. of Cluny.

GENIAL, Genialis, an epithet applied by the ancients to certain deities, whom they ſuppoſed to preſide over generation.

They were thus called *a gerendo, from bearing*; or, according to the correction of Scaliger and Voſſius, *a genendo, to yean, produce*: yet Feſtus ſays, that they were alſo called *geruli*, which ſeems to require the former reading. M. Dacier, in a note, ſhews that *genere* has the ſenſe of πράττειν.

Among the genial gods, *dii geniales*, ſays Feſtus, were water, earth, fire, and air, which the Greeks called *elements*. The twelve ſigns were ſometimes alſo ranked in the number; as alſo the ſun and moon.

GENICULATUS, Culmus, in *Botany*, a ſtraw bent like the knee, as in *Alopecurus geniculatus*; ſee Culmus; and Caulis, n. 19.

GENICULI, the joints or knots which appear in the ſhoots of plants; whence botaniſts call thoſe marked therewith geniculate plants.

GENIE. See Genius.

GENIES, St., in *Geography*, a town of France, in the department of the Aveiron, and chief place of a canton, in the diſtrict of Eſpalion; 18 miles E.N.E. of Rhodez. N. lat. 44° 28′. E. long. 3° 3′. The place contains 3333, and the canton 7988 inhabitants, on a territory of 202½ kiliometres, in 8 communes.—Alſo, a town of France, in the department of the Gard; 9 miles N.W. of Niſmes.—Alſo, a town of France, in the department of the Lower Alps; 6 miles N.E. of Siſteron.

GENII, in *Mythology*. See Genius.

GENILLE, in *Geography*, a town of France, in the department of the Indre and Loire; 3 miles N. of Loches.

GENIO-GLOSSUS, in *Anatomy*, (from γενειον, the *chin*, and γλωσσα, the *tongue*,) a large muſcle belonging to the tongue. See Deglutition.

GENIO-HYOIDEUS, from γενειον, the *chin*, and υοειδης, an epithet given to the bone of the tongue, is a muſcle belonging to the os hyoides. See Deglutition.

GENIO-PHARYNGEUS, from γενειον and φαρυγξ, a name given by Winſlow to a particular ſlip of the conſtrictor pharyngis ſuperior.

GENIOSTOMA, in *Botany*, from γενειον, a *beard*, and στομα, the *mouth*, becauſe the orifice of the flower is beſet with a denſe fringe. Forſt. Gen. t. 12. Schreb. 131. Willd. Sp. Pl. v. 1. 998. Mart. Mill. Dict. v. 2. Juſſ. 420. Lamarck Illuſtr. t. 133, merely copied from Forſter.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. "uncertain," Juſſ. *Apocineæ?*

Gen. Ch. *Cal.* Perianth inferior, turbinate, permanent, with five acute ſegments. *Cor.* of one petal, funnel-ſhaped; tube dilated upwards, longer than the calyx, its orifice bearded; limb ſpreading, in five deep, ovate, rather pointed ſegments, as long as the tube. *Stam.* Filaments five, ſhort, in the tube of the corolla; anthers oblong, prominent. *Piſt.* Germen ſuperior, ovate; ſtyle thread-ſhaped, longer than the tube; ſtigma cylindrical, obtuſe, furrowed. *Peric.* Capſule? oblong, of two cells. *Seeds* numerous, ſomewhat angular, ranged along a thread-ſhaped receptacle.

Eſſ. Ch. Corolla funnel-ſhaped, bearded at the mouth. Calyx inferior, with five ſegments. Stigma cylindrical, abrupt, furrowed. *Pericarp* of two cells, with many ſeeds.

1. G. *rupeſtris*. Forſt. Prod. 17. Native of rocky places in the iſland of Tanna. *Stem* ſhrubby, climbing without tendrils, branched in an oppoſite manner, round, with a ſmooth grey bark. *Leaves* oppoſite, about three inches long, elliptic-lanceolate, pointed, entire, ſlightly wavy, ſmooth, opaque, with one rib, and a few remote, curved, interbranching veins. *Footſtalks* ſlender, ſmooth, channelled, half an inch long. *Stipulas* intrafoliaceous, united, ſhort, acute, rather membranous. *Flowers* ſmall, in ſolitary, forked, oppoſite, ſomewhat downy, axillary panicles, rather longer than the footſtalks. *Bracteas* ſhort, acute, united at their baſe, in pairs under each fork of the panicle. *Calyx* minutely fringed. *Corolla* apparently reddiſh.—From one of Forſter's own dried ſpecimens. Juſſieu probably never ſaw the plant, or we think he would have referred it to his *Apocineæ*. No figure has been publiſhed, except of the fructification.

GENIPA. (See Gardenia.) The name is barbarous, of Weſt Indian origin, and appears to be ſometimes called *Genipat*. See Tournefort, 658.

GENIPABU, in *Geography*, a river of Braſil, which runs into the Atlantic, S. lat. 5° 35′. W. long. 34° 46′.

GENIS, St. a town of France, in the department of the Lower Charente, and chief place of a canton, in the diſtrict of Jonſac; 24 miles S. of Saintes. The place contains 862, and the canton 12,600 inhabitants, on a territory of 212½ kiliometres, in 17 communes.—Alſo, a town of France, in the department of Mont Blanc, and chief place of a canton, in the diſtrict of Chambery, near the conflux of the Rhône and Guiers; 15 miles W. of Chambery. The place contains 1550, and the canton 7960 inhabitants, on a territory of 112½ kiliometres, in 12 communes.

Genis *la Val, St.* a town of France, in the department of the Rhône, and chief place of a canton, in the diſtrict of Lyons; 4 miles S. of Lyons. The place contains 2400, and the canton 15,522 inhabitants, on a territory of 97½ kiliometres, in 10 communes.

GENISTA, in *Botany*, Green-weed, or Dwarf Broom. The etymology ſeems not very clear, either from *genu*, a knee, in alluſion to the bending of the twigs, or from *geno*, to produce, becauſe it grows wild in abundance; yet ſuch are propoſed by the learned, and we have no better to offer. Linn. Gen. 368. Schreb. 488. Willd. Sp. Pl. v. 3. 936. Sm. Fl. Brit. 754. Mart. Mill. Dict. v. 2. Juſſ. 353. Lamarck Illuſtr. t. 619. Gærtn. t. 151. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſmall, tubular, two-lipped; the upper lip with two teeth, more deeply divided; lower with three nearly equal teeth. *Cor.* papilionaceous: ſtandard oblong, remote from the keel, entirely reflexed; wings oblong, lax, ſhorter than the other petals; keel ſtraight, emarginate, longer than the ſtandard. *Stam.* Filaments ten, all united, emerging from the keel; anthers ſimple. *Piſt.* Germen oblong, enveloped by the common filament; ſtyle ſimple, directed upwards; ſtigma acute, involute. *Peric.* Legume roundiſh or oblong, turgid, of one cell and two valves. *Seeds* ſeveral, moſtly kidney-ſhaped, with a ſmooth elevated border round the ſcar.

Eſſ. Ch. Calyx two-lipped, the upper lip with two teeth, lower with three. Standard oblong, bent backwards from the reſt of the flower.

A genus of ſhrubs, almoſt entirely European, with tough angular ſtems and branches, either ternate or ſimple leaves, and yellow flowers. Willdenow has twenty-five ſpecies, eighteen of which are unarmed, the other ſeven furniſhed with ſpines, in many inſtances remarkably compound. The ſpinous ones have all ſimple leaves. Three *Geniſtæ* are natives of Britain.

G. *tinctoria*. Engl. Bot. t. 44. Dyer's Green-weed. So called from its uſe in dyeing yellow, and, with the addition of woad, green. Ray ſays it gives a bitter flavour to the milk of cows that feed upon it.

G. *piloſa*. Engl. Bot. t. 208. Hairy Green-weed. Found only on high ſandy ground about Bury, Suffolk, at the foot of Cader Idris, North Wales, and on ſoap rocks near the Lizard point. It grows quite proſtrate, and is difficult to find except in May, when it flowers copiouſly and forms a rich golden carpet. Mr. Roſe firſt deſcribed this as an Engliſh plant, and figured it in his Introduction to Botany, appendix 452. t. 3.

G. *anglica*. Engl. Bot. t. 132. Needle Green-weed, or Petty Whin. This is our only ſpinous ſpecies, and its ſpines are very conſpicuous, long, ſimple, and ſpreading. *Stem* of humble growth, but nearly erect. *Flowers* not inelegant, turning green when dried. It is frequent on moiſt turfy or ſandy heaths, bloſſoming in May and June.

G. *candicans*, *ſibirica*, *florida*, and *triquetra*, are hardy garden plants, worthy of cultivation for their beauty or ſingularity. The firſt eſpecially has a ſhowy appearance when trained againſt a wall. G. *canarienſis*, and *linifolia*, Curt. Mag. t. 442, are rather greenhouſe ſhrubs, and the latter is very elegant on account of its ſilky ſilvery leaves. It grows in Switzerland as well as in Spain, but like many other alpine plants, does not well bear our winters.

Geniſta, in *Gardening*, comprehends plants of the low ſhrubby evergreen and deciduous kinds, of which the ſpecies chiefly cultivated are, the common dyer's broom (G. tinctoria); the jointed broom (G. ſagittalis); the Spaniſh dyer's broom (G. florida); the hairy broom (G. piloſa); the Engliſh geniſta petty-white, or needle furze (G. Anglica); the hoary geniſta, or Montpelier cytiſus (G. candicans); and the Canary geniſta or cytiſus (G. canarienſis.)

Method of Culture.—The ſix firſt ſorts are all of the hardy kind, and capable of being increaſed by ſowing the ſeeds in beds of common mould, and, which is better, in the borders or clumps where they are to remain; but which ſhould be done in the early autumnal or ſpring ſeaſons, though the former is by much the better, as a great deal of time will be ſaved. In caſes where they are raiſed in beds, the plants ſhould be carefully taken up and removed, as ſoon as they have attained about twelve months' growth, into the ſituations in which they are to continue. In the latter mode of cultivation, they however require no other management than that of properly thinning them out, and keeping them free from all ſorts of weeds.

The laſt, or Canary ſort, may likewiſe be raiſed by ſowing the ſeeds in pots of good garden mould in the ſpring ſeaſon, but the aid of a moderate hot-bed is neceſſary to bring them forward. As ſoon as the plants have acquired a little growth they ſhould be removed into ſeparate ſmall pots, and be immediately replunged in the hot-bed. In their after-management they demand the ſame ſort of attention as other leſs tender kinds of green-houſe plants.

Each of the firſt ſix ſorts are proper for the more forward parts of the clumps and borders in ornamented grounds, and have a good effect from the fine appearance of their flowers.

The laſt kind produces a variety among other evergreen plants in the green-houſe collections.

GENITA Bridge, in *Geography*, a town of America, in Powhatan county, Virginia, 166 miles from Waſhington.

Genita-*mana*, in *Mythology*, a goddeſs who preſided over child-birth, to whom the Romans ſacrificed a dog.

GENITAL, Genitalis, in *Anatomy*, ſomething that relates to *generation*; which ſee.

Genital *gods*, *dii genitales*, are ſometimes uſed in the ancient Roman poets for thoſe we otherwiſe call *indigites*.

Auſonius, in the argument of the fourth book of the Æneid, takes the word in a different manner: the *dii genitales*, he obſerves, were ſuch as were not born of human parents, and were not thus called *quaſi genitii ex hominibus*, but rather becauſe they themſelves had begot human children.

GENITALIA, or Genitores, in *Anatomy*, a name ſometimes given to the teſtes or teſticles of a man, on account of their office in *generation*, which ſee.

GENITE, in *Geography*, a town of France, in the department of the Correze; 18 miles W. of Brive.

GENITED, in *Geometry*. See Generated.

GENITES, Γενηται, or *Geneſei*, among the *Hebrews*, thoſe that deſcended from Abraham, without any mixture of foreign blood.

The Greeks diſtinguiſhed by the names of genites ſuch of the Jews as were iſſued from parents who, during the Babyloniſh captivity, had not allied with any gentile family.

GENITIVE, in *Grammar*, the ſecond caſe of the declenſions of nouns.

When one thing is repreſented as belonging to another, in the relation of cauſe, origin, or author, its name has a termination given to it, called the *genitive* caſe; and as the author is properly the owner of a thing, the genitive is alſo called the *poſſeſſive* caſe.

In Engliſh, the genitive caſe is made by prefixing the particle *of*; or it is expreſſed by an apoſtrophe, with the letter *s* coming after it, as "thy father's houſe:" when the plural ends in *s*, the other *s* is omitted, but the apoſtrophe is retained, as "on eagles' wings:" ſometimes alſo, when the ſingular terminates in *ſs*, the apoſtrophic *s* is not added; as "for righteouſneſs' ſake." In French the genitive is expreſſed by *de*, or *du*, &c. though, in ſtrictneſs, there are no caſes at all, or at moſt only two, in either of theſe languages, inaſmuch as they do not expreſs the different relation of things by different terminations, but only by additional prepoſitions. (See Case.)

An ingenious grammarian obſerves, that though the termination called the genitive caſe be rendered by *of*, it means invariably *from*, *beginning*, *motive*; and this, he ſays, ſeems to be the true ſignification of *of*, if we regard its etymology, it being taken from αφ, απο, *ab*, *from*; and though cuſtom ſeems to have aſſigned it ſome different undefinable meaning, it is in all caſes reſolvable into the ſenſe of *from*. Thus, a table *of* wood is a table *from* wood, wood being the origin or beginning of it. Again, he is ſick *of* love, *i. e.* ſick *from* love, love being the cauſe of his ſickneſs; and ſo in all other inſtances. And this is the reaſon why ſome prepoſitions which ſignify *origin* or *beginning* in Greek, Latin, and French, are rendered in our tongue by *of*.' Jones's Greek Grammar, p. 194.

In the Latin, this relation is expreſſed in divers manners, thus we ſay, *caput hominis, the head of a man; color roſæ, the colour of a roſe; opus Dei, the work of God*, &c.

As the genitive caſe ſerves to expreſs very different, and even oppoſite relations, there ſometimes ariſes an ambiguity from this circumſtance; thus, in the phraſe, *vulnus Achillis*, the *wound of Achilles*, the genitive, *Achillis*, may either ſignify paſſively the wound Achilles has received, or actively the wound Achilles has given: thus in that paſſage of St. Paul, *Certus ſum quod neque mors, neque vita, &c. nos poterit ſeparare a charitate Dei in Chriſto, &c.* the genitive *Dei* has been taken by interpreters in two different ſenſes; ſome, giving it the relation of object, underſtand the paſſage of the love which the elect bear to God in Jeſus Chriſt; whereas others give it the relation of ſubject, and explain it from the love which God bears the elect in Jeſus Chriſt.

In the Hebrew tongue, the genitive caſe is marked after a manner very different from that of the Greek and Latin: for whereas in thoſe languages the noun governed is varied, in the Hebrew the noun governing undergoes the alteration.

GENITO, St. in *Geography*, a town of Naples, in Calabria Citra; 21 miles N. W. of Biſignano.

GENIUS, in *Mythology*, a good or evil ſpirit, or dæmon, whom the ancients ſuppoſed ſet over each perſon, to direct his birth, accompany him in life, and be his guard until death. Thoſe that attended women were females, and called *Junones*, but thoſe that attended men were males, and called *Genii*. They ſeem, in their original, to be nothing elſe but the particular bent and temper of each perſon deified; and as every one's own temper is in a great meaſure the cauſe of his happineſs or miſery, each of theſe were ſuppoſed to ſhare, and have an equal feeling in all the enjoyments and ſufferings of the perſons they attended. (See Horace, lib. ii. ep. ii. ver. 189.) The ancients had their Genii of nations, of cities, of provinces, &c. Nothing is more common than the following inſcription on medals: GENIUS POPULI ROM. "the Genius of the Roman people:" or, GENIO POP. ROM. "to the Genius of the Roman people." The ancient Gauls acknowledged Genii, who took care of each particular province and canton: but the foundation of the worſhip, which they paid to their deified cities, or rather to the genius who protected them, and became their tutelar divinity, was to engage them to take care of them, to defend them againſt enemies, and to remove from them all evils, with which they might be diſtreſſed; ſuch as epidemical diſtempers, and other calamities. The names of theſe tutelar Genii were kept ſecret, leſt, if they ſhould be known, they ſhould be conjured away, and forced to abandon the cities that were committed to their charge, and paſs into others, where they were promiſed a more ſolemn worſhip.

In this ſenſe, *genius* and *lar* were the ſame thing; as, in effect, Cenſorinus and Apuleius affirm they were.

Of theſe genii or dæmons, Plato ſuppoſes that every man has his own, who is his guardian, and the witneſs, not only of his actions, but of his very thoughts; but that, at death, the genius delivers up to judgment the perſon who had been committed to his charge; and if, when the perſon is interrogated by the judge, his anſwer be found not agreeable to truth, the genius cenſures and reprimands him very ſeverely, as, on the other hand, he pronounces an encomium upon him when what he ſays is true; and it is upon the approbation of the genius, that the doom is pronounced; for this dæmon knows whatever paſſes in the man, even his moſt ſecret thoughts.

Although Plato and Jamblichus were of opinion that every individual had but one of theſe genii to conduct him, and to preſide over all his actions, other philoſophers of the ſame ſchool were perſuaded, that he had two, the one good, the other bad. To this purpoſe Servius upon Virgil (Æn. l. vi. c. 743.) ſays, "Volunt unicuique genium oppoſitum, Dæmonem bonum et malum; hoc eſt, rationem quæ ad meliora ſemper hortatur, et libidinem quæ ad pejora; hic eſt Larva et genius malus; ille bonus genius et Lar. "They will have it that every one has two genii, the one good, and the other bad; that is, reaſon, which always excites men to good, and luſt, which prompts them to ill: the latter is what they call "Larva," or evil genius: the other good Genius, or "Lar."

The Platoniſts, and other eaſtern philoſophers, ſuppoſed the Genii to inhabit the vaſt region, or extent of air, between earth and heaven. They were a ſort of intermediate powers, who did the office of mediators between gods and men. They were the interpreters and agents of the gods; communicated the will of the deities to men; and the prayers and vows of men to the gods. As it was unbecoming the majeſty of the gods to enter into ſuch trifling concerns, this became the lot of the genii, whoſe nature was of a middle kind between the two; who derived immortality from the one, and paſſions from the other; and who had a body framed of an aerial matter. Moſt of the philoſophers, however, held that the genii of particular men were born with them, and died. Thus Plutarch attributes the ceaſing of oracles partly to the death of the Genii.

The heathens, who conſidered the Genii as the guardian ſpirits of particular perſons, believed that they rejoiced and were afflicted at all the good and ill fortune that befel their wards. They never or very rarely appeared to them; and then only in favour of ſome perſon of extraordinary virtue or dignity. They likewiſe held a great difference between the Genii of different men; and that ſome were much more powerful than others; on which principle it was, that a wizard in Appian bids Antony keep at a diſtance from Octavius, becauſe Antony's Genius was inferior to, and ſtood in awe of, that of Octavius.

There were alſo evil Genii, who took a pleaſure in perſecuting men, and bringing them evil tidings: ſuch was that in Paterculus, &c. which appeared to Brutus the night before the battle of Philippi. Theſe were alſo called *larvæ*, and *lemures*.

According to the theogony of Heſiod, the men of the golden age became dæmons, or good genii; thoſe, according to him, are the guardians of men, the earth having fallen to their lot. Thoſe of the ſilver age were changed into manes, or ſubterraneous genii, happy though mortal. Thoſe of the brazen age went down to the infernal regions. Thoſe of the heroic age took poſſeſſion of the Fortunate iſlands, or the Elyſian fields, ſituate at the extremities of the world. See DÆMON, and DÆMON *of Socrates*.

The Mahometans alſo admit the exiſtence of Genii, ſuppoſed by them to be a claſs of intermediate beings, between angels and men; of a groſſer fabric than the former, and more active and powerful than the latter. Some of them are good, and others bad; and they are, like men, capable of future ſalvation or condemnation.

GENIUS is more frequently uſed for the force or faculty of the ſoul conſidered as it thinks or judges.

Thus, we ſay, a happy genius, a ſuperior genius, an elevated genius, a narrow confined genius, &c. in like ſenſe we alſo ſay, a work of genius, a want of genius, &c.

Genius is alſo uſed, in a more reſtrained ſenſe, for a natural talent, or diſpoſition to one thing more than another. In which ſenſe we ſay, a genius for verſe, for the ſciences, &c.

Dr. Blair, in his "Lectures on Rhetoric, &c." (vol. i.) diſtinguiſhes between Taſte and Genius. Taſte, he ſays, conſiſts in the power of judging: Genius, in the power of executing. One may have a conſiderable degree of taſte in poetry, eloquence, or any of the fine arts, who has little or hardly any genius for compoſition or execution in any of theſe arts. But genius cannot be found without including taſte alſo. Genius, therefore, deſerves to be conſidered as a higher power of the mind than taſte. Genius always imports ſomething inventive or creative; which does not reſt in mere ſenſibility to beauty, where it is perceived, but which can, moreover, produce new beauties, and exhibit them in ſuch a manner, as ſtrongly to impreſs the minds of others. Refined taſte forms a good critic: but genius is further neceſſary to form the poet, or the orator. Beſides, genius is a word, which, in common acceptation, extends much further than to the object of taſte. It is uſed to ſignify that talent, or aptitude, which we receive from nature, for excelling in any one thing whatever. Accordingly, we ſpeak of a genius for mathematics, as well as a genius for poetry; or a genius for war, for politics, or for any mechanical employment. This talent or aptitude, for excelling in any one particular, is received from nature; and though it may be greatly improved by art and ſtudy, it cannot by them alone be acquired. As genius is a higher faculty than taſte, it is more limited in the ſphere of its operations. Whilſt we find many perſons, who have an excellent taſte in ſeveral of the polite arts, ſuch as muſic, poetry, painting, and eloquence, all together; it is much more rare to meet with one who is an excellent performer in all theſe arts. Indeed, an univerſal genius, or one who is equally and indifferently turned towards ſeveral different profeſſions and arts, is not likely to excel in any. The rays muſt converge to a point, in order to glow intenſely. A genius for any of the fine arts always ſuppoſes taſte; and the improvement of taſte will ſerve to forward and correct the operations of genius. But genius, in a poet or orator, may ſometimes exiſt in a higher degree than taſte; that is, genius may be bold and ſtrong, when taſte is neither very delicate, nor very correct. This is often the caſe in the infancy of arts; a period when genius frequently exerts itſelf with great vigour, and executes with much warmth; while taſte, which requires experience, and improves by ſlower degrees, hath not yet attained its full growth. Homer and Shakſpeare may be referred to as examples in proof of this aſſertion. (See Taste.) Longinus, in his "Treatiſe on the Sublime," remarks, that liberty is the nurſe of true genius: it animates the ſpirit, and invigorates the hopes of man; excites honourable emulation, and a deſire of excelling in every art. It is obſervable, that writers and artiſts moſt diſtinguiſhed for genius have generally appeared in conſiderable numbers at the ſame period. Beſides the moral cauſes which have been alleged to account for this phenomenon, ſuch as favourable circumſtances of government and manners, encouragement from great men, and emulation excited among men of genius, the Abbé du Bos, in his "Reflections on Poetry and Painting," has collected a great many obſervations on the influence which the air, the climate, and other natural cauſes, may be ſuppoſed to have upon genius. The opinion of the Abbé du Bos, that genius chiefly depended on ſoil, food, air and climate, has been favoured by Monteſquieu in his "Spirit of Laws:" and it occaſionally occurs in other writers. Mr. Hume, however, has attacked this hypotheſis with great ingenuity and ſtrength of reaſoning in his "Eſſay on National Characters." In that Eſſay he has clearly proved, that the differences we obſerve in nations, with regard to genius, ſcience, and manners, ariſe from moral, and not from phyſical cauſes. (See Climate.) The fact, however, is unqueſtionable, that ſome periods or ages of the world have been much more diſtinguiſhed than others for the extraordinary productions of genius. (See Age, *in the Hiſtory of Literature*, &c.) If we inſtitute a compariſon between the ancients and moderns in this reſpect, we muſt allow, that while the advancing age of the world brings along with it more ſcience and more refinement, its earlier periods may lay claim to more vigour more fire, more enthuſiaſm of genius. Among the ancients, we find higher conceptions, greater ſimplicity, more original fancy: among the moderns, ſometimes more art and correctneſs, but feebler exertions of genius. Admitting this to be in general a mark of diſtinction between the ancients and moderns, it cannot be admitted without exceptions; for, in point of poetical fire and original genius, Milton and Shakſpeare are not inferior to any poets in any age.

Genius, is not a muſical term, nor does it appertain to one of the polite arts more than another; but Rouſſeau (Dict. de Mus.) has volunteered an article for it among muſical terms, and has written it with peculiar eloquence and enthuſiaſm.

Rouſſeau, paradoxical on almoſt all other ſubjects, is ſometimes not only capricious, but miſchievous; yet his bittereſt enemies admit, that muſic is his bright ſide: and though he is not allowed by the preſent French muſical critics to be a profound contrapuntiſt, yet his taſte in muſic and poetry was refined, and of the higheſt claſs; and his views concerning dramatic muſic were enlarged, rational, ingenious, and free from all caprice and paradox.

GENLIS, in *Geography*, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the diſtrict of Dijon. The place contains 707, and the canton 8599 inhabitants, on a territory of 187½ kiliometres, in 27 communes.

GENNABA, a town of Perſia, in Farſiſtan, in the Perſian gulf; 15 miles N.W. of Bender Rigk.

GENNADIUS I., in *Biography*, patriarch of Conſtantinople, was elected to that dignity, having been ſome years an ordained preſbyter of the church, in the year 458, on the death of Anatolinus. In the following year, in a council of 73 biſhops, he procured the paſſing of a canon againſt ſimoniacal ordinations, and eſtabliſhed the equitable regulation, that the oblations made in the churches, which it had been cuſtomary to claim for the patriarch's treaſury, ſhould thenceforward belong to the officiating clergy. He died in 471, leaving behind him a high character for great zeal and diſintereſtedneſs in correcting the relaxed ſtate of diſcipline which prevailed in his ſee. He is placed by thoſe who lived about the ſame period among the eccleſiaſtical writers of the day, and is applauded for the extent of his learning and the elegance of his ſtyle. The proofs of this have not come to us, excepting in "A ſynodal Epiſtle" againſt ſimony, inſerted in the fourth volume of the Collect. Concil.; and fragments againſt the anathemas of Cyril of Alexandria, quoted by Facundus, biſhop of Hermiana, and another from a treatiſe addreſſed to Parthenius, and quoted by Leontius. Moreri.

Gennadius II., another patriarch of Conſtantinople, in the fifteenth century, aſſumed the name upon embracing the eccleſiaſtical life, having, prior to this, the name of George Scholarius. He was a native of Conſtantinople, where he was educated, and attracted much notice by his talents and remarkable progreſs in the different branches of learning. He became ſecretary to the emperor John Palæologus, and afterwards chief judge of the Greeks. In 1438 he accompanied the emperor to the council at Florence for the purpoſe of bringing about an union between the Greek and Latin churches: it is, however, a matter of much doubt whether Scholarius was in favour of the meaſure which his duty to his maſter required him to ſanction and ſupport. After his return to Conſtantinople he united with Mark of Epheſus, in oppoſing the reception of thoſe terms of union to which the emperor had acceded, as well by his influence as by his writings, which brought on him for a time the diſpleaſure of the emperor. After the death of Palæologus in 1448, Scholarius was as violent as ever againſt the propoſed union, and finding that his oppoſition muſt ſubject him to danger with the new emperor, Conſtantine, he reſolved to relinquiſh his civil employments, and to embrace the eccleſiaſtical life. He accordingly, in 1459, after ſending a valedictory oration to the emperor, entered into a monaſtery adjoining Conſtantinople, and lived a ſecluded life for two years, which is ſuppoſed to have been the reſult of the emperor's orders, to prevent him from taking part againſt the propoſed union. During his retreat from the world he compoſed ſeveral homilies, which could offend no one; but he did not engage in any controverſy until the union was completed. This called forth his zeal in behalf of the Greek church: he wrote letters to all the eccleſiaſtics of Conſtantinople, and to the different monaſtic orders, exhorting them to adhere to the faith of their anceſtors, and not to ſubmit to the Florentine union: he alſo remonſtrated with the emperor on the ſubject, but the monarch was not to be turned from his plan, and made every effort, by perſuaſion and by threats, to bring over Gennadius. The attempt was futile; he had gone too far to retract, and had obtained a multitude of adherents whom he had converted by his writings and exhortations, which repreſented the union to be a deſertion of the cauſe of God and his truth. The emperor ſubſcribed the act of union at Conſtantinople, as it had been ratified in the council of Florence. On the 12th of December 1452, the two nations, in the church of St. Sophia, joined in the communion of ſacrifice and prayer. But the dreſs and language of the Latin prieſt who officiated at the altar were objects of ſcandal; and it was obſerved, with a feeling of horror, that he conſecrated a wafer of unleavened bread, and poured cold water into the ſacramental cup. From the dome of St. Sophia, the inhabitants of either ſex, and of every degree, ruſhed in crowds to the cell of Gennadius to conſult him, as the oracle of the church. He was inviſible, and entranced, as it ſhould ſeem, in deep meditation, or divine rapture; but he had expoſed on the door of his cell a tablet, on which were written theſe words: "O miſerable Romans, why will ye abandon the truth; and why, inſtead of confiding in God, will ye put your truſt in the Italians? In abandoning your faith, you will loſe your city. Have mercy on me, O Lord! I proteſt, in thy preſence, that I am innocent of the crime. O miſerable Romans, conſider, pauſe, and repent! At the ſame moment that you renounce the religion of your fathers by embracing impiety, you ſubmit to a foreign ſervitude." This was the ſignal for inſurrection, (ſee CONSTANTINOPLE); and, after the capture of the city, the ſultan Mahomet, deſirous of conciliating thoſe inhabitants who had ſurvived the immenſe ſlaughter made by his army, and of recalling the Greeks, who had eſcaped, to their deſerted houſes, ordered Gennadius to be ſought for, and offered him to the choice of the clergy and people, by whom he was immediately elected their patriarch. In the election and inveſtiture of Gennadius, the ceremonial of the Byzantine court was revived and imitated. With a mixture of ſatisfaction and indignation, they beheld the ſultan on his throne, who delivered into the hands of Gennadius the paſtoral ſtaff, the ſymbol of his eccleſiaſtical office, who conducted the patriarch to the gate of the ſeraglio, preſented him with an horſe richly capariſoned, and directed the vizirs and baſhaws to lead him to the palace which had been allotted for his reſidence. The churches of Conſtantinople were ſhared between the two religions: their limits were marked, and till it was infringed by Selim, the grandſon of Mahomet, the Greeks enjoyed above ſixty years the benefit of this equal partition. Gennadius preſided over the ſee of Conſtantinople between five and ſix years, when he reſigned his dignity, and retired into a monaſtery. He died about the year 1460. He was author of "An Explanation of the Chriſtian Faith, delivered before the Turkiſh emperor Mahomet." This work was the reſult of a long converſation which he had with the emperor, ſoon after his inſtallation, when Mahomet ſuffered him to produce all the arguments he was able in ſupport of the truth of Chriſtianity. It is to be found in Cruſius's Turco-Græcia; and is alſo in David Chytræus's "De ſtatu Eccleſiarum in Græcia." Gennadius wrote likewiſe a treatiſe concerning predeſtination, and another on the trinity. He compoſed many homilies in the early part of life, which were delivered before the emperor, as orations, which laymen were, in that age, accuſtomed to pronounce in the imperial dining-room. Moreri. Gibbon's Hiſt.

GENNADIUS, an eccleſiaſtical writer, flouriſhed towards the cloſe of the fifth century, and became prieſt of Marſeilles. He was a great writer, and is ſaid to have compoſed eight books againſt all hereſies, ſix againſt Neſtorius, three againſt Pelagius, and a treatiſe concerning the millennium and the book of Revelation; but the only works remaining of this author are entitled "De viris illuſtribus," which is a continuation of St. Jerome's catalogue of Eccleſiaſtical Writers; and a treatiſe "De Fide, ſeu de dogmatibus Eccleſiaſticis Liber ad Gelaſium Papam miſſus." This laſt was for a conſiderable time attributed to St. Auguſtine, and was generally inſerted in the editions of his works. The time of Gennadius's death is not known, but it did not take place before the year 395.

GENNARI, CESARE and BENEDETTO, two brothers who both made painting their profeſſion. They were nephews, heirs, copyiſts, and imitators of Guercino; they frequently repeated his pictures, but not with adequate ſweetneſs or force. At firſt they wrought together at ſeveral places in Italy: but ſeparating, Ceſare remained at Bologna, and Benedetto went to England, where there are many of his works, particularly at Windſor Caſtle, diſcoverable by a laboured, dry imitation of Guercino; with a mixture of the flutter and parade exhibited by the French painters of that period. He was made painter to James II. and executed a picture of that prince and his family. At their expulſion he returned to Italy: and as his manner, by the mixture of French art he had introduced, was novel, he obtained applauſe and employment. He died in 1715, aged 82.

GENNE, in *Geography*, a town of France, in the department of the Maine and Loire, near the Loire; 9 miles N.W. of Saumur.

GENNEP, a town of France, in the department of the Roer, ſituated on the Niers, near the Meuſe. It contains two churches, one for Roman Catholics, and another for Proteſtants; 9 miles S. S. W. of Cleves. N. lat. 51° 47'. E. long. 5° 50'.

GENNES, a town of France, in the department of the Maine and Loire, and chief place of a canton, in the diſtrict of Saumur; 5 miles N.E. of La Guerche. The place contains 1455, and the canton 8248 inhabitants, on a territory of 190 kiliometres, in 15 communes.

GENOA, and ſince the French revolution the "Ligurian republic," is a ſmall, mountainous territory, in the northern part of Italy, forming a kind of creſcent along the Mediterranean ſea on the ſouth, and covered on the land ſide by the Apennines, which ſeparate it from the countries of Milan, Piedmont, the Montſerrat, the Milaneſe, and Parmeſan. Its length from the town of Vintimiglia on the weſt, almoſt to the territory of the republic of Lucca on the eaſt, is about 150 miles, and its greateſt breadth, from the ſea to the interior of the country, is not more than 20 miles. The mountains that encloſe it are, in ſome places, covered with foreſts, in others they are barren rocks, and in ſome few parts they yield excellent paſture. There is but a ſmall quantity of arable land in this country, ſo that it is under a neceſſity of ſeeking a ſupply of corn from Naples, Sicily, and other places; but the inhabitants avail themſelves of every ſpot which is capable of cultivation. They are furniſhed throughout the year with excellent legumes and vegetables for the table; they alſo make a conſiderable quantity of wines, and are amply provided with various kinds of fruit, eſpecially citrons, oranges, pomegranates, almonds, and figs. They raiſe a great number of mulberry trees for feeding ſilk-worms, and olives grow in great plenty, particularly round the gulf of Spezzia. Salt is produced for exportation. The Apennines, and ſome other hills, ſupply them with excellent marble, while Polzevera, in the Bocchetta, yields the beautiful ſtone ſo called, being ſerpentine of various colours veined with marble, which is eaſily conveyed by a magnificent road formed, in 1778, from the Bocchetta, or mountains to the north of Genoa, through the Polzevera, by three years' labour of from five to eight hundred men, at the expence of one patriotic and noble family, the Cambiaſi. The inhabitants of this country, amounting to about 400,000, are Roman Catholics, though the papal power is not much venerated; the people being devoted to commerce, and diſpoſed to receive monied heretics, without any religious ſcruples. The manufactures were formerly very conſiderable, but they have of late declined; the principal are velvet, pluſh, damaſk, different kinds of ſilk, for which they are ſupplied with the raw material from Meſſina and other places; gold and ſilver ſtuffs, lace, gloves, ſtockings, ribbons, ſoap, paper, &c. Other articles of commerce are, oil, fruit, macaroni, confectionary, Parmeſan cheeſe, anchovies, &c. Although Genoa is a free port, Leghorn, which is likewiſe free and indulged with greater liberty, interferes with its trade, and diminiſhes it. This country is part of the ancient Liguria (ſee LIGURIA); which, in the ſecond Punic war, eſpouſed the intereſt of the Carthaginians; but the city of Genoa, which was then a celebrated emporium, taking part with the Romans, was plundered and burnt by Mago the Carthaginian. It was afterwards rebuilt by the Romans, and continued under their dominion, together with the reſt of Italy, till the concluſion of the fifth century, about A. D. 498, when Theodoric, king of the Goths, having defeated the uſurper Odoacer, was proclaimed by the army king of Italy, even with the conſent of the emperor Zeno. Genoa was afterwards recovered by Beliſarius, when he entirely ſubdued the Goths; and when the Lombards invaded Italy, this city remained for ſome time unmoleſted, deriving an acceſſion of wealth and inhabitants by the refugees who fled from the vicinity of the Po, in order to eſcape the fury of the invaders. At length, in the ſeventh century, Genoa was plundered and burnt by the Lombards, and remained under their power till Italy was conquered by Charlemagne, when the territory of Genoa, diſtinguiſhed by its wealth and populouſneſs, was erected into a marquiſate. It ſoon afterwards became ſo powerful, under the Genoeſe empire, and after it had obtained a kind of independence, that, in 806, it reduced the iſland of Corſica, and in 935 defeated the Saracens, who had plundered and burnt the city, in their return to Africa, on the coaſt of Sardinia. About the year 950, when the Franks having loſt all authority in Italy, the Genoeſe began to form themſelves into a kind of ariſtocratical republic, under a chief called *doge*, (ſee DOGE,) elected every two years, and to be governed by their own magiſtrates, who were freely elected, and took the name of conſuls. In order to maintain their independence, they applied, with great aſſiduity, to navigation and commerce, and thus became rich and powerful. Their commerce extended from Spain to Syria, and from Egypt to Conſtantinople, and was carried on in veſſels, that were fitted for war as well as traffic. In the year 1017 they united with the Piſans in an expedition againſt Sardinia; and about 33 years after this expedition, the Genoeſe and Piſans were engaged in a deſtructive war, which laſted nearly 18 years; but when a treaty of peace and alliance was concluded between them, they concurred in a ſucceſsful expedition againſt the Moors, in Africa. What contributed more than any other circumſtance to the opulence and grandeur of the Genoeſe, was the part they took in the cruſades, and the important ſervices they rendered to the religious warriors, towards the cloſe of the eleventh and commencement of the twelfth centuries. During the latter century, they ſubjected the half of Sardinia, and the city of Syracuſe; they alſo made themſelves maſters of the Black ſea, formed eſtabliſhments in the Crimea and in the ſuburbs of Pera, at Conſtantinople, where they remained till the Turks took that city. In the thirteenth century, they added to their conqueſts the towns of Albengo, Savona, Vintimiglia, and others in their neighbourhood; and for the ſuperiority of the ſea, they engaged in a long and obſtinate conteſt with the Venetians, which did not terminate till the year 1381. In their various conflicts with neighbouring powers, their ſtrength was enfeebled, ſo that, in 1471, they were expelled from the Crimea; though their maritime power ſtill continued reſpectable. Exhauſted by the Venetian war, in particular, Genoa offered voluntary ſubjection to France and to Milan; but after many revolts and conflicts, with a view of recovering their independence, they were at length, *viz.* in 1528, reſcued from the dominion of foreign princes, by the vigorous exertions of Andrew Doria. Doria, having driven out the French, and gained poſſeſſion of Genoa, aſſembled the nobility, and reſtored the government into their hands, declaring that he pretended to no greater ſhare in it than became him as a nobleman. He re-eſtabliſhed the ancient form of the republic, and received from his country all thoſe teſtimonies of gratitude, which a conduct ſo diſintereſted ſeemed to deſerve. (See DORIA.) Towards the end of the ſixteenth century, Genoa was diſtracted by a civil war; but after a reconciliation had been effected between the two contending parties, diſtinguiſhed by the appellations of the old and new nobility, the republic enjoyed peace and felicity for an interval of 48 years, during which period ſcarcely an incident, domeſtic or foreign, occurred, that is worth recording. In the year 1624, a diſpute aroſe between the republic and Charles Emanuel, duke of Saxony, in which Lewis XIII. bore a ſhare; and a treaty was concluded between France and Savoy, that was hoſtile to the Genoeſe. On this occaſion the Spaniards declared in favour of Genoa; and a peace with France and Savoy reſtored the republic to its former ſituation, at the commencement of the war. In 1636, the Spaniards attempted to ſurpriſe the city; but their enterpriſe was fruſtrated; and from this time till the year 1656, Genoa enjoyed all the bleſſings of peace and commerce. In the following year Hippolito Centurioni, the Genoeſe admiral, gained ſeveral advantages over the corſairs of Barbary, which paved the way for a treaty of commerce that was concluded with the piratical ſtates, and the grand ſignior. The treaty with the Porte was conſiderably extended by the marquis Durazzo, who went in quality of ambaſſador to Conſtantinople in the year 1666. The reſult of this treaty renewed the vigour of the Genoeſe trade, to a pitch beyond what any of the maritime towns had experienced ſince the Dutch founded their commercial republic, and extended their trade not only to the Levant, but to every quarter of the globe. For ſome years Genoa lived in peace with all the neighbouring powers, enjoyed domeſtic harmony, and aſſiduouſly cultivated commerce, and whatever ſhould render the republic powerful and happy. Some little jealouſies and differences aroſe between her and Venice, the ſiſter and rival republic; but they were ſuch as terminated amicably, and never cauſed any diſturbance to the repoſe of Italy. In the year 1684, the Genoeſe unfortunately incurred the reſentment of Lewis XIV., who looked with jealouſy on their attachment to Spain; and could not bear to ſee the republic under the protection of that crown. His attempts for humbling them proved too ſucceſsful; but in conſequence of their ſubmiſſion, and the interpoſition of the pope, peace was obtained. The terms ſtipulated by the French were peculiarly ſevere and oppreſſive; among others, they required that the doge and four counſellors ſhould appear in perſon at Verſailles, in order to ſue for pardon; and that the ſtate ſhould diſarm all their gallies, ſix excepted, with a promiſe not to fit out more, without the knowledge and conſent of the king. During the enſuing war, kindled by the ambition of Lewis, which embroiled the greateſt part of Europe, the republic of Genoa adhered wiſely to a neutrality, and enjoyed the advantages of peace and commerce, while the dominions of their neighbour, Victor Amadeus, duke of Savoy, underwent all the calamities of war. In 1713, Charles VI. ſold the marquiſate of Finale to the republic for a conſiderable ſum of money. In 1743, the queen of Hungary, having at the treaty of Worms ceded to the king of Sardinia all her rights to the town and marquiſate of Finale, and demanding that the Genoeſe ſhould deliver up the marquiſate, they entered into an alliance with France, Spain, and Naples; and, in 1745, declared war againſt the king of Sardinia who had made himſelf maſter of a great part of the ſtate; ſeveral Genoeſe ports were bombarded by an Engliſh fleet; and the Imperialiſts ſeized upon the city of Genoa; but after a dreadful ſlaughter on both ſides, they were again driven out by the inhabitants; and, in 1747, miſcarried in their attempt to recover it. The treaty of Aix-la-Chapelle, in 1748, reſtored its tranquillity. The ancient nobility conſiſt of 28 families, whom Andrew Doria, in 1528, ſeparated from all the reſt, and declared to be only capable of holding the chief offices and dignity of doge; all the other inhabitants being reduced by him to the claſs of commoners. Since that time it has been found neceſſary to create other nobility. The nobility of Genoa were allowed to keep manufactures of velvet, ſilk, and cloth; to farm the duties, and to have ſhares in merchant veſſels; but all other buſineſs and handicrafts were forbidden. The form of government in this republic was ariſtocratical; the chief being called doge. This government continued till the year 1798, when the French form was choſen, and the new ſtyle aſſumed of the Ligurian republic, confirmed by the more recent treaty of February 1801. The troops of this ſtate, including the militia, may amount to about 30,000; and the fleet, anciently ſo celebrated for its victories over the Saracens, the Piſans, the Venetians, Spaniards, and Turks, and for maintaining during a long period a conſiderable dominion over Sardinia, Corſica, Malta, Majorca, Minorca, Candia, Cyprus, and many other places in and near the Mediterranean and Archipelago, and even the Black ſea, the Crimea and other parts, is now reduced to a few gallies.

Genoa, or *Janua*, frequently, though corruptly, called by the Latin writers *Januta*, is the capital of the country deſcribed in the preceding article. It is ſituated partly on a level ſtrand near the ſea, and in part riſes gradually to the top of the hill. It is about 10 miles in circumference, and is defended towards the land by a double wall. Several baſtions are erected along the ſea-ſhore, on rocks which appear above the water. The ſtreets are in general narrow, but clean and well paved; two of which, called the "Strada Nuova" and "Strada Balbi," are filled with magnificent palaces, fronted with marble. It is the ſee of an archbiſhop. The cathedral is built in the Gothic ſtyle, and paved with black and white marble; in the treaſury is preſerved a curious hexagonal diſh, ſaid to be made of a ſingle emerald, found at Cæſarea in the time of the Cruſades, which the Genoeſe received as their ſhare of the plunder. Beſides the cathedral, it contains 32 pariſh churches, ſome of which are magnificent, and adorned with ſculptures and pictures by the beſt maſters. The doge's palace is large, without decoration, except two ſtatues of John Andrew Doria, and Andrew Doria, larger than life, at the entrance. The arſenal contains arms for 34,000 men, models for bridges, the armours worn by a number of the Genoeſe women in the cruſades, a ſhield containing 120 piſtols, made by Julius Cæſar Vacche, for the purpoſe of aſſaſſinating the doge and ſenate at one time. Other public buildings are the Albergo, which ſerves as a poor-houſe, and houſe of correction, where is a beautiful relievo, the Virgin ſupporting a dead Chriſt, by Michael Angelo, and the aſſumption of the Virgin, in white marble, by Puget, an inimitable piece of ſculpture; a large hoſpital for the ſick of all nations and religions; the conſervatory, for educating and portioning 300 poor girls; and a great number of palaces belonging to the nobility; and the number of convents for men and women is reckoned to be 69. Such was the ſtate of Genoa before the late revolution; what devaſtation it has ſuffered by its new maſters, we are not able to ſay. It is certain, that the ſiege in 1799 was very deſtructive. The harbour is large and deep, but expoſed to the ſouth-weſt wind; but it has a mole for the ſecurity of gallies and ſmall veſſels; neverthleſs the city is much expoſed to a bombardment. The number of inhabitants is eſtimated at 80,000. N. lat. 44° 25'. E. long. 8° 58'.

Genoa *Bar*, a reef of rocks, extending ſome miles from the north coaſt of the iſland of Bahama. N. lat. 26° 20'. W. long. 79° 36'.

Genoa *Balſam*, in *Medicine*, the name of a famous compoſition, called alſo the balſam of Aquapendente. Its great virtues are the curing pains in the extremities of the body, and allaying the violent pains in the bowels, to which many women are ſubject after delivery. The preſcription is given at large in Velſcius, but the medicine is now out of uſe.

GENOLA, in *Geography*, a town of France, in the department of the Stura; three miles N. E. of Savigliano.

GENOLHAC, a town of France, in the department of the Gard, and chief place of a canton, in the diſtrict of Alais; 15 miles N. W. of Alais. The place contains 1,502, and the canton 9,579 inhabitants, on a territory of 195 kiliometres, in 13 communes.

GENOPLESIUM, in *Botany*, from γενος, *a genus*, and πλησιον, *nearly akin*, indicating its great affinity to *Praſophyllum*, another new orchidean genus of Mr. Brown's. The name is but too expreſſive of many genera recently eſtabliſhed, inſomuch that it is wonderful no writer has hit upon it before. Brown Prod. Nov. Holl. v. 1. 319. Claſs and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Gen. Ch. *Cal.* Perianth ringent, helmet-like in front, its two lower or poſterior leaves longer and ſpreading. *Cor.* Petals, (inner calyx-leaves of Mr. Brown,) attached below to the column. Nectary, or lip, aſcending, undivided, hooded at the baſe, without a ſpur. *Style*, or column, cloven half way down, without any lateral membranous ſegments, in which laſt particular alone it differs from *Praſophyllum*. *Anther* parallel to the ſtigma, permanent, its cells cloſe together. Maſſes of pollen not obſerved. The only ſpecies is

G. *Baueri*, ſeen by Mr. Brown growing near Port Jackſon, New South Wales, but the above character was drawn up by him from Mr. Ferdinand Bauer's coloured figure.

GENOSA, in *Geography*, a town of Naples, in the province of Otranto; 10 miles S. E. of Otranto.

GENOVESI, Anthony, in *Biography*, a man of letters, and philoſopher, was born of parents of very moderate circumſtances, at Caſtiglione, a ſmall town in the diſtrict of Salerno, in the year 1712. He was intended for the church, and received an education ſuitable to the purpoſe. An early attachment to the daughter of a neighbouring peaſant induced his father to place him, at a diſtance from home, under the care of a lay eccleſiaſtic, who was an able claſſical ſcholar, as well as deeply ſkilled in theology and juriſprudence. Here the young man made ſuch progreſs in learning as aſtoniſhed all about him. His reſolution to marry the object of his love created in him a zeal and diligence that ſurmounted all difficulties; before, however, he was in a ſituation to maintain a wife, ſhe, at the inſtigation of his father, married. This diſappointment made him reſolve to devote himſelf to the church, and he was in due time conſecrated a prieſt, and obtained the patronage of the archbiſhop of Conza. Unfortunately for Genoveſi the prelate died, which made him repair to Naples, to follow the practice of the law, an employment highly lucrative in that city. He was ſoon diſſatisfied with his buſineſs, and after diligently ſtudying the elements of modern and ancient philoſophy, he obtained the office of extraordinary-profeſſor of metaphyſics. He began his lectures in November 1741, and his ſchool was crowded with pupils; the boldneſs of his manner, and the novelty of many parts of his ſyſtem, excited his enemies, who accuſed him not only of infidelity, but of opening the door of free-thinking in Italy; merely, it is ſaid, becauſe he recommended the works of Galileo, Grotius, and Newton. His friends, however, powerfully ſupported him, and by the influence of Galiani, the director of the Neapolitan univerſities, he was appointed to the office of profeſſor of ethics, which afforded him ample field for combating the ignorance and prejudices of the ſchools. The principle of his ſyſtem was, that the happineſs of man is the only object of the philoſophical doctrine of morals, and he deduced his duties from analytical conſiderations. He interwove in his lectures the hiſtory of the human paſſions, and enlivened them by a boldneſs and ſpirit peculiarly his own. He compoſed a new ſyſtem of logic, which he dictated in his lectures, and which was afterwards publiſhed in 1745, under the title of "Elementorum Artis Logico-criticæ, Libri quinque." This might be conſidered as an introduction to his metaphyſics, the firſt part of which had been publiſhed before this period, but the ſecond and third parts made their appearance in the years 1747—1751. In 1748, he put up for the vacant chair of theology, but, as this was always connected with the epiſcopal dignity, he was immediately regarded as unfit for ſo high an office in the church, on account of his heretical notions. His enemies now diſcovered the moſt ſerious and alarming doctrines, in the publiſhed and unpubliſhed pieces of which he had been the author. He was obliged therefore to renounce the ſcience of theology, and to ſuppreſs ſome valuable works on this ſubject. He now turned his attention to political economy, and in a few years he not only made himſelf maſter of every thing deſerving of notice on this ſcience, but ſtruck out ſome new lights. He publiſhed, in 1753, the firſt fruits of his reſearches, entitled "Eſſays on Agriculture, with conſiderations on the true Object of the Sciences." He was now, at the inſtance of his friend Intieri, made profeſſor of political economy, with a conſiderable ſalary. The office had been inſtituted ſolely for him, and it was agreed that the lectures ſhould always be delivered in the Italian language, a circumſtance, at that time, wholly unknown at Naples. His lecture room was crowded, and in a ſhort ſpace of time he was obliged to take a ſtill larger place for the diſplay of his talents, which alſo was inſufficient to contain all who came to be benefited by his inſtructions. His chief and avowed object was, while he taught the principles of political economy, to inſpire the Neapolitan youth with the ſocial and civil virtues, and above all with a public ſpirit of patriotiſm, without which no nation, he contended, could attain to that height of proſperity of which it is ſuſceptible. He cauſed to be tranſlated Carey's Hiſtory of the Engliſh Trade into the Italian, and then publiſhed it with uſeful notes. After this he pointed out in a ſhort treatiſe the cauſes of the decline and neglect of agriculture in the kingdom of Naples. In 1765 he publiſhed another work, in which he examined the queſtion, "Why countries, the moſt fruitful by nature, are often expoſed to the miſeries of ſcarcity." He was author of many other works, but his maſter-piece was the "Italian Syſtem of Morality," of which the firſt part was publiſhed in the year 1767, under the title of "Dicoſyna." His health now gave way, and he was unable to proſecute his ſtudies, and, in 1768, he was obliged to diſcontinue his lectures, and in the following year he expired, in the fifty-ſeventh year of his age. He had attained, as a man of ſcience, a very high reputation, and his moral character was in every reſpect worthy of a true philoſopher. He poſſeſſed a moſt ardent love of truth, and a deſire to extend its dominion, in which he was aware the happineſs of his fellow-creatures was deeply concerned. "He was," ſays his biographer, "an irreconcileable enemy to injuſtice and deception: his countenance diſplayed cheerfulneſs, tranquillity, and invincible courage. He was too proud to ſtoop to flattery in order to become rich, and was contented with a very moderate income." He died poor, and would have been in diſtreſſed circumſtances in the latter years of his life, had not the ſovereign ſupported him unſolicited. He was held in high eſtimation by pope Benedict XIV. and many of the cardinals; and by inſpiring in the breaſts of his pupils an ardent love of their country, with a well regulated zeal for its beſt intereſts, he was the means of introducing them to offices of diſtinction, which they filled with honour to themſelves, and high advantage to the beſt intereſts of the ſtate. Gen. Biog.

GENOUILLAT, in *Geography*, a town of France, in the department of the Creuſe; nine miles W. of Bouſſac.

GENOUILLE, a town of France, in the department of the Charente; 10 miles W. of Jean d'Angely.

GENOWI, a town of Africa; ſix miles N. of Sennaar.

GENSAC, a town of France, in the department of the Gironde; nine miles S. E. of Libourne.

GENS D'ARMES. See GENDARMES.

GENSERIC, in *Biography*, a famous king of the Vandals, ſucceeded his brother Gonderic in his Spaniſh dominions in the year 428. He had already ſignalized his courage and ſkill in war, and was enured to toil and hardſhips of every kind. Soon after his ſucceſſion he invaded Africa, at the head of 50,000 men, and made himſelf maſter of the greater part of the country on the ſea-coaſt. The perſecution of the Donatiſts was an event highly favourable to the deſigns of Genſeric. Seventeen years before he had landed in Africa, a public conference was held at Carthage by order of the magiſtrate, which ended in a moſt ſevere perſecution. Under theſe circumſtances, Genſeric, himſelf a Chriſtian, but an enemy of the orthodox faith, avowed himſelf the vindicator of the rights of the Donatiſts, who, in their turn, looked up to him as their deliverer, from whom they might reaſonably expect the repeal of the odious and oppreſſive edicts of the Roman emperors. Genſeric obtained the moſt ſignal victories over his enemies, but notwithſtanding his ſucceſs, he agreed to a treaty with the emperor Valentinian, whom he conſented to leave in poſſeſſion of the three Mauritanias. He delivered to the Romans his own ſon Hunneric, as a hoſtage for the obſervance of his treaty; but they, truſting to his good faith, ſent back the youth. Genſeric abuſed this indulgence by ſeizing upon the city of Carthage in 439, at a time when the empire was engaged in a war with the Goths. From Carthage he ſailed with a large fleet, and landed in Sicily. He ravaged almoſt the whole of that iſland, and made a vaſt booty, but was unable to effect the conqueſt of Palermo. The object of this prince was to render himſelf formidable by ſea; and he ſucceeded ſo completely, that the eaſtern and weſtern emperors, Theodoſius and Valentinian, thought it neceſſary to join againſt him. They fitted out a powerful fleet, with a large army, deſtined for the recovery of Africa; but Genſeric deluded them by propoſals of accommodation, and the irruption of the Huns obliged Theodoſius to recal his forces. When Maximus aſcended the weſtern throne, he compelled Eudoxia, the widow of Valentinian III., to marry him; ſhe in a ſhort time ſecretly applied for the dangerous aid of Genſeric to free her from his tyranny. He, ſeizing the occaſion, appeared at the mouth of the Tiber with a numerous fleet; and in the conteſt Maximus was ſlain, which afforded Genſeric an opportunity of marching to the gates of Rome, where he was admitted almoſt without oppoſition. For fourteen days the city was abandoned to all the licentiouſneſs of a barbarian ſoldiery; and on his return he carried away an immenſe quantity of treaſure, beſides multitudes of captives, chiefly of the female ſex, among whom were the empreſs and her two daughters, one of whom he married to his ſon Hunneric; and after the lapſe of ſeveral years, he reſtored the other and her mother to their native place. Genſeric continued to annex to his dominion the remaining Roman provinces in Africa; and then ſent a fleet, conſiſting of ſixty gallies, into the Italian ſea, which was deſtroyed. But the loſs of his ſhips did not prevent him from renewing his ravages on the coaſt of Italy, till his power received a ſevere check from the emperor Majorian, who now began to act on the offenſive, and formed the ſpirited reſolution of attacking the Vandals, in Africa. He fitted out a formidable fleet for the purpoſe, which obliged Genſeric to ſue for peace. His ſuit being rejected, he ſent out a ſquadron, which coming unawares upon the Roman navy, in the bay of Carthagena, almoſt deſtroyed it. Peace was now made between the two warriors, the terms of which were obſerved till the death of Majorian, in 461. After this, Genſeric prepared to repeat his aggreſſions, and he again ravaged the coaſts of Italy and Sicily, and even took poſſeſſion of Sardinia. He extended his hoſtilities to all parts of the Mediterranean, and frequently indulged in acts of the moſt brutal atrocity. At one time he is reported to have maſſacred five hundred noble citizens of Zacynthus, and to have thrown their dead bodies into the ſea. Leo, the eaſtern emperor, reſolved to make an effort to free his dominions from this terrible ſcourge, and made vaſt preparations for the invaſion of Africa. The conduct of the expedition was given to Baſiliſcus, who might have extinguiſhed for ever the kingdom of the Vandals, had he ſeized the moment of conſternation, and boldly advanced to the capital. Genſeric beheld the danger with firmneſs, and eluded it with his veteran dexterity. He profeſſed himſelf ready to ſubmit his perſon and dominions to the will of the emperor; but requeſted a truce of five days to regulate the terms of his ſubmiſſion. Baſiliſcus conſented to the fatal truce; and during the ſhort interval, the wind became favourable to the deſigns of Genſeric. He manned his largeſt ſhips of war with the braveſt of the Vandals and Moors; and they towed after them many large barks filled with combuſtible materials. In the obſcurity of the night theſe deſtructive veſſels were impelled againſt the unguarded and unſuſpecting fleet of the Romans, who were ſoon awakened to a ſenſe of their inſtant danger. "Their cloſe and crowded order," ſays the hiſtorian, "aſſiſted the progreſs of the fire, which was communicated with rapid and irreſiſtible violence; and the noiſe of the wind, the crackling of the flames, the diſſonant cries of the ſoldiers and mariners, who could neither command, nor obey, increaſed the horror of the nocturnal tumult." Baſiliſcus returned ingloriouſly to Conſtantinople with the remainder of his ſhattered fleet; and thus the fruits of all this mighty effort were loſt. Genſeric put to ſea, recovered Sardinia, which had been taken from him, reduced Sicily and all the iſlands between Italy and Africa, and became a greater terror to the empire than ever. In 476, he made a peace with Odoacer, king of Italy, to whom he reſtored Sicily, but on condition of receiving tribute. The emperor Zeno likewiſe relinquiſhed to him and his ſucceſſors all claims to the African provinces. Genſeric died in the year 477. In his early youth he had renounced the orthodox communion; and as an apoſtate he could neither grant nor expect a ſincere forgiveneſs. He was exaſperated to find that the Africans, who had fled before him in the field, ſtill preſumed to diſpute his will in ſynods and churches; and his ferocious mind was incapable of fear, or of compaſſion. His catholic ſubjects he oppreſſed with intolerant laws, and arbitrary puniſhments. The language of Genſeric was furious and formidable; the knowledge of his intentions might juſtify the moſt unfavourable interpretation of his actions; and the Arians were reproached with the frequent executions which ſtained the palace, and the dominions of the tyrant, Gibbon. Univer. Hiſt.

GENTIAH, in *Geography*, a town of Aſia, in the country of Aſſam; 370 miles E. of Patna. N. lat. 25° 10'. E. long. 92° 10'.

GENTIAN, in *Gardening*, the common name of a large hardy perennial herbaceous plant, which has a root that affords an extremely ſtrong bitter. See GENTIANA.

GENTIANA; in *Botany*, γεντιανη of the Greeks, named after Gentius, a king of Illyria, who is ſaid to have diſcovered it, or at leaſt to have firſt experienced its virtues as a cure for the plague, which infected his army. Gentian, or Fell-wort. The latter name, we preſume, is derived from *fel*, gall, alluding to its extreme bitterneſs, and not from fell, the north-country appellation of a mountain. It therefore ought to be, as Gerarde writes it, Fel-wort.—Linn. Gen. 126. Schreb. 175. Willd. Sp. Pl. v. 1. 1331. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 284. Juſſ. 141. Lamarck Illuſtr. t. 109. Gærtn. t. 114. Claſs and order, *Pentandria Digynia*. (*Monogynia*; Lamarck.) Nat. Ord. *Rotaceæ*, Linn. *Gentianæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, in five deep, oblong, acute, permanent ſegments. *Cor.* of one petal, tubular in the lower part, without pores; in the upper five-cleft, regular, various in form and direction, withering. *Stam.* Filaments five, awl-ſhaped, ſhorter than the corolla, connected with its tube; anthers oblong, ſimple, ſometimes united into a cylinder. *Piſt.* Germen ſuperior, ovate or oblong, cylindrical, as long as the ſtamens; ſtyles none; ſtigmas two, ovate, recurved. *Peric.* Capſule oblong, roundiſh, pointed, ſlightly cloven at the ſummit, of one cell and two concave inflexed valves. *Seeds* numerous, ſmall, flattiſh. *Receptacles* two, affixed longitudinally to each valve.

Eſſ. Ch. Corolla tubular at the baſe, deſtitute of nectariferous pores. Capſule ſuperior, of one cell and two valves, with many ſeeds.

Obſ. The figure of the fruit is conſtant, but the corolla is very different in different ſpecies, being either wheel-ſhaped, bell-ſhaped, or funnel-ſhaped. In ſome there are ſmall intermediate ſegments, in others a fringe to the corolla; in ſome it is plaited, in others plain. A few ſpecies have a four-cleft tetrandrous flower; but the remark in Linn. Gen. 176, that there is a ſpecies with three additional parts of the flower, alludes to *Chlora*, once reckoned a *Gentiana*. Linnæus has eraſed the line from his own copy, and his editors might eaſily have made the ſame correction. G. *lutea*, and ſome others, however, have frequently a ſuperabundance of diviſions and ſtamens in a few of their bloſſoms.—The upper part of the germen ſo much reſembles a ſtyle, that Lamarck has perhaps offered no great violence to nature, or the Linnæan ſyſtem, in conſidering it ſuch.

This very noble and beautiful genus of herbaceous plants is chiefly of alpine origin, where the lovely blue flowers of many ſpecies enamel the turf in a moſt ſplendid manner. Moſt are perennial, ſome few annual. All are intenſely bitter in flavour, eſpecially the roots of the larger perennial kinds, G. *lutea*, Woodv. Med. Bot. t. 156, which is the officinal Gentian; *purpurea*, Fl. Dan. t. 50, which is the Curſuta of the Edinburgh Pharmacopœia; *pannonica*, Jacq. Auſtr. t. 136; *punctata*, ibid. app. t. 28; and *campanulata*, t. 29. Theſe are ſcarcely even ſeen in gardens, except the firſt, which is not eaſily eſtabliſhed; but few plants are more ſtately and ornamental. The North American G. *ſaponaria*, Curt. Mag. t. 1039; and the alpine *aſclepiadea*, t. 1078, are both very handſome, and we have found the latter thrive for many years in a bed of peat, earth and loam, as well as on its native mountains. See Curt. Mag.—G. *acaulis*, Curt. Mag. t. 52. Engl. Bot. t. 1594, is one of the moſt common in gardens, but requires rather a pure air. G. *verna*, nearly allied to it in habit and beauty, ſee Engl. Bot. t. 493, though wild in the mountainous parts of Durham, and abundant on the Swiſs and Italian Alps, will ſcarcely live in a garden at all. G. *Pneumonanthe*, ibid. t. 20, found on turfy heaths in many places, is likewiſe very handſome, and rather impatient of culture. We have never ſeen the culture of the annual kinds attempted; ſuch are *nivalis*, Engl. Bot. t. 896; Amarella, t. 236; and *campeſtris*, t. 237.

Linnæus was by no means well acquainted with the different ſpecies of this genus, having never viſited the more ſouthern alps of Europe, where alone they are to be ſtudied to advantage. Hence his *verna* and *bavarica* are one ſpecies, and he confounded with *lutea*, which he ſeems never to have ſeen, or at leaſt to have afterwards forgotten, the G. *floribus terminantibus diaphanis*, Gmel. Sib. v. 4. 106; G. *algida*, Pallas. Roſſ. t. 95. Hence the erroneous remark under *lutea*, "petala punctis ſparſis creberrimis, flava." There is ſome doubt whether G. *ſeptemfida*, Sims in Curt. Mag. t. 1229, be the ſame as Pallas's t. 92. f. 3. In the former the flower appears to us very rarely, if ever, with more than five diviſions, nor do the habits of the two figures accord. Willdenow has fifty-ſix ſpecies of *Gentiana*, ſome of which among the annual kinds we are not able to determine to our ſatisfaction. He quotes a monograph by Froelich, which appears to have great merit, but which has not come to our hands.—Six ſpecies only of this genus are wild in Britain, the *Chlora* and *Chironia* being now, with the greateſt poſſible propriety, ſeparated from it.

GENTIANA, in *Gardening*, compriſes plants of the hardy, herbaceous, perennial, flowery kind; of which the ſpecies cultivated are the yellow gentian (G. *lutea*); ſpotted flowered gentian (G. *punctata*); ſwallow-wort-leaved gentian (G. *aſclepiadea*); and the dwarf gentian, or gentianella.

Method of Culture.—In the three firſt ſorts it is eaſily effected by ſowing the ſeeds in pots ſoon after it is ripe, as when kept till ſpring it will not ſucceed: the pots ſhould be placed in a ſhady ſituation, and kept clean from weeds. Some adviſe their being ſown where they are to remain, but the firſt is probably the beſt method. In the ſpring the plants appear, when they muſt be duly watered in dry weather, and kept clean from weeds till the following autumn; then be carefully ſhaken out of the pots, ſo as not to break or injure their roots; and a ſhady border of loamy earth ſhould be well dug and prepared to receive them, into which they ſhould be put at about ſix inches diſtance each way, the tops of the roots being kept a little below the ſurface of the ground, and the earth preſſed cloſe to the roots. If the following ſpring prove dry, they ſhould be duly watered to forward their growth. The plants may remain here two years, by which time they will be fit to tranſplant where they are deſigned to grow, removing them in the autumn as ſoon as their leaves decay; great care being taken in digging them up not to cut or break their roots, as that greatly weakens them. They require afterwards no other culture but to dig the ground about them early in the ſpring before they begin to ſhoot, and in the ſummer to keep them clean from weeds. The roots continue many years, but the ſtalks decay every autumn;

the ſame roots not flowering two years together, or ſeldom oftener than every third. When they flower ſtrong, they have, however, a fine appearance among other ſimilar plants.

In reſpect to the laſt ſort it is moſtly propagated by offſets or parting the roots, and planting them where they are to remain in the early autumn; but in order to have the plants flower well, they ſhould not be often tranſplanted or parted. And they are alſo capable of being raiſed from ſeeds managed in the ſame way as in the firſt kinds.

All theſe plants ſucceed the moſt perfectly in moiſt loamy ſoils, where there is a degree of ſhade afforded.

They are uſeful as ornamental plants, for the clumps, borders, and quarters of pleaſure-grounds; thoſe of low growth being planted towards the fronts, and the latter kinds more backward in them.

Gentiana, *Gentian*, in the *Materia Medica*. The root, which is the only medicinal part of the plant, has little or no ſmell, but to the taſte it manifeſts great bitterneſs; a quality which is extracted by aqueous, ſpirituous, and vinous menſtrua, though not in ſo great a degree by water as by ſpirit; and the extract of this root, prepared from the watery infuſion, is leſs bitter than that made from the ſpirituous tincture. Gentian is the principal bitter now employed by phyſicians; and as the intenſe bitters are generally admitted to be not only tonic and ſtomachic, but alſo anthelmintic, antiſeptic, emmenagogue, antiarthritic, and febrifuge, this root has a better claim to the poſſeſſion of theſe powers than moſt of this kind. Many diſpeptic complaints, though ariſing from debility of the ſtomach, are more effectually relieved by bitters than by Peruvian bark; and hence may be inferred their ſuperior tonic power on the organs of digeſtion; but we are told by Dr. Cullen (Mat. Med. vol. ii.) that the gentian, joined with equal parts of tormentil or galls, conſtantly ſucceeded in curing intermittents, if given in ſufficient quantity. As a ſimple bitter the gentian is rendered more grateful to the ſtomach by the addition of an aromatic: and for this purpoſe orange-peel is commonly employed. The officinal preparations of this root are, the "infuſum gentianæ compoſitum," and "tinctura gentianæ compoſita," (Ph. Lond.) and the "infuſum amarum," "vinum amarum," "tinctura amara," ſive "elixir ſtomachicum" (Ph. Ed.) which latter is ſaid by Dr. Cullen to be the ſame as Stoughton's elixir, (ſee *Stomachic* Elixir) and by both Pharmacopœias the extract is directed. The "compound infuſion" is prepared by taking gentian root ſliced and orange-peel dried, of each a dram, of freſh lemon-peel two drams, and boiling water twelve ounces; and macerating for an hour in a covered veſſel, and then ſtraining the liquor. For the "tincture," take of gentian root dried, two ounces, orange-peel dried, an ounce, cardamom ſeed bruiſed, half an ounce, and proof ſpirit two pints; macerate for fourteen days, and ſtrain. For the "extract," take of gentian-root ſliced, a pound, and boiling water, a gallon; macerate for twenty-four hours, then boil down to four pints; ſtrain the hot liquor, and evaporate it to a proper conſiſtence. The extracts are made into pills, with or without aromatic additions. Wines and malt liquors are likewiſe impregnated with the virtues of this root in different proportions. An ounce of the gentian root, the ſame quantity of freſh lemon-peel, and two drams of long pepper, communicate by maceration, without heat, a grateful warmth and bitterneſs to a quart of mountain. There is an Indian gentian brought from America by the Portugueſe, of a pale yellowiſh colour, jointed and marked with knots and circles like ipecacahuna, more intenſely bitter than any of the officinal bitter drugs. This root is greatly commended in obſtinate intermittents, and other diſorders; a ſcruple is ſaid to be more effectual than repeated half drams of bark.

There was a mixture of henbane root brought over ſome years ago with the common gentian, which occaſioned violent diſorders, and in ſome inſtances proved fatal.

This root is of a paler colour than gentian, and its longitudinal wrinkles finer and cloſer; the poiſonous root, when cut, appears white, without any degree of the yellow hue, which is deep in gentian; and its taſte is not bitter, but mucilaginous. Phil. Tranſ. vol. xlv. p. 240. Lewis's Mat. Med. Woodville's Mat. Med.

Gentian *Water*. See Water.

GENTIANÆ, the forty-ſixth natural order of plants in Juſſieu's ſyſtem, or the thirteenth of his eighth claſs, ſo named from the principal genus contained in it. The character of this eighth claſs is *Cotyledons* two. *Flowers* of one petal, inſerted below the germen, regular or irregular. *Calyx* of one leaf. *Stamens* of a definite number, inſerted into the corolla, and uſually alternate with its diviſions, when they agree in number. *Germen* ſuperior, ſimple; ſtyle one, (ſometimes none in the *Apocineæ*, with a double germen); ſtigma ſimple or divided. *Fruit* ſuperior, conſiſting either of naked ſeeds, or for the moſt part encloſed, either in a pulpy or a capſular ſeed-veſſel, of one or many cells.

The characters of the *Gentianæ* are theſe. *Calyx* divided, permanent. *Corolla* regular, often withering before it falls, with a limb equally divided, whoſe ſegments agree in number with thoſe of the calyx and are moſt commonly five, ſometimes oblique. *Stamens* as many, inſerted into the middle or upper part of the corolla; anthers incumbent. *Style* one, or rarely, by ſplitting, double; ſtigma ſimple or lobed. *Capſule* ſimple or of two parts, of two valves, and one or two cells, the valves inflexed at the margin, involute where there is but one cell, flat and conſtituting the partition where there are two. *Seeds* numerous, ſmall, inſerted into a marginal receptacle connected with the valves. *Stem* herbaceous, rarely ſomewhat ſhrubby. *Leaves* oppoſite, moſtly undivided and ſeſſile; floral ones occaſionally ſmaller, reſembling bracteas, the flowers in ſuch caſe becoming, as it were, doubly bracteated.—The firſt ſection has a ſimple capſule, of one cell, and contains *Gentiana*, *Lita* of Schreber (*Vohiria* of Aublet,) *Picrium* of Schreber (*Coutoubea* of Aublet), *Swertia* and *Chlora*; the ſecond, with a ſimple capſule of two cells, contains *Exacum*, *Liſianthus*, *Myrmecia* of Schreber (*Tachia* of Aublet), *Chironia* and *Nigrina*; the third with a didymous or two-lobed capſule of two cells, contains only *Spigelia* and *Ophiorrhiza*. In a fourth ſection ſtands as a kin to this order, by itſelf, *Nicandra* of Schreber (*Potalia* of Aublet.) The plants of this natural order are chiefly remarkable for their intenſe bitterneſs, and conſequent ſtomachic virtues. Their flowers are uſually beautiful, either blue, yellow or red, ſcarcely white, except by occaſional variation of the blue or red.

GENTIANELLA, in *Gardening*, the common name of the dwarf gentian, and which properly ſignifies the *little gentian*, which has a broad leaf and large flower. See Gentiana.

GENTILE, Gentilis, a pagan, or perſon who adores falſe gods. The Hebrews applied the name גוים, *gentes*, *nations*, to all the people of the earth who were not Iſraelites or Hebrews.

Some will have it that the gentiles were thus called in contradiſtinction to the Jews, becauſe the latter had a poſitive law to obſerve in matters of religion, whereas the gentiles had only the natural law: hence they are called "gentiles, quia ſunt uti geniti fuerunt," becauſe they remain as in a ſtate of nature.

The Jews apply the denomination gentiles much as the Chriſtians do that of infidels. St. Paul is called the *doctor*, or *apoſtle of the gentiles*, which appellation he firſt gave himſelf, Rom. xi. 13. "As I am the apoſtle of the gentiles, I magnify mine office."

The calling of the gentiles to Chriſtianity had been predicted in the Old Teſtament, as it was accompliſhed in the New. See Pſal. ii. 8. Iſa. ii. Joel ii. 29. Matth. viii. 11. xii. 18. Acts, xi. 18. xiii. 47, 48. xxviii. 28. Rom. i. 5. iii. 29. xi. 12, 13. 25. Eph. ii. 11. Rev. xi. 2. xxii. 2.

Some account may not be improperly given in this place of the ſtate of Chriſtianity both before and after the time of Conſtantine's converſion. The oppoſition of the Jews to its reception and prevalence appears in the Acts of Apoſtles, and the epiſtles of the New Teſtament. Our preſent object is to conſider, firſt, the ſtate of its progreſs in gentile countries, and under heathen emperors, from about the middle of the firſt century, when it began to be preached among the gentiles, and to make ſome progreſs among them, to the period when Conſtantine embraced the Chriſtian religion; and, ſecondly, its ſtate under the Chriſtian emperors, and their treatment by the gentiles. In the former period, we find from St. Luke's account in the Acts of the Apoſtles (ch. xiv. 19, 20. ch. xvi. 19—24.) that St. Paul met with ſome difficulties in preaching the goſpel in gentile cities; but no imperial edicts were iſſued againſt the Chriſtians, before that of Nero in the year of Chriſt 64 or 65, at which time the two apoſtles, Peter and Paul, were put to death. For an account of the *ten* perſecutions, as they have been uſually reckoned, which the Chriſtians ſuffered under heathen emperors, we refer to the article Persecution. Theſe perſecutions were ordered by edicts of emperors, beginning with Nero's and ending with Diocleſian's. During the whole of this period Chriſtianity had been in a ſtate of perſecution. At the commencement of the ſecond period, in 313, Conſtantine and Licinius iſſued a law or edict, giving liberty to all men, Chriſtians and others, to follow that way of worſhip which ſhould be moſt agreeable to them. However, it appears that Conſtantine did not ſtrictly obſerve his own edict; for, according to the utmoſt of his power, by various methods, by laws, inſtitutions, rewards and encouragements, he endeavoured to root out the ancient religion, and to promote the Chriſtian doctrine. Conceiving that neither he nor the Roman empire could be ſafe, as long as the ancient ſuperſtition ſubſiſted, he openly oppoſed the gods of the gentiles, and their worſhip, as dangerous to the public welfare. After the death of Conſtantine in the year 337, the whole empire was divided between his ſons. Conſtans, with whom his brother Conſtantius concurred, paſſed a law in 341, ordering ſuperſtition to ceaſe, and the madneſs of ſacrificing to be aboliſhed; under the menace of a proper and convenient puniſhment. This law was followed by another law of Conſtans in the next year, 342, forbidding the demolition of temples, which ſtood without the walls of the city of Rome. Another law, which was the firſt of Conſtantius, and paſſed, as it has been ſuppoſed, in the year 353, ordained that in all places, and in all cities, temples ſhould be immediately ſhut up, and that the people ſhould abſtain from ſacrifices, under the penalty of death and the confiſcation of their eſtates to the treaſury. The ſecond law of Conſtantius, in the ſame year, prohibited nocturnal ſacrifices; and a law, publiſhed by the ſame emperor in the year 356, appointed capital puniſhment to ſuch as were convicted of performing ſacrifices or worſhipping images. Three other laws of Conſtantius were alſo publiſhed in the year 356 or 357, with the penalty of death againſt all who conſulted any of the maſters of divination, who are enumerated under their ſeveral titles of haruſpices, mathematicians, Chaldæans, harioli, augurs, vates, and magicians. The emperor Julian is well known for his zeal in favour of gentiliſm, and for his injurious treatment of the Chriſtians. At his acceſſion we may reaſonably ſuppoſe, that all the laws of preceding Chriſtian emperors againſt gentiliſm and its rites, were abrogated, and that it was actually eſtabliſhed by imperial edicts; whilſt Chriſtians were deprived of magiſtracy, and all honours and dignities, as well as alſo of equal rights of citizenſhip. The emperors Jovian, Valentinian, and Valens were Chriſtians; and they encouraged their ſubjects in the profeſſion of Chriſtianity, and protected them in the enjoyment of the privileges conferred upon them by Conſtantine: but it does not appear that during this period any new laws were iſſued againſt gentiles and their ſacrifices. Jovian, indeed, publiſhed a law of univerſal toleration; and Valentinian was remarkable for the moderation of his government. In the year 381 was iſſued a law of Theodoſius, with the joint authority of Gratian, and the younger Valentinian, enacting, that apoſtates from Chriſtianity to paganiſm ſhould loſe the power of making a will. This law was afterwards ratified, and followed by other laws of Theodoſius the Great, Valentinian the Younger, Arcadius, Honorius, and Theodoſius II., with the addition of other clauſes. In the ſame year, 381, and by the ſame authority, was enacted a law, forbidding all ſacrifices in the way of divination, either by day or by night, in the temples or elſewhere, upon the pain of proſcription. By another law of Theodoſius, in the following year, the magnificent temple in the province of Oſrhoené, or Edeſſa, was allowed to be open, and to be frequented, provided no ſacrifices were performed there. In 385 Theodoſius publiſhed another law, forbidding ſacrifices, eſpecially ſuch as were made in the way of divination, and for diſcovering futurities, upon pain of death. In 391 was publiſhed a law of Theodoſius, in which all ſacrifices of innocent victims, and acceſs to the temples, and the worſhip of ſenſeleſs images, are prohibited. This law was particularly deſigned for Rome and Italy; and in the ſame year a ſimilar law was publiſhed for Egypt, forbidding ſacrifices and acceſs to temples. In 392 was publiſhed a ſevere law of Theodoſius, forbidding to men of all ranks every kind of heatheniſh worſhip; and in 399 Arcadius publiſhed a law for deſtroying temples in country places. Several other laws were publiſhed by Theodoſius the younger againſt all Pagan oblations and ſacrifices, and ordering the deſtruction of chapels, temples, and conſecrated places. Nevertheleſs gentiliſm ſtill ſubſiſted. Upon the whole it may be obſerved, that the period of 20 or 25 years, from the death of Conſtantius to the acceſſion of Theodoſius, or thereabout, is remarkable for the mildneſs with which the gentiles were treated, and the few laws that were iſſued againſt them; and theſe laws againſt gentiliſm were not rigorouſly executed; but many gentiles were admitted into civil offices of great truſt and profit; and many inſtances occur, which evince the moderation of Chriſtian magiſtrates under Chriſtian emperors; and, indeed, it is true both with reſpect to Chriſtians and gentiles, that all wiſe and underſtanding men, of every ſect and religion, recommended moderation, and concurred in condemning force and compulſion in religious matters. See more on this ſubject in Lardner's Works, vol. ix. 98—218.

Gentile, *Gentilis*, in the Roman *Law* and *Hiſtory*, a name which ſometimes expreſſes thoſe whom the Romans otherwiſe call Barbarians; whether they were allies of Rome, or not. In which ſenſe the word occurs in Ammianus, Auſonius, and the Notitia Imperii.

Gentilis was alſo uſed, in a more peculiar ſenſe, for all ſtrangers, or foreigners, not ſubject to the Roman empire; as we ſee in the Theodoſian Code, in the title "De Nuptiis Gentilium;" where the word gentiles ſtands oppoſed to *provinciales*, or the inhabitants of the provinces of the empire.

The word is likewiſe uſed, in this ſenſe, in the Greek; but it was not introduced either into that, or the Latin tongue, till after Chriſtianity was eſtabliſhed; it being taken from ſcripture. See Esquire and Gentleman.

GENTILESCHI, Orazio, in *Biography*, a painter, born at Piſa in 1563. His parental name was Lomi, but he choſe to adopt that of his maternal uncle. He firſt learnt the art under his half brother Aurelio Lomi, but afterwards ſtudied at Rome. After diſtinguiſhing himſelf at Florence, Turin, and Genoa, he paſſed to Savoy and France, and thence was invited into England by Charles I. who gave him lodgings, and a conſiderable ſalary; and employed him in painting ceilings, &c. at Greenwich. He was alſo employed by Villiers, duke of Buckingham, at York Houſe, on a picture of himſelf and his family. After reſiding here about twelve years, he died at the age of 84 in 1647. The clearneſs and brilliancy of the ſtyle in which he painted may be ſeen to the greateſt perfection in a picture at Hampton Court of Joſeph and Potiphar's wife. He made king Charles a preſent of a large book of drawings, and was deſervedly reſpected and admired for his abilities.

Gentileschi, Artemisia, daughter of Orazio, and his pupil, who obtained almoſt as much ſkill and credit as her father. She followed him to England, where ſhe practiſed in portraits with great ſucceſs. She alſo exerciſed her talents in hiſtorical painting, and has left many highly creditable works behind her.

Her picture of Judith with the head of Holofernes at St. James's palace, is in the ſame ſtyle of deſign as her father's, but though very ſkilful, is not ſo bright, or ſo finely wrought as his pictures uſually are. After the death of Orazio, ſhe retired to Naples, where Graham ſays ſhe became as famous for her amours as for her ſkill in painting. She died in 1642.

GENTILI, Alberico, was born in 1550, at Caſtel S. Geneſio, in the marche of Ancona. He ſtudied the law, and took his degrees at the univerſity of Perugia, and was prætor at Aſcoli, when his father, becoming a convert to the reformed religion, determined to quit Italy, and take with him his ſons Alberico and Scipio. The former, the ſubject of this article, came to England, and in 1582 was choſen profeſſor of juriſprudence in the univerſity of Oxford, which he held with much reputation till his death in 1608. He was a man of great learning, and publiſhed various works. One, entitled "Six Dialogues on the Interpreters of Law," he dedicated to his patron the earl of Leiceſter. He is author of three books "De Jure belli," which are highly applauded by Grotius: of three others "De Legationibus," and ſeveral tracts relative to antiquities. His "Lectiones Virgilianæ" prove that he had cultivated polite literature very ſucceſsfully. Bayle.

Gentili, Scipio, brother of the preceding, was born in 1563, and, while a child, was ſent to Tubingen for his education. Here he diſtinguiſhed himſelf in the ſtudy of the claſſics and juriſprudence, which he afterwards purſued with increaſing ſucceſs at the univerſities of Wittemberg and Leyden. In 1589 he took his degree of doctor at Baſil, and then went to Wittemberg as a public expounder of the law. Shortly after he removed to Altdorf, and became principal profeſſor of law. His fame extended very far, and he received invitations to ſettle at ſeveral univerſities, and one from pope Clement VIII. to ſettle at Bologna, which he declined. He died at Altdorf in 1616, leaving behind him many works as monuments of his deep erudition. Theſe were afterwards collected and printed in 8 vols. 4to.; they are chiefly on ſubjects connected with juriſprudence. As a teacher, his manner was clear and intereſting. He was a good Latin poet, and tranſlated ſeveral of the Pſalms, and the firſt two cantos of Taſſo's Jeruſalem. Bayle.

GENTILIS, Gentilis, was born at Foligni, in Italy, about the year 1230. He ſtudied medicine under the tuition of Thaddeus of Florence, with great diligence and reputation, ſo that on his return to his native place he was regarded by his fellow-citizens as the firſt phyſician of the time; and his fame ſoon extended through Italy. He was alſo eſteemed one of the beſt commentators upon Avicenna, whoſe writings were then held in high veneration in moſt of the univerſities of Europe. Gentilis died at Bologna about the year 1310, and left ſeveral treatiſes, which were collected and publiſhed at Venice, in four volumes folio, in 1484, 1486, and 1492. The following works were likewiſe printed ſeparately: 1. "Expoſitiones in textu Avicennæ."—2. "De Febribus," Venice, 1484.—3. "Expoſitio cum Commento Ægidii Monachi Benedictini Libri de Judiciis Urinarum, et Libri de Pulſibus." Ibid. 1494.—4. "Conſilia peregregia ad quævis morborum totius corporis genera," with ſome other tracts, Venice, 1503.—5. "Quæſtiones et Tractatus extravagantes." Ibid. 1520.—6. "De Lepra Tractatus." Ibid, 1536, with the ſurgery of Dinus de Garbo.—7. "De proportionibus Medicinarum," with different diſſertations upon the ſubject of doſes of medicines by the moſt celebrated phyſicians, Padua 1556, &c. See Eloy. Dict. Hiſt.—Several other individuals of the family of Gentilis were diſtinguiſhed for their knowledge of medicine and the ſciences.

Gentilis, John-Valentine, was born at Coſenza in Calabria. Educated in the principles of the Roman Catholic religion, and becoming a convert to the principles of the Reformation, he was obliged to quit his native country, and take refuge in Geneva, where ſeveral Italian families had already formed a congregation. His enquiries did not ſtop by the open renunciation of papal errors; he became diſſatisfied with the orthodox doctrine of the Trinity. He was required to ſubſcribe to the articles of faith which the perſecutor John Calvin had eſtabliſhed againſt hereſy, to which a promiſe was annexed, never to do any thing, directly or indirectly, that ſhould controvert the doctrine of the Trinity. At firſt Gentilis refuſed the teſt, but was afterwards prevailed on to comply, dreading probably, in caſe of his reſiſtance, a ſimilar treatment to that which Servetus had experienced. What his hand had ſigned, and his tongue confeſſed, his heart abhorred, and in private he did not ſcruple to avow the truth, which coming to the ears of the magiſtrates, they committed him to priſon. From the dungeon he attempted to expoſtulate with his perſecutors, ſhewing the inoffenſiveneſs of his opinions, but their hearts were ſteeled againſt the ſupplications of a heretic, till he offered to abjure his errors, conſented to throw his writings into the fire, and take an oath not to quit Geneva without leave of the magiſtrates. Being thus, in a meaſure, freed from ſuſpicion, and feeling conſcious that he would be juſtified in breaking an oath which had been extorted by terror, he withdrew from the city, but finding no place of ſafty he returned, was again impriſoned, but in a ſhort time liberated. From this period he ſeems to have wandered from place to place, and we find him at Lyons, in various parts of Poland and Germany, in Savoy, and at laſt of Bern, where he was accuſed of hereſy. He underwent a long and tedious trial, and being convicted of obſtinately oppugning the myſtery of the Trinity, he was ſentenced to loſe his head. This ſentence was carried into execution, but death, which, at a greater diſtance, ſeemed ſo formidable to him, was now diſarmed of his terrors, and by a manly fortitude he was enabled to triumph over his enemies, who expected that his mind was ill-adapted to ſo trying a ſcene; his laſt moments were probably the happieſt of his life. He died exulting that he was thought worthy of ſuffering for the cauſe of truth, and that he was admitted to ſeal, with his blood, the doctrine of the ſupremacy and unrivalled glory of the Father. Moreri. Bayle.

GENTILITIA, Sacra, among the Romans. See Sacra.

GENTILITIUS, an epithet uſed by ſome authors to expreſs diſeaſes propagated from father to ſon, and running through whole families; ſuch as are more uſually called hereditary diſorders. Such are the gout very frequently, and often many others.

GENTILLET, Valentine, in *Biography*, a native of Dauphiné, who flouriſhed in the ſixteenth century. He had in early life ſtudied juriſprudence, and was a civilian by profeſſion. He was an advocate in the parliament of Toulouſe, and afterwards a ſyndic of the republic of Geneva, and at one period of his life he was preſident of the parliament of Grenoble. He became diſtinguiſhed by his writings againſt popery, but by the edicts publiſhed in France againſt thoſe of the reformed religion, he was driven into exile. His principal works are, “An Apology for the Proteſtants,” which went through ſeveral editions in the French, and was afterwards tranſlated into Latin and enlarged, under the title of “Apologia pro Chriſtianis Gallis Religionis, Evangelicæ ſeu Reformatæ, qua docetur hujus Religionis fundamenta in Sacra Scriptura jacta eſſe:” and “Le Bureau du Concile de Trente, &c.” This was printed in French in 1586, and in the ſame year a Latin tranſlation of it was publiſhed, which was frequently reprinted at different places. Its deſign is to ſhew that many of the decrees of that council were contrary to the ancient councils and canons. He was author alſo of “Anti-machiavel,” and the “Anti-ſocinus.” Bayle.

GENTIMANETOUR, in *Geography*, a town of Hindooſtan, in the Carnatic; 30 miles W. of Cuddalore.

GENTIOUX *et* Pallier, a town of France, in the department of the Creuſe, and chief place of a canton in the diſtrict of Aubuſſon; 9 miles S.W. of Felletin. The place contains 907, and the canton 6,507 inhabitants, on a territory of 327½ kiliometres, in 8 communes.

GENTLE Pit Ore, in *Mineralogy*, a name given by our miners in Suſſex, to a kind of iron ore found in conſiderable plenty in that county, and very readily running in the fire, though not over rich in metal. It is a ſtrong ſubſtance, and lies in ſeveral parts of that county in form of a moderately thick ſtratum. It is of a duſky brown colour, and in ſome places much paler than in others. It has always a great number of glittering ſpangles in it, and very often contains foſſile ſhells, and other extraneous ſubſtances in it.

GENTLEMAN, a perſon of good family, or deſcended of a family which has long borne arms, the grant of which adds gentility to a man's family.

The word is formed of the French *gentilhomme*, or rather of *gentil, fine, faſhionable*, or *becoming*; and the Saxon *mon*, q. d. *honeſtus*, or *honeſto loco natus*. The ſame ſignification has the Italian *gentilhuomo*, and the Spaniſh *hidalgo*, or *hijodalgo*, that is, the ſon of ſomebody, or of a perſon of note. If we go farther back, we ſhall find gentleman originally derived from the Latin *gentilis homo*, which was uſed among the Romans for a race of noble perſons, of the ſame name, born of free or ingenuous parents, and whoſe anceſtors had never been ſlaves, or put to death by law. Thus Cicero, in his Topics, “gentiles ſunt, qui inter ſe eodem ſunt nomine ab ingenuis oriundi, quorum majorum nemo ſervitutem ſervivit, qui capite non ſunt diminuti, &c.” Some hold that it was formed from *gentile*, i. e. *pagan*; and that the ancient Franks, who conquered Gaul, which was then converted to Chriſtianity, were called gentiles by the natives, as being yet heathens. Others relate that towards the declenſion of the Roman empire, as recorded by Ammianus Marcellinus, there were two companies of brave ſoldiers; the one called *gentilium*, and the other *ſcutariorum*; and that it was hence we derived the names gentleman and eſquire. This ſentiment is confirmed by Paſquier, who ſuppoſes the appellation *gentiles* and *ecuyers* to have been tranſmitted to us from the Roman ſoldiery; it being to the *gentiles* and *ſcutarii*, who were the braveſt of the ſoldiery, that the principal benefices and portions of lands were aſſigned. (See Benefice.) The Gauls obſerving, that during the empire of the Romans, the *ſcutarii* and *gentiles* had the beſt tenements, or appointments of all the ſoldiers on the frontiers of the provinces, became inſenſibly accuſtomed to apply the ſame names, *gentilhommes*, and *ecuyers*, to ſuch as they found their kings gave the beſt proviſions or appointments to. Paſq. Rech. lib. ii. cap. 15.

In ſtrictneſs, Chamberlayne obſerves, a gentleman is one whoſe anceſtors have been freemen, and have owed obedience to none but their prince: on which footing, no man can be a gentleman who is not born ſo.

Among us, the term gentleman is applicable to all above yeomen; ſo that noblemen may be properly called gentlemen.

In our ſtatutes, *gentilis homo* was adjudged a good addition for a gentleman, 27 Edw. III. The addition of knight is very ancient: but that of eſquire, or gentleman, was rare before 1 Hen. V.

We read that J. Kingſton was made a gentleman by king Richard II.

As it may juſtly be aſked what conſtitutes a gentleman with us? the reply is eaſy; being a gentleman, is being entitled to bear arms. And Mr. Camden obſerves, that the diſtinction of a gentleman of coat-armour, or an upſtart, and a gentleman of blood, is the bearing of arms from the grandfather; and that he who bears arms from his grandfather is to all intents and purpoſes a gentleman of blood; for which cauſe it is requiſite by the ſtatutes of the Bath that every knight, before his admiſſion, proves himſelf to be ſo qualified, which done, it carries with it, if his merit be equal, a paſſport alſo to the order of the Garter. Notitia Anglicana, p. 24. See alſo Doddridge's Honour's Pedigree, p. 147. Smith, De Republ. Angl. & Forteſcue, fol. 82.

Guillim, in his chapter of gentlemen, ſays, that they have their beginning either of blood, as being born of worſhipful parents; or that they have done ſomething, either in peace or war, whereby they deſerve to bear arms, and be accounted gentlemen. He farther ſays, chap. xxiv. if a gentleman be bound apprentice to a merchant or other trader, he hath not thereby loſt his gentility; and he deſires it may be remembered, for the honour of trade, that king Henry VIII. thought it no diſhonour to him, when he quitted his queen, to take to his wife Anne, the daughter of Thomas Bullen, ſome time mayor of London. To which may be added the thought, that the firſt William, who founded our royal race, was the grandſon of a tanner.

Sir Edward Coke ſays, that eſquires and gentlemen are only names of worſhip, and not of dignity. And before theſe the heralds rank all colonels, ſerjeants at law, and doctors in the three learned profeſſions. See Precedence.

Sir Thomas Smith (ubi ſupra) ſays, that whoſoever ſtudieth the laws of the realm, or ſtudieth in the univerſity, or profeſſeth the liberal ſciences; and (in ſhort) who can live idly, and without manual labour, and will bear the port, charge, and countenance of a gentleman, ſhall be called maſter, and ſhall be taken for a gentleman.

Gentleman *Uſher of the Black Rod,* is the chief gentleman uſher to the king, called in the black book "Lator virgæ nigræ, et haſtiarius," and elſewhere "Virgæ bajulus." His duty is to bear the rod before the king at the feaſt of St. George at Windſor; he has alſo the keeping of the chapter-houſe door, when a chapter of the order of the garter is ſitting; and in time of parliament attends the houſe of peers. His badge is a "black rod," with a lion in gold at top. This rod has the authority of a mace; and to his cuſtody all peers queſtioned for any crime are firſt committed.

Gentleman *of the Bed-chamber.* See Bed-Chamber.

Gentlemen *of the Chapel,* are officers whoſe duty and attendance are in the royal chapel, being in number thirty; ten whereof are prieſts, and the other twenty called *clerks of the chapel,* who aſſiſt in the performance of Divine ſervice. One of the firſt ten is choſen for confeſſor of the houſhold, whoſe office it is to read prayers every morning to the houſhold ſervants; to viſit the ſick, examine and prepare communicants, and adminiſter the ſacrament.

Another, well verſed in muſic, is choſen firſt organiſt: who is maſter of the children, to inſtruct them in muſic, and what is neceſſary for the ſervice of the chapel: a ſecond is likewiſe an organiſt; a third a luteniſt; and a fourth a violiſt.

There are likewiſe three vergers, ſo called from the ſilver rods they uſually carry in their hands; being a ſerjeant, yeoman, and groom of the veſtry: the firſt attends the dean and ſub-dean; finds ſurplices and other neceſſaries for the chapel: the ſecond has the whole care of the chapel; keeps the pews, and ſeats the nobility and gentry; the groom has his attendance within the chapel-door, and looks after it.

Gentlemen *Penſioners.* See Pensioners.

GENTLEN, in *Geography,* a town of Germany, in the duchy of Magdeburg; 30 miles N.E. of Magdeburg.

GENTLEWOMAN, Generosa, is a good addition for the eſtate and degree of a woman, as *generoſus* is for that of a man; and if a gentlewoman be named ſpinſter in any original writ, appeal, &c. it hath been held that ſhe may abate, and quaſh the ſame. (2 Inſt. 668.) But it ſeems that ſpinſter is in general a good addition for an unmarried woman, as ſingle woman is for one who, being unmarried, hath had a baſtard.

GENTOOS, in *Modern Hiſtory,* according to the common acceptation of the term, denote the profeſſors of the religion of the Bramins (ſee Brachmans), who inhabit the country called Hindooſtan, in the Eaſt Indies, from the word *ſtan,* a *region,* and *hind* or *hindoo*; which Feriſhteh, as we learn from colonel Dow's tranſlation of his Hiſtory, ſuppoſes to have been a ſon of Ham, the ſon of Noah. It is obſerved, however, that Hindoo is not the name by which the inhabitants originally ſtyled themſelves, but according to the idiom of the Shanſcrit, which they uſe, *jumbodeep,* from *jumboo,* a *jackall,* an animal common in their country, and *deep,* a large portion of land ſurrounded by the ſea, or *bhertekhunt,* from *khunt,* i. e. a *continent,* and *bherrut,* the name of one of the firſt Indian rajahs. It is alſo obſerved, that they have aſſumed the name of Hindoos only ſince the era of the Tartar government, to diſtinguiſh themſelves from their conquerors, the Muſſulmen. The term *Gentoo,* or *Gent,* in the Shanſcrit dialect, denotes *animal* in general, and in its more confined ſenſe *mankind,* and is never appropriated particularly to ſuch as follow the doctrines of Brhima. Theſe are divided into four great tribes, each of which has its own ſeparate appellation; but they have no common or collective term that comprehends the whole nation under the idea affixed by the Europeans to the word Gentoo. Mr. Halhead, in the preface to his tranſlation of the "Code of Gentoo Laws," conjectures that the Portugueſe on their firſt arrival in India, hearing the word frequently in the mouths of the natives, as applied to mankind in general, might adopt it for the domeſtic appellation of the Indians themſelves, or, perhaps, their bigotry might force from the word Gentoo a fanciful alluſion to gentile or pagan. The Hindoos, or Gentoos, vie with the Chineſe as to the antiquity of their nation. They reckon the duration of the world by four jogues, or diſtinct ages; the firſt is the Suttee jogue, or age of purity, which is ſaid to have laſted about 3,200,000 years, during which the life of man was 100,000 years, and his ſtature twenty-one cubits; the ſecond, the Tirtah jogue, or the age in which one-third of mankind were reprobate, which conſiſted of 2,400,000 years, when men lived to the age of 10,000 years; the third, the Dwapaar jogue, in which half the human race became depraved, which endured to 600,000 years, when mens' lives were reduced to 1,000 years; and fourthly, the Collee jogue, in which all mankind were corrupted, or rather diminiſhed, which the word *colle* imports. This is the preſent era, which they ſuppoſe will ſubſiſt for 400,000 years, of which near 5,000 are already paſt, and man's life in this period is limited to 100 years. It is ſuppoſed by many authors, that moſt of the Gentoo *ſhaſters* or ſcriptures, were compoſed about the beginning of the collee jogue or cal jug, of which, according to Mr. Dow, the year of Chriſt 1769 was the 4887th; but an objection occurs againſt this ſuppoſition, *viz.* that the ſhaſters take no notice of the deluge; to which the Bramins reply, that all their ſcriptures were written before the time of Noah, and the deluge never extended to Hindooſtan. Nevertheleſs it appears from the ſhaſters themſelves, that they claim a much higher antiquity than this; inſtances of which are recited by Mr. Halhead.

After all, it muſt be allowed, that perſons of ſagacity and good judgment have made it appear with ſufficient evidence, that the oldeſt accounts of the Hindoo nation do not, in reality, go further back than to the deluge mentioned in the books of Moſes, and that their religious inſtitutions were conſequently poſterior to that event. Sir William Jones ſays, (Diſſertations relating to Aſia, vol. i. p. 199.) that the firſt corruption of the pureſt and oldeſt religion, which conſiſted in the worſhip of one God, the maker and governor of all things, was the ſyſtem of the Indian theology, invented by the Bramins, and prevailing in thoſe territories, where the book of Mahabad, or Menu, is at this time the ſtandard of all religious and moral duties. In his preface to the "Inſtitutions of Menu," (ſee Menu) he ſays, they are ſuppoſed by the Bramins to have been promulgated by Menu, the ſon or grandſon of Brahma, or the firſt of created beings. This work he ſuppoſes to have been written about 300 years after the Vedas, or about 1280 years B. C. Sir W. Jones is of opinion, that the origin of the Hindoo nation and government is to be looked for in Iran, or Perſia, where a great monarchy was eſtabliſhed before the Aſſyrian, called by the oriental hiſtorians the "Piſhdadian dynaſty;" and they ſay, that the firſt of theſe ancient monarchs, whom they call Mahabad, or Menu, received from the creator a ſacred book, in a heavenly language, meaning the “Vedas,” (Diſſ. relating to Aſia, vol. ii. p. 111.) This firſt monarch, they alſo ſay, divided the people into four orders, the religious, the military, the commercial, and the ſervile. (Diſſ. &c. vol. i. p. 197. 206.) In the reign of Huſhang, the third of the Piſhdadian race, a reformation, he ſays, was made in the religious ſyſtem, when the complex polytheiſm of the preceding times was rejected, and religion was reduced to what is called “Sabaiſm,” which conſiſted chiefly in the worſhip of the ſun, moon, and ſtars; but it is probable, that ſabaiſm, being a more ſimple form of religion than that of the Hindoos, muſt have preceded it. The laws of Mahabad, however, were retained, and his ſuperſtitious veneration for fire. Upon this change, the favourers of the old religion retired to Hindooſtan, and their oldeſt exiſting laws forbad them ever to return, or to leave the country they now inhabit.

Another reformation, or change, in the ſyſtem, was made, he ſays, under Guſhtaſp, in the next, or “Kaianite dynaſty,” thought to have been the ſame with Darius Hyſtaſpis. This was effected by Zeratuſht, or Zoroaſter; he introduced genii, or angels, preſiding over months and days, new ceremonies in the veneration ſhewn to fire, and gave out a new work, which he ſaid came from heaven, but at the ſame time eſtabliſhed the adoration of the Supreme Being. This work was loſt at the conqueſt of Perſia by the Mahometans; but the prieſts of that religion have compoſed another from what they were able to recollect of their inſtitution. It is called “*Zendaveſta*,” which ſee. The followers of Zeratuſht, now called “Gebres,” or Parſis,” perſecuted thoſe of the religion immediately preceding, and theſe alſo took refuge in India, where they wrote a number of books, which are now very ſcarce. They reſemble, according to the account of ſir William Jones, the Hindoo ſects of “Sauras,” and “Saguinas,” of which the laſt is very numerous at Benares.

Another innovator in the religion of the Eaſt, before the Chriſtian era, was “Budda,” (ſee Boodh), generally ſuppoſed to have been the ſame with the Fo (ſee Fo) of the Chineſe, the “Somonocodom” of Siam, the “Xaca” of Japan, and the “Odin” of the north of Europe. According to ſir W. Jones, he diſapproved of the Vedas, becauſe they enjoined the ſacrifice of cattle; and made his appearance in the year 1027 B. C. His diſciples are thought to have been the ſame with the “Sammanes,” who were oppoſed to the Brachmans of the Greek hiſtorians. But theſe Sammanes were, it is probable, of much greater antiquity, as was alſo Somonocodom. The followers of Budda gave great umbrage to the Bramins, who never ceaſed to perſecute them till they had effected their extirpation from Hindooſtan by fire and ſword, about 500 years ago. There is, however, a great reſemblance between the ſyſtem of the Hindoos and that of Budda; and perhaps with a view to conciliate theſe people, the Bramins of Caſi make Budda the 9th *avatar* or transformation of Vichnow. This religion is that which prevails in India beyond the Ganges; it was received in China A. D. 65, and is eſtabliſhed in Japan. A religion, very ſimilar to this, is alſo that of the Lamas of Thibet. Indeed, all deviations from the original Hindoo ſyſtem, retained the ſame general principles. The advocates of them all held the doctrine of the pre-exiſtence of ſouls, their ſubſiſting and acting independently of bodies, and their tranſmigration into other bodies after death. They had the ſame low opinion of matter, and the ſame veneration for the elements of fire and water, as purifiers of the ſoul. They had ſimilar reſtrictions with reſpect to food, the ſame addictedneſs to divination, and the ſame idea of the uſe of corporeal auſterities for the expiation of ſin.

There can be no doubt of the very high antiquity of the religion of the Hindoos, and it is not improbable that the commencement of all thoſe ſyſtems which deviated from the religion of the patriarchs, preſerved in the writings of Moſes, was prior to the general diſperſion of mankind. A ſyſtem ſo ancient as that of the Hindoos muſt have been formed about the ſame time with that of the Egyptians, from which that of the Greeks, and other weſtern nations, was in ſome meaſure derived; and accordingly many points of reſemblance have been obſerved between them; too many, and too ſtriking to have been altogether fortuitous. Even ſome of the inhabitants of Ethiopia appear to have been of the ſame origin with thoſe of Hindooſtan (ſee Diſſ. relating to Aſia, vol. i. p. 112.); and both the Egyptians and Ethiopians ſeem to have had ſome connection or intercourſe with the Hindoos; but of what kind it was, or when it ſubſiſted, we have no certain account; and they have been ſo long ſeparated, that at preſent they are in total ignorance of each other. According to Euſebius and Syncellus, ſome people from the river Indus ſettled in the vicinity of Egypt in the reign of Amenophis, the father of Seſoſtris, and many Egyptians, baniſhed by their princes, ſettled in other countries, and ſome went ſo far as India. It is alſo ſuppoſed, that many of the prieſts of Egypt left the country on the invaſion of it by Cambyſes. But ſuch circumſtances as theſe are not of themſelves ſufficient to account for the great reſemblance between the two ſyſtems. The Hindoos themſelves ſay, that their ſacred books came from the weſt, (ſee Ezourvedam, p. 15—17.) But the Hindoos, as well as their books, moſt probably came from that quarter, and their ſacred books were compoſed while the ſeat of the empire was in Perſia. The affinity of the Egyptians and Hindoos may be inferred from the ſimilarity that ſubſiſts between ſome Egyptian words and thoſe that occur in the ancient language of Hindooſtan. The names and figures of the 12 ſigns of the zodiac, among the Hindoos, are nearly the ſame with ours, which came from Egypt through Greece, and each of theſe is divided into 30 degrees. Moreover, both the Egyptians and Hindoos had alſo the ſame diviſion of time into weeks, and they denominated each day by the names of the ſame planets. The reſemblance between the oriental and occidental ſyſtems extends much farther than Egypt. The office and power of the Druids in the northern parts of Europe did not differ much from thoſe of the Bramins; and the Etruſcans, from whom the Romans derived the greateſt part of their learning and religion, had a ſyſtem very much reſembling that of the Perſians and Indians, and they wrote alternately to the right hand and left. (See Etruscans.) Several remarkable “general principles” were held alike by the ancient Egyptians and the modern Hindoos. They both believed that the ſouls of men exiſted in a prior ſtate, and that they go into other bodies after death. They had the ſame ideas of the body being a priſon to the ſoul, and imagined that they could purify and exalt the ſoul by the mortification of the body; and from the idea of the great ſuperiority of ſpiritual to corporeal ſubſtances, they held all matter in great contempt. They alſo both believed that plants had a principle of animation. Several religious ideas and cuſtoms were common to both countries. The Egyptians of Thebais repreſented the world under the figure of an egg, which proceeded from the mouth of Cneph; and this reſembled the firſt production according to the Hindoo ſyſtem. Several of the Egyptian deities were both male and female, which correſponds to the figure of the “lingam” with the Hindoos. This obſcene figure, or at leaſt the “phallus,” was much uſed in the Egyptian worſhip, and from Egypt it was carried into Greece, where it was uſed in the myſteries of Bacchus. Beſides, the laſcivious poſtures of the Egyptian women before their god Apis, were the ſame with thoſe of the Hindoo women, before their idols, (ſee BRACHMANS): and, moreover, the Hindoos chuſe their ſacred bulls by the ſame marks that were uſed by the Egyptians. The Egyptians worſhipped the Nile, as the Hindoos do the Ganges: the pyramidal or conical form of the Egyptian temples reſembled that of the pagodas: and the onion, which was held in veneration by the Egyptians, is not eaten by the Hindoos. Beſides this reſemblance of general principles, and religious cuſtoms, it is obſervable, that the Hindoos, Egyptians, and Greeks adopted the ſame gods, and paid homage to them under ſimilar repreſentations or images. The Egyptians held cows in much greater veneration than any other animal: they were ſacred to Iſis, and never ſacrificed. That the cow was reſpected by the Hindoos is well known. Upon the whole, it is undeniable that a ſyſtem, very ſimilar to that of the preſent Hindoos, muſt have been of very great antiquity, and prior to the general diſperſion of mankind. For though ſimilar ſituations may lead to ſimilar ſentiments, and correſponding practices, the above-mentioned ſimilarity, which might be traced in a much greater number of inſtances, extends to too many particulars, to admit our accounting for it in this way: nevertheleſs, it is impoſſible that a ſyſtem, ſo extenſive and complex, and implying ſuch abſtruſe metaphyſics, as that of the Hindoos, ſhould have been completed at a very early period. This muſt have been ſubſequent to the rudeſt age of mankind; and, therefore, we may well imagine, that it could not have had its origin long before the time of Moſes. Whether the Jewiſh law-giver was acquainted with it or not, it will appear to any candid as well as accurate examiner of the one or the other, that he was far from deriving any advantage from it; nor is there in his writings any alluſions to *books* pretended to be ſacred, ſuch as the Vedas, but only to ſuch *practices* as were common to the Hindoos and other heathen nations.

The Hindoos ſeem to have preſerved the knowledge of the Supreme Being, when the Greeks, and other more poliſhed nations in the weſtern parts of the world, had loſt ſight of him; their attention being ingroſſed by inferior objects of worſhip. Some of their deſcriptions of the deity are juſt, and truly ſublime. In the “Inſtitutes of Menu” he is ſaid to be “one whom the mind alone can comprehend, whoſe eſſence eludes the external organs, who has no viſible parts, who exiſts from eternity, the ſoul of all beings, whom no being can comprehend.” They alſo ſay, that “goodneſs is the very eſſence of God.” (See BRACHMANS.) Nevertheleſs, the moſt ſublime conceptions of Deity entertained by the Hindoos fall far below thoſe that were formed of him by the Hebrews, and which are recorded in the ſacred writings. In the Hindoo ſyſtem the firſt production of the Supreme Being was ſomething ſimilar to the chaos of Moſes, an earth covered with water; and they ſpeak of the “ſpirit of God” as moving upon it. One of the Hindoo fables, related by father Bouchet (Ceremonies of Religion, p. 38.) bears ſome reſemblance to the moſaic hiſtory of Paradiſe. The Hindoos ſay that the firſt man was called “Adam,” and the firſt woman “Manan-iva.” The Hindoos have alſo a peculiar day of the week, which they appropriate to acts of religion, as prayer and faſting: and in agreement, at leaſt in part, with the account of Moſes, the Hindoos ſay that in the firſt ages of the world men were greatly ſuperior to the preſent race both in the length of their lives, and in the powers both of body and mind; but that, in conſequence of vice, they gradually declined. The Hindoos have alſo preſerved an unequivocal tradition of an univerſal deluge; and according to the “Puranams,” books which are ſaid to contain a faithful account of their doctrines, eight perſons eſcaped the general deluge. A curious account of the intoxication of Noah, and of the behaviour of his three ſons on the occaſion, is given us from the Hindoo writings in the third volume of “Aſiatic Reſearches.” The 4th and 5th “avatar” of the Hindoos, as ſir W. Jones ſays (Diſſ. &c. v. i. p. 110.) relate to the puniſhment of impiety, and the humiliation of the proud; and refer, as he thinks, to the diſperſion from Babel. In the “Bagavadam” there are, beſides the moſaic account of the deluge, the principal circumſtances of the hiſtory of Iſhmael, and the ſacrifice of Iſaac. Several things occur in the Hindoo traditions, which greatly reſemble ſome in the hiſtory of Abraham; and Brahma, the Hindoo law-giver, very much reſembles this ancient patriarch.

The ſeveral inſtitutes contained in the collection of the Gentoo laws, which we ſhall preſently notice, are interwoven with the religion of the Gentoos, and revered as of the higheſt authority. The curious reader will diſcover an aſtoniſhing ſimilarity between the inſtitutes of this code and many of the ordinances of the Jewiſh law, between the character of the Bramins or prieſts, and the Levites; and between the ceremony of the ſcape-goat, under the Moſaic diſpenſation, and a Gentoo ceremony, called the *aſhummeed jug*, in which a horſe anſwers the purpoſe of a goat. In this code we find ſome of the more extraordinary laws and cuſtoms of the Hebrew nation, ſuch as were never received in the weſtern part of the world; as that of a man taking the widow of his brother, in order to keep up his family. Polygamy appears alſo to have been allowed to the Hindoos, as it was to the Hebrews. Many obſolete cuſtoms and uſages, alluded to in many parts of the Old Teſtament, may alſo receive illuſtration from the inſtitutes of this code. It appears from the code, that the Bramins, who are the prieſts and legiſlators of the country, have reſigned all the ſecular and executive power into the hands of another caſt or tribe; and no Bramin has been properly capable of the magiſtracy ſince the time of the ſuttee jogue; the only privilege of importance which they have appropriated to themſelves is an exemption from all capital puniſhment; they may be degraded, branded, impriſoned for life, or ſent into perpetual exile; but it is every where expreſsly ordained, that a Bramin ſhould not be put to death on any account whatſoever.

Among the Hindoos there is a conſiderable difference of opinion on the ſubject of creation; but in the following general outline they ſeem to be all agreed. They ſay, that after the Supreme Being had exiſted alone from all eternity, he reſolved to produce other beings. But this production was wholly “from his own ſubſtance;” and after a certain period, they believe that every thing will be abſorbed into him again, when he will exiſt alone as before. There will, however, be a ſucceſſion of theſe creations and abſorptions without end. At what time the firſt creation took place they do not ſay; but according to them, every thing that now exiſts has exiſted before, and will hereafter exiſt again. The great ſuperiority of the ſpiritual to the corporeal part of man is the fundamental doctrine of the Hindoo ſyſtem; and hence ſprings the ſatisfaction which the Hindoos always expreſs on the ſeparation of them. From the Indian philoſophy it is probable that the Manicheans had their idea of an original difference in ſouls, ſome being neceſſarily good, and others bad. That all nature is animated, and that the ſouls which animate the loweſt forms of things are capable of riſing to the higheſt ſtate, is aſſerted in the “Inſtitutes of Menu.”

Menu." Thus it is ſaid, "the ſouls that animate worms and inſects, ſerpents, moths, beaſts, birds and vegetables, attain heaven by the power of devotion."

The doctrine of tranſmigration is one of the diſtinguiſhing tenets of the Gentoos. With regard to this ſubject it is their opinion, according to Mr. Holwell, that thoſe ſouls which have attained to a certain degree of purity, either by the innocence of their manners, or the ſeverity of their mortifications, are removed to regions of happineſs, proportioned to their reſpective merits; but that thoſe who cannot ſo far ſurmount the prevalence of bad example, and the powerful degeneracy of the times, as to deſerve ſuch a promotion, are condemned to undergo continual puniſhment in the animation of ſucceſſive animal forms, until, at the ſtated period, another renovation of the four jogues ſhall commence, upon the diſſolution of the preſent. They imagine ſix different ſpheres above this earth, the higheſt of which, called *ſuttee*, is the reſidence of Brhimā, and his particular favourites. This ſphere is alſo the habitation of thoſe men who never uttered a falſhood, and of theſe women who have voluntarily burned themſelves with their huſbands; the propriety of which practice is expreſsly enjoined in the code of the Gentoo laws. This code, printed by the Eaſt India company in 1776, is a very curious collection of Hindoo juriſprudence, which was ſelected by the moſt experienced pundits, or lawyers, from curious originals in the Shanſcrit language, who were employed for this purpoſe from May 1773 to February 1775; afterwards tranſlated into the Perſian idiom, and then into the Engliſh language, by Mr. Halhed.

We have already obſerved, that the Hindoos are divided into four great and original tribes, which, according to the Gentoo theology, proceeded from the four different members of Brhimā, the ſuppoſed immediate agent of the creation under the ſpirit of the Almighty. Theſe tribes are the Bramins, which proceeded from his mouth, and whoſe office is to pray, read, inſtruct, and conduct the ſacrifices; the Chehteree, which proceeded from his arms, whoſe office is to draw the bow, to fight, and to govern; the Bice, proceeding from the belly or thighs, who are to provide the neceſſaries of life by agriculture and traffic; and the Sooder from the feet, which are ordained to labour, ſerve, and travel. See CAST.

Few Chriſtians, ſays the tranſlator of the Gentoo Code, have expreſſed themſelves with a more becoming reverence of the grand and impartial deſigns of Providence in all its works, or with a more extenſive charity towards all their fellow-creatures of every profeſſion, than the Gentoos. It is, indeed, an article of faith among the Bramins, that God's all-merciful power would not have permitted ſuch a number of different religions, if he had not found a pleaſure in beholding their varieties.

Mr. Holwell, and alſo Mr. Dow, attempt to exculpate the Hindoos from the charge of polytheiſm and idolatry. "Let us reſt aſſured," ſays the latter, "that whatever the external ceremonies of religion may be, the ſame infinite being is the object of univerſal adoration." But though the Hindoos acknowledge one Supreme Being, from whom all power is derived, they ſuppoſe that the immediate government of the world is placed by him in other hands. To theſe inferior deities their prayers and religious ſervices are externally addreſſed; and this worſhip is encouraged and enjoined in their ſacred books. According to their ſyſtem, there ſprung from the Supreme Being, as emanations of his divinity, an infinite number of ſubaltern deities and genii, of which every part of the viſible world was the ſeat and temple. Theſe intelligences did not barely reſide in each part of nature; but they directed its operations, each element being under the guidance of ſome being peculiar to it. Theſe inferior gods, being of various and oppoſite diſpoſition and character, their worſhippers adopted different methods of deprecating their anger, and ſoliciting their favour. Hence proceeded a great variety of whimſical and abſurd, and alſo of cruel and dreadful, as well as impure, rites. The veneration of the Hindoos for the images of their gods ſubjects them juſtly to the charge of idolatry and polytheiſm; although the learned Bramins pretend, that they do not worſhip the viſible idol, but the inviſible being repreſented by it. Mr. Sonnerat ſays that, beſides thoſe whom the Hindoos place in the rank of gods, they have alſo "ſaints," whoſe pictures they place in their temples, and that they addreſs prayers to them as well as to their gods. Nor let it be ſaid, that theſe are the accounts of travellers. In the ſacred books of the Hindoos mention is made of various divinities beſides the Supreme Being. The worſhip of the ſun, ſays ſir W. Jones (Diſſ. &c. v. i. p. 481.) is principally recommended in the Vedas. The "Inſtitutes of Menu" ſay, that "the Supreme Being created an aſſemblage of inferior deities, and divine attributes, and pure ſouls, and a number of genii exquiſitely delicate." In this work mention is alſo made of "orders of demi-gods that are wafted in airy cars, genii of the ſigns and lunar manſions, &c." The worſhip paid to the manes, or anceſtors, is a great article in the ſyſtem, and is mentioned almoſt in every page of the "Inſtitutes." All the neighbouring nations whoſe religions have ſome affinity to that of the Hindoos are polytheiſts. The ancient religion of the northern European nations was, in ſeveral reſpects, ſimilar to that of the Eaſt; and we find among them the acknowledgment of one Supreme God, with the worſhip of ſeveral inferior ones. Thus, their deities, Odin the god of war, Frea his wife, and Thor the god of thunder, were the principal objects of worſhip to all the Scandinavians.

It has been ſaid that the polytheiſm of the Hindoos, and others, was mild and tolerant in its nature; but the fact is, that like the ancient Egyptians, they quarrelled with one another on account of their attachment to different deities, eſpecially in Malabar; and mild as the religion of the Hindoos appears to be, and gentle as are their general manners, they can aſſume a very different character when their religion is concerned. The Bramins exterminated the Sammanians, and the followers of Budda, with fire and ſword, leaving none of them on the weſt ſide of the Ganges, under a pretence of their being atheiſts; and when any Hindoo is converted to Chriſtianity, he is not only baniſhed from his tribe, but abandoned to the inſults of the whole nation. Such alſo was the treatment of thoſe who were excommunicated by the Druids. The Hindoos regard all Chriſtians with the utmoſt abhorrence and deteſtation, as much below the loweſt of their own ſects. The Bramins themſelves can be cruel and malignant, where their religion is concerned. Nevertheleſs, when the Hindoos converſe with Chriſtians on the ſubject of religion, they profeſs to believe, as we have already obſerved, that the Supreme Being is equally pleaſed with all religions, and intended that all the different modes of it ſhould be adopted by different nations.

Although there are many points of reſemblance between the religion of the ancient Egyptians and that of the Hindoos, yet in many reſpects they are exceedingly different; ſo that though they may have gone together at the firſt, they muſt have ſeparated at a very early period. The Hindoos never worſhipped living animals, which is a principal feature in the religion of the Egyptians; and the names, the characters, and the images of their deities have very little reſemblance to each other. But between the religion and mythological fables of the Greeks and thoſe of the Hindoos, there is a very remarkable reſemblance; though we are unable to trace any connection that ever ſubſiſted between them.

The religion of the Hindoos ſeems to be much too complex to have been, as ſir W. Jones ſuppoſes, the oldeſt ſyſtem of polytheiſm and idolatry. It is evidently a refinement on ſomething much more ſimple, and this ſeems to have been the ſyſtem of the "Sammanes," whom the Greek writers mention as a ſect of philoſophers in India, oppoſed to the "Brachmanes," and to be the ſame with thoſe who are now called "Schamans" in Siberia. See SAMANCANS.

Nothing can be more humiliating than the ſituation to which the Hindoo inſtitutions reduce the female ſex. According to the Vedas, the ſouls of women, as well as thoſe of all individuals of the inferior caſts, are condemned to continual tranſmigrations, till they are regenerated in the bodies of men. The ſame unfavourable character is amply juſtified by the repreſentations that occur in the "Inſtitutes of Menu," and the "Code of Gentoo laws." Such being, in the opinion of the Hindoo law-givers, the natural character of women, it is no wonder that little regard is paid to their evidence in courts of juſtice; nor can we be ſurpriſed, that the birth of a female is no cauſe of rejoicing in a Hindoo family. In perfect agreement with ſuch degrading ideas of the female character, the women muſt always be under the abſolute controul of men; nor has the ſubjection of the wife to her huſband any bounds. As women are treated in this diſreſpectful manner, and conſidered as unqualified to read their ſacred books, they are in general very ignorant, ſo that few of them can either read or write.

The devotion of the Hindoos is ſuppoſed to compriſe all other duties; but their devotion conſiſts in the frequent repetition of the names and attributes of God. The firſt thing in their prayer is to pronounce the word *oum*, then excluding all ſenſible objects, even forbearing to breathe, and to think only on God. This kind of prayer ſerves for the pardon of ſin and purification. This word *oum*, on the pronunciation of which ſo much is ſuppoſed to depend, ſignifies, according to ſir W. Jones, Brahma, Vichnou, and Seva, or the three powers of creation, preſervation, and deſtruction. This myſtical word, he conceives, may be the Egyptian *on*, commonly ſuppoſed to mean the ſun, and by the ancient idolaters the ſolar fire. The religion of the Hindoos conſiſts principally in oblations to the gods, *i. e.* to the inferior deities, and to the manes of their anceſtors; and theſe oblations are accompanied with many frivolous ceremonies. Moreover, a great part of their religion conſiſts in the auſterities to which they ſubject themſelves. Among other things, all fermented or ſpirituous liquors are forbidden, and they ſubmit to various reſtrictions with regard to their food. To a genuine Hindoo nothing appears more heinous than the killing, and much more the eating of any thing that had life. The Hindoos are much devoted to pilgrimages for the purpoſe of bathing in diſtant rivers; and they generally prefer the Ganges. In theſe pilgrimages, they practiſe ſingular auſterities. Their faſts in honour of different deities are of long duration, and are very ſtrictly obſerved; and they are thought to have ſingular efficacy in effacing all ſins. See FAQUIRS.

It is not uncommon with the Hindoos to devote themſelves to certain and very painful death, under the influence of their wretched ſuperſtition. They throw themſelves on the large iron hooks that are faſtened to the wheels of the carriages, which carry the images of ther deities in proceſſion. Others lie ſprawling on the ground for the wheels to paſs over them, and cruſh them to death. But the moſt affecting inſtances of involuntary death are thoſe of the Hindoo women, who burn themſelves alive with the bodies of their deceaſed huſbands. In this way of terminating life they indulge the hope of attaining the ſame ſtate of happineſs with them after death. This is deemed a kind of religious duty, though it is not regarded as of univerſal obligation. On the deaths of perſons of high rank and celebrity, theſe victims of ſuperſtition, voluntary, or involuntary, are ſometimes very numerous. At the death of a king of Tanjore, no leſs than 300 of his concubines leaped into the flames, and 400 burned themſelves at the funeral of a naique, of Madura. (Maurice's Ind. Antiq. vol. ii. p. 165.) The Hindoo religion, which has been extolled as the mildeſt of all religions, formerly enjoined and countenanced human ſacrifices; and ſir William Jones ſays, that the ancient ſolemn ſacrifice of the Hindoos was that of a man, a bull, and a horſe. Among other ſuperſtitious notions and practices prevalent among the Hindoos, we may mention their exceſſive veneration for the cow, and alſo for the elements of fire and water. Penances of a ſingular and ſevere nature were enjoined for killing cows without malice; and if this crime was maliciouſly committed, it admitted of no expiation whatever. Mr. Wilkins informs us, (Sketches relating to the hiſtory, &c. of the Hindoos, vol. i. p. 234.) that the Bramins are enjoined to light a fire at certain times, and that it muſt be produced by the friction of two pieces of wood of a particular kind; that with a fire thus procured their ſacrifices are burned, the nuptial altar flames, and the funeral pile is kindled. Their veneration for water, eſpecially that of the Ganges, has already been mentioned; and perſons chuſe to die in rivers from an idea, that the ſoul paſſing through the water, as it leaves the body, is purged from its impurities.

The Hindoo religion is little, if at all, more unexceptionable than the ancient Egyptian, with regard to the extravagance and indecency of many of its ceremonies. Inſtances occur at their pagodas, which we have already noticed under the article BRACHMANS, and which it is needleſs here to repeat. (See alſo PAGODA.) Charms are alſo held in eſtimation among the Hindoos; a regard to them is authorized by their ſacred books, and the practice of incantation is profeſſed by their learned Bramins. From a veneration for the elements of fire and water, and an opinion of their poſſeſſing ſomewhat of divinity, they have been deemed proper teſts of guilt, or of innocence. Hence has proceeded the trial by *Ordeal;* which ſee. With regard to the Hindoo doctrine of a future ſtate, Mr. Dow ſays, that men firſt atone for their crimes in hell, where they remain for a ſpace of time proportioned to the degree of their iniquities; then they riſe to heaven, to be rewarded for their virtues, and thence they will return to the world to re-animate other bodies. The more learned Bramins, he ſays, affirms that the hell which is mentioned in the "Bedang" is only intended as a bug-bear to the vulgar; agreeably to the doctrine of the Greek philoſophers. On the other hand, Mr. Holwell, contrary to all other accounts, which repreſent future puniſhment as in all caſes finite, ſays, that whoſoever ſhall free himſelf by violence from this mortal body, ſhall be plunged in "Onderah" for ever. According to another account of the religion of Malabar, they who deſtroy themſelves go neither to heaven nor hell, but ſtroll about, and become what are called "Spirits," under the power of the chief of the devils. Sometimes they enter into men, and then they become demoniacs, and go about naked and mad, to diſturb the neighbourhood, eating graſs and raw fleſh. According to the Indians, ſays P. Della Valle, ſome very wicked men become devils. To conclude our account of the Hindoos, or Gentoos, we obſerve, that notwithſtanding the unreaſonable ſtreſs which they lay on mere external obſervances of various kinds, there are not wanting in their writings ſome excellent moral maxims, ſimilar to many in the books of the Old Teſtament, which repreſent every thing of this kind as inſignificant, without moral virtue. A peculiar ſtreſs, we find, even too great, is laid on the duties to parents; ſo as to ſuperſede the obligation, and to depretiate the importance of other duties. Upon comparing the Hindoo ſyſtem with that of Moſes, the abſurdity of the former is as apparent as the ſuperior wiſdom of the latter. With the Hindoos we perceive the rudiments, and more than the rudiments, of moſt of the arts and ſciences, eſpecially that of aſtronomy, of which moſt other nations are wholly ignorant. And yet while the Hebrews made no diſcoveries in ſcience, they had a religion perfectly rational; and that of the Hindoos was abſurd in the extreme. This, ſurely, is an argument of the internal kind in favour of the divine origin of the Hebrew religion, almoſt as irreſiſtible as any argument from miracles. From the preceding ſketch of the Hindoo religion, we muſt be led to acknowledge the neceſſity and utility of a divine revelation.

Thoſe who are deſirous of being farther acquainted with the principles, manners, and various inſtitutes of the Gentoos, may conſult Holwell's Intereſting hiſtorical Events, &c. 1766. Dow's Hiſtory of Hindooſtan, 4to. 1768. and the Code of Gentoo Laws. Prieſtley's Compariſon of the Inſtitutions of Moſes with thoſe of the Hindoos and other Ancient Nations, 8vo. Northumberland, in America, 1799. For a further account of the religious tenets and practices of the Gentoos, ſee Brachmans. See alſo Shastah and Viedam.

GEN-TSING, in *Geography*, a town of China, in Setchuen; 87 miles N.W. of Hoei-li.

GENUFLEXION, of *genu*, *knee*, and *flecto*, *I bend*, the act of bowing, or bending the knee; or rather of kneeling down.

The Jeſuit Roſweyd, in his Onomaſticon, ſhews, that genuflexion, or kneeling, has been a very ancient cuſtom in the church, and even under the Old Teſtament diſpenſation; and that this practice was obſerved throughout all the year, excepting on Sundays, and during the time from Eaſter to Whitſuntide, when kneeling was forbidden by the council of Nice.

Others have ſhewn, that the cuſtom of not kneeling on Sundays had obtained from the time of the apoſtles; as appears from St. Irenæus and Tertullian; and the Æthiopic church, ſcrupulouſly attached to the ancient ceremonies, ſtill retains that of not kneeling at divine ſervice. The Ruſſians eſteem it an indecent poſture to worſhip God on their knees. Add, that the Jews uſually prayed ſtanding. Roſweyd gives the reaſons of the prohibition of genuflexion on Sundays, &c. from St. Baſil, Anaſtaſius, St. Juſtin, &c.

Baronius is of opinion, that genuflexion was not eſtabliſhed in the year of Chriſt 58, from that paſſage in Acts xx. 36. where St. Paul is expreſsly mentioned to kneel down at prayer: but Saurin ſhews, that nothing can be thence concluded.

The ſame author remarks, alſo, that the primitive Chriſtians carried the practice of genuflexion ſo far, that ſome of them had worn cavities in the floor where they prayed: and St. Jerome relates of St. James, that he had contracted a hardneſs on his knees equal to that of camels.

GENUS, in *Algebra*. The ancient algebraiſts diſtributed that art into two genera, or kinds; the *logiſtic*, and *ſpecious*; which ſee.

Genus, in *Syſtematic Botany*, from γενος, a *family*, implies one or more ſpecies of plants, differing eſſentially in their parts of fructification from all others, and agreeing together in the general ſtructure of thoſe parts, as well as in one or more peculiar marks or characters. If a genus be perfectly natural and diſtinct, ſuch characters in the fructification are accompanied with more or leſs decided diſtinctions in the other parts of the plant, as well as in its general habit or aſpect. On this principle it is contended by Linnæus and his ſchool, that all genera are, or ought to be, natural, and that the genus ought to give the character, not the character the genus. The ſame principle is extended to the animal kingdom. Botaniſts of the French ſchool, on the contrary, maintain that all ſuch aſſociations and diſtinctions are merely arbitrary, ſerving to facilitate the ſtudy of plants, but not at all founded in nature. It is ſingular that, with ſuch ideas, theſe philoſophers ſhould not only ſtrenuouſly contend for a natural ſyſtem of arrangement, but object to the Linnæan method, whoſe *facility* cannot be diſputed, merely becauſe it is not *natural*, terming it in their language *léze nature*. If genera are not natural, certainly the more comprehenſive aſſemblages, of ſuch genera into orders and claſſes, can, in no ſenſe, be ſo. We nevertheleſs do not ſcruple to allow, that the principles of all ſuch diſtinctions are founded in nature, though we readily admit that no ſyſtem has as yet applied them correctly to practice, even with regard to generic, and far leſs to claſſical, diſtinctions. The latter indeed have been ſcarcely found capable of definition, or in ſo vague a manner as to leave us moſt in doubt where preciſion is moſt wanted; and were it not for that intuitive, or at leaſt practical, perception of affinities and differences, which is, by the French, contended to be inadmiſſible in judging of genera, we could certainly come at no knowledge of moſt of the natural orders of theſe learned writers.

Examples of natural genera, each characterized by an eſſential character of its own, which diſtinguiſhes it, not only from every other genus in its natural order, but from every one hitherto diſcovered, are found in *Quercus* the Oak, whoſe acorn affords ſuch a character; in *Trapa*, whoſe ſingular quadrangular nut is armed with ſpines that once conſtituted the calyx-leaves; in *Parnaſſia*, ſo well marked by the fringes and lucid balls that border its nectaries; in *Soldanella* with its many-cleft monopetalous corolla, and *Elæocarpus*, whoſe polypetalous one is ſimilarly cut; in *Geoffræa*, the only known inſtance of a papilionaceous flower with a drupa; not to mention a great number beſides. Inſtances of good natural genera, diſtinguiſhed by ſome one eſſential character from all others in their natural order, are found in *Echium*, whoſe irregular corolla keeps it diſtinct from all others of the *Aſperifoliæ*; *Cornucopia*, known from all other graſſes by its remarkable involucrum; *Pimpinella* diſtinguiſhed from its allies by the globoſe ſtigmas; *Ranunculus* by the nectariferous pore in the claw of each petal; *Vella* by the prominent dilated partition of its pouch, extending twice as far as the valves; to which may be added many genera of the claſs *Didynamia Gymnoſpermia*; ſee Smith's Introd. to Botany, 434. The Linnæan *Icoſandria Polygynia* affords one of the moſt perfect examples poſſible of a natural claſs and order, of which all the genera are natural, and ſo well diſtinguiſhed in habit, that any perſon at all obſervant of plants may know them by their foliage, infloreſcence, or general appearance, while their fruit affords clear eſſential generic characters. The natural family of *Orchideæ*, as arranged by Swartz and Brown, come very near the ſame point of perfection, but their differences of habit are leſs obvious. Such inſtances ought to ſtimulate the philoſophical botaniſt to "go on from one degree of perfection to another,"

another," though, like the chriſtian moraliſt, he cannot hope to reach the ſummit.

Lamarck has very well traced the indiſtinct origin, and gradual improvement of generic knowledge among botaniſts. In an early ſtate of the ſcience, ſome general aſſociations were formed, though founded on vague and unphiloſophical principles. The idea and name of a roſe ſoon embraced many different ſpecies, and hence the dog-roſe, the white-roſe, the damaſk-roſe, &c. were diſtinguiſhed from one another, and a ſort of generic and ſpecific nomenclature aroſe, finally extended ſyſtematically to every plant by Linnæus. Caſpar Bauhin in his *Pinax*, anno 1623, firſt diſtributed plants under a kind of generic ſections, with ſome mention of the peculiar characters of each; but he did not profit, as he ought to have done, of the great principle firſt inculcated by Conrad Geſner, that the parts of the flower and fruit afford the only clue to a ſcientific diſtribution of vegetables; a principle to which "the very exiſtence of botany, as a ſcience, is owing." Tournefort at length, adopting this maxim, undertook the arrangement of all known plants into genera, illuſtrating each by a figure of the parts of fructification, ſo as to diſplay their diſtinguiſhing characters; but it was reſerved for Linnæus to define thoſe characters in words, and thus to perfect the plan of Tournefort, as well as to reform it in many points, and correct ſome fundamental defects. He extended moreover his improvements to the clear definition and nomenclature of the ſpecies, which Tournefort had, without diſcrimination, merely collected, by their old appellations, under each of his genera, except indeed that he preſerved an uniformity in their generic names.

Linnæus did not at once hit upon the beſt manner of defining his genera. His firſt aim was to deſcribe all the ſeven parts of fructification in each, ſo that their differences might appear, which is the plan of all the editions of his *Genera Plantarum*. At length, in the ſixth edition of his *Syſtema Naturæ*, publiſhed in 1748, he undertook a ſynoptical table of the ſhort eſſential characters of the genera, and in the tenth he carried this plan nearly to the perfection in which he left it at his death. It has been adopted, not only by his pupils, and the followers of his ſyſtem of claſſification, but even by the celebrated Juſſieu and his ſcholars, who have widely differed from the learned Swede as to other principles of arrangement, and who have certainly not improved upon his ſtyle of definition, terminology, or nomenclature. Juſſieu indeed has, like Gouan, ſubjoined to the generic characters taken from the fructification, very uſeful indications of the habit, which invention of the latter botaniſt was highly applauded by Linnæus.

Linnæus termed the full deſcriptions in his *Genera Plantarum*, the *natural* character of each genus. They ought to accord with every ſpecies of each, but in large genera, many ſpecies of which have been diſcovered ſubſequently to their eſtabliſhment, this is ſcarcely poſſible. Such characters as ſerve merely to diſtinguiſh each genus from every other in its artificial order, in the Linnæan, or any other artificial, ſyſtem, are called *factitious*; theſe are much better extended ſo as to include ſufficient marks of diſcrimination between the genus under conſideration and every other, and they then become the *eſſential* characters above-mentioned, which ought in every ſyſtematic botanical work to ſtand at the head of each genus, or at leaſt to be indicated by a reference. Lamarck, though much diſpoſed to criticiſe the great Swediſh botaniſt, and differing totally from him reſpecting his opinion of natural genera, very candidly allows that "theſe eſſential characters are the reſult of one of Linnæus's moſt happy ideas, and cannot but contribute greatly to the perfection of Botany." The ſame able writer aſſents entirely to the Linnæan maxim, founded on the good ſenſe and penetration of Conrad Geſner, that "generic characters ought always to be taken from the parts of fructification alone;" "at leaſt," ſays Lamarck, "if that be always practicable." When it is not, he would borrow characters from any thing very decided in the habit; nor does he perceive that any inconvenience would reſult from it. To this we object the uncertainty of ſuch characters, even when taken from what is leaſt exceptionable, the infloreſcence. Of this no more ſtriking example can be found than the *Umbellatæ*, as diſtributed by Linnæus after the principles of his friend Artedi, in which, however it may be diſguiſed by ſophiſtry, the infloreſcence makes a leading part. Thoſe who juſtly, like Lamarck, complain of the errors, unjuſtly termed by him *arbitrary* and *voluntary* errors, which are found in this part of Linnæus's ſyſtem, cannot but allow that they all originate from his having had reſpect to the infloreſcence, that is, to the umbels and involucrums, inſtead of the flowers and ſeeds, which if truly obſerved are fully ſufficient in this, as, we believe, in every other natural order. Indeed the more we conſider the ſubject, the more we are convinced that, although the infloreſcence ought, like every part of a plant, to enter into our general contemplation before we decide upon a genus, it ought never to form a part of the technical or eſſential character. It is tempting enough to botaniſts who are not endowed with clear mathematical powers of diſcrimination and definition, to amplify their generic characters with any thing that, as they ſuppoſe, may give them additional ſtrength. But characters, when too long, rather indicate feebleneſs in themſelves and in their authors, and endanger a return towards barbariſm in a ſcience, which has been raiſed to its preſent pitch of perfection by the didactic preciſion and deciſive brevity of Linnæus. S.

Genus, *Kind*, in *Logic* and *Metaphyſics*, is that which has ſeveral ſpecies under it; or it is the origin and radix of divers ſpecies, joined together by ſome affinity, or common relation between them. See Classification.

Genus is a nature, or idea, ſo common and univerſal, that it extends to other general ideas, and includes them under it. Thus, animal is ſaid to be a genus, in reſpect of man and brute; becauſe man and brute agree in the common nature and character of animal; ſo a right-lined figure of four ſides is a genus in reſpect of a parallelogram, and a trapezium; and ſo, likewiſe, is ſubſtance in reſpect of ſubſtance extended, which is body; and thinking ſubſtance, which is mind.

A good definition, ſay the ſchoolmen, conſiſts of genus and difference.

In the general, genus may be ſaid to be a claſs of a greater extent than ſpecies; and which is not convertible therewith: for though we may ſay, that all body is ſubſtance; yet it cannot be ſaid all ſubſtance is body.

Add, that whatever may be ſaid of the genus may likewiſe be ſaid of the ſpecies under it: *e. gr.* whatever is ſaid of *ens*, being, will equally hold of the body.

The ſchoolmen define the *genus logicum* to be, an univerſal which is predicable of ſeveral things of different ſpecies; and divide it into two kinds: the one, the *ſummum*, which is the higheſt, or moſt general; and has nothing above it to reſpect as a genus: the other, the *ſubaltern*, which they likewiſe call *medium*.

Genus *ſummum* is that which holds the uppermoſt place in its claſs, or predicament; or that which may be divided into ſeveral ſpecies, each whereof is a genus in reſpect of other ſpecies placed below it.

Thus, in the predicament of things ſubſiſting of themſelves, *ſubſtance* has the place and effect of *genus ſummum*, and is predicated of all the things contained in that claſs: for Plato, and man, and animal, and even ſpirit, are properly called ſubſtance.

Accordingly there are as many *ſumma genera*, as there are claſſes of predicaments, or categories.

Genus, *ſubaltern*, is that which, being a medium between the higheſt genus and the loweſt ſpecies, is ſometimes conſidered as a genus, and ſometimes as a ſpecies.

Thus, bird, when compared with animal, is a ſpecies; when to a crow, an eagle, or the like, it is a genus.

Genus, again, is divided into *remotum*, remote, where between it and its ſpecies there is another genus; and *proximum*, or next, where the ſpecies is immediately under it; as man under animal.

Genus is alſo uſed for a character, or manner applicable to every thing of a certain nature or condition. In which ſenſe it ſerves to make capital diviſions in divers ſciences; as muſic, rhetoric, botany, anatomy, &c. *e. gr.*

Genus, in *Muſic*. See Genera.

Genus. By the word *genus*, in *Natural Hiſtory*, we underſtand a certain analogy of a number of ſpecies making them agree together in the number, figure, and ſituation of their parts in ſuch a manner, that they are eaſily diſtinguiſhed from the ſpecies of any other genus, at leaſt by ſome one article. This is the proper and determinate ſenſe of the word genus, whereby it forms a ſubdiviſion of any claſs or order of natural beings, whether of the animal, vegetable, or mineral kingdoms, all agreeing in certain common and diſtinctive characters. See Generical *name*, and Classification *of Animals*.

Genus, in *Rhetoric*, is one of the common places or topics, and contains under it two or more ſorts of things differing in nature. From this head logicians reaſon thus: Becauſe every animal is mortal, and man is an animal, therefore man is mortal. (See Genus, in *Logic*.) But orators make a further uſe of this argument, which they call aſcending from the hypotheſis to the theſis, that is, from a particular to a general. As if a perſon, ſpeaking in praiſe of juſtice, ſhould take occaſion from thence to commend and ſhew the excellency of virtue in general, with a view to render that virtue more amiable. For ſince every ſpecies contains in it the whole nature of the genus to which it relates, beſides what is peculiar to itſelf, whereby it is diſtinguiſhed from it; what is affirmed of the genus muſt, of neceſſity, be applicable to the ſpecies.

Beſides, authors diſtinguiſh the art of rhetoric, as alſo orations, or diſcourſes, produced thereby, into three genera, or kinds; *demonſtrative*, *deliberative*, and *judiciary*. See each term.

GENUSIUM, in *Ancient Geography*, a town of Italy, in that part of Magna Græcia called Meſſapia. It was ſituated a little S. of the road that led to Tarentum.

GENZANO, in *Geography*, a town of Naples, in Baſilicata; 12 miles E. S. E. of Venoſa.—Alſo, a town of Campagna di Roma, in Italy; 3 miles W. of Veletri.

GENZINGEN, a town of France, in the department of the Rhine and Moſelle; 5 miles N. E. of Creutznach.

GEOCENTRIC, of γη, *earth*, and κεντρον, *centre*, in *Aſtronomy*, is applied to a planet, or its orbit, to denote it concentric with the earth; or, having the earth for its centre, or the ſame centre with the earth.

All the planets are not geocentric: the moon, alone, is properly geocentric.

Geocentric *latitude* of a planet, is its latitude ſeen from the earth; or the inclination of a line connecting the planet and the earth, to the plane of the earth's (or true) ecliptic.

Or it is the angle which the aforeſaid line (connecting the planet and the earth) makes with a line drawn to meet a perpendicular let fall from the planet to the plane of the ecliptic. See Latitude.

Thus in *Plate* XIII *Aſtronomy*, *fig.* 116, the angle ♀ *T e* is the meaſure of that planet's geocentric latitude when the earth is in *T*: and the angle *e t* ♀ the meaſure of it when the earth is in *t*.

Geocentric *place* of a planet, is the place wherein it appears to us, from the earth, ſuppoſing the eye there fixed: or, it is a point in the ecliptic, to which a planet, ſeen from the earth, is referred.

Geocentric *longitude* of a planet, is the diſtance meaſured on the ecliptic, in the order of the ſigns between the geocentric place and the firſt point of Aries.

GEODÆSIA, that part of practical geometry which teaches how to divide, or lay out, lands, or fields, between ſeveral owners.

The word is Greek, γεωδαισια, formed of γη, *terra*, *earth*, and δαιω, *divido*, *I divide*.

Geodæsia is alſo applied, by ſome, to all the operations of geometry which are performed in the field.

This is more uſually called *ſurveying*, (which ſee,) when employed in meaſuring of lands, grounds, roads, countries, provinces, &c.

Vitalis defines geodæſia the art of meaſuring ſurfaces and ſolids not by imaginary right lines, as is done in geometry, but by ſenſible and viſible things: as by the ſun's rays, &c.

GEODES, in *Natural Hiſtory*, a genus of cruſtated bodies formed into large, and in great part, empty caſes, incloſing a ſmall quantity of earthy or arenaceous matter. See Siderochita.

Of this genus are five known ſpecies.

GEOFF, in *Rural Economy*, a term provincially applied to a mow of hay, corn, &c. See Stack.

GEOFFRÆA, in *Botany*, ſo named by Jacquin, in memory of Stephen Francis Geoffroy, M. D. of Paris, author of a Materia Medica, in which a chemical analyſis is given, to little purpoſe indeed, of every officinal plant; and of ſeveral ingenious chemico-botanical eſſays in the Memoires de l'Acad. des Sciences. Jacquin ſeems to confound him with his brother Claude Joſeph Geoffroy, author of an eſſay on the ſtructure and uſe of the principal parts of flowers, and of ſome other phyſiological papers, printed in the ſame Memoires.—Jacq. Amer. 207. t. 180. f. 62. Linn. Gen. 378. Schreb. 500. Willd. Sp. Pl. v. 3. 1129. Mart. Mill. Dict. v. 2. Juſſ. 363. Lamarck Illuſtr. t. 604.—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, inferior, bell-ſhaped, five-cleft half way down; its two upper ſegments diverging, ſpreading. *Cor.* papilionaceous; ſtandard roundiſh, emarginate, flat, reflexed; wings equal to it in length, obtuſe, concave; keel compreſſed, the length and ſhape of the wings. *Stam.* Filaments in two ſets (ſingle and nine-cleft), the length of the keel; anthers roundiſh. *Piſt.* Germen ſuperior, roundiſh; ſtyle awl-ſhaped; ſtigma obtuſe. *Peric.* Drupa nearly ovate, large, with a longitudinal furrow at each edge. *Seed.* Nut nearly ovate, ſomewhat woody, a little compreſſed, with a furrow along each edge, acute, of two valves.

Eſſ. Ch. Calyx five-cleft. Drupa ovate. Nut compreſſed.

1. G. *ſpinoſa*. Linn. Sp. Pl. 1043. Swartz. Prod. 106.

(Umari; Marcgr. Bras. 121.)—"Spinous. Leaflets oblong, obtuſe."—Native of Braſil, and the country about Carthagena, in woods on a ſandy ſoil near the ſea. Jacquin deſcribes it as an inelegant *tree*, twelve feet high, with a few ſpines on the trunk and larger branches, which are awl-ſhaped, and generally an inch long. *Leaves* pinnate, about ſeven pair, with an odd one, of oblong, obtuſe, ſmooth, entire leaflets, on a ſtalk four inches in length. *Cluſters* nearly as long, axillary, ſimple, denſe. *Flores* on ſhort partial ſtalks; their colour a dirty orange, and their ſcent extremely powerful and offenſive. *Fruit* like that of an almond in its coat, ſlightly downy, greeniſh-yellow; the pulp ſoft, ſweet, but of a nauſeous ſmell, yellowiſh, ſtaining the hands with a ruſty hue, very difficult to waſh off. This coat adheres firmly to the nut, whoſe kernel is white, mealy and aſtringent. Jacquin was juſtly ſurpriſed at meeting, for the firſt time, with a drupa to a papilionaceous flower, but he juſtly ſo named it, in ſpite of any preconceived theory.

2. G. *ſurinamenſis.* Willd. n. 2. Bondt. Monogr. 13, with a figure.—"Without ſpines. Leaflets oblong, obtuſe, emarginate."—Native of Surinam. *Willdenow.*

3. G. *inermis.* Swartz. Prod. 106. Woodv. Med. Bot. t. 112. (Cabbage-bark tree of Jamaica; Wright in Phil. Tranſ. v. 67. 507. t. 10.)—"Without ſpines. Leaflets lanceolate."—Native of Jamaica and Martinico. A tall *tree*, whoſe wood is white, and ſo tough as to be preferred beyond all others for the ſhafts of carriages. The *bark* is a celebrated remedy for worms in the inteſtines, adminiſtered in a decoction, ſyrup, powder, or extract, and given in gradually increaſed doſes, till a nauſea is produced. The *leaves* conſiſt of five or ſix pair, with an odd one, of elliptic lanceolate, pointed leaflets, about three inches long. *Flowers* light-red, in very large much-branched, terminal, downy panicles. *Fruit* the ſize of a ſmall plum.

Geoffræa, or Geoffroya, *inermis*, *cabbage-bark* tree, or *worm-bark* tree, in the *Materia Medica,* is a native of Jamaica. (See the preceding article.) The bark of this tree, which has a mucilaginous and ſweetiſh taſte, and a diſagreeable ſmell, was firſt noticed as a vermifuge by Mr. Peter Duguid. (Eſſ. and Obſ. Phyſic. and Liter. vol. 2. page 264.) But the fulleſt information concerning this tree, in reſpect to both its medical and botanical characters, has been communicated by Dr. Wright, who reſided a long time in Jamaica. According to his account, the bark of this tree is powerfully medicinal, and its anthelmintic effects have been eſtabliſhed in Jamaica by long experience. It may be given in different forms, as in decoction, ſyrup, powder, and extract; and the manner of preparing, and exhibiting theſe, are particularly ſtated by Dr. Wright. For the *decoction*, take freſh dried or well-preſerved cabbage-bark, one ounce: boil it in a quart of water, over a ſlow fire, till the water is of an amber colour, or rather of a deep-coloured Madeira wine; ſtrain it off, ſweeten it with ſugar, and let it be uſed immediately; as it does not keep many days. In order to obtain the *ſyrup*, add a double portion of ſugar to any quantity of the above decoction. This ſyrup will retain its virtues for years. The *extract* is made by evaporating the ſtrong decoction in *balneo mariæ* to the proper conſiſtence; it muſt be continually ſtirred, as otherwiſe the reſinous part riſes to the top, and on this, probably, its efficacy depends. The *powder* of well dried bark is eaſily made, and looks like jalap, though not of equal ſpecific gravity. As this anthelmintic has alſo a narcotic effect, it is proper to begin with ſmall doſes, which may be gradually increaſed till a nauſea is excited, when the doſe for that patient is aſcertained. A ſtrong healthy grown perſon may at firſt take four table-ſpoonfuls of the decoction or ſyrup, three grains of the extract, or thirty grains of the powder for a doſe. The doſe muſt be diminiſhed for younger perſons: and children two or three years of age, may take a table-ſpoonful of the decoction or ſyrup, one grain of extract, or ten grains of the powder; and children of a year old, half the quantity. Cold water muſt not be drank during the operation of the medicine, as it is apt to occaſion ſickneſs, vomiting, fever, and delirium. In this caſe the ſtomach muſt be waſhed with warm water, caſtor oil muſt be adminiſtered, and lime juice beverage uſed plentifully for common drink. The bark purges pretty briſkly, eſpecially in powder; thirty or forty grains working as well as jalap by ſtool; but in this mode of adminiſtering it, it does not ſeem to kill worms ſo well as in decoction. The cabbage-bark is a valuable remedy when uſed with proper caution; but ſome fatal accidents have attended the imprudent uſe of it, chiefly from overdoſing the medicine. Phil. Tranſ. vol lxvii. p. 597.

GEOFFREY of Monmouth, in *Biography*, an early hiſtorian of our own country, who flouriſhed about the middle of the 12th century, was firſt archdeacon of Monmouth, and then biſhop of St. Aſaph. On account of tumults in Wales he quitted his dioceſe, and obtained the abbacy of Abingdon in commendam. His clergy applied to him to return, which he refuſed, thinking he might ſtill keep his abbacy; in this he was diſappointed, and was left without any preferment. As an hiſtorian he is known by his "Chronicon ſive Hiſtoria Britonum." This work has been cenſured for its fabulous narrations; the author is, however, entitled to much applauſe as a polite ſcholar. His Latin ſtyle riſes greatly above mediocrity. He was author of many other pieces, among which is a poem on Merlin, which is much commended by Leland. The Chronicon is ſuppoſed to be tranſlated from an ancient hiſtory in the Welſh language, and it contains a pretended genealogy of the kings of Britain, from the time of Brutus the Trojan, and enumerates upwards of ſeventy illuſtrious monarchs before the invaſion of Julius Cæſar. This work has been frequently reprinted. Bayle. Moreri. New Annual Regiſter, vol. iv.

GEOFFROY, Etienne Francois, a phyſician, was born at Paris on the 13th of February, 1672. His father was an apothecary, and had held the offices of ſheriff and conſul. While the young Geoffroy was purſuing his ſtudies under his paternal roof, his father held regular ſcientific meetings, at which Caſſini attended with his planiſpheres, Sebaſtien with his machines, and Joblot with his magnets, and at which Du Verney performed his diſſections, and Homberg his chemical experiments. After an excellent foundation of general ſcience was thus laid, his father ſent him, in 1692, to Montpellier, to ſtudy his own profeſſion of pharmacy under an experienced apothecary. Here he attended the courſes of the moſt celebrated profeſſors of the univerſity, and afterwards travelled through the ſouthern provinces before he returned to Paris. Already he had acquired conſiderable reputation; and, although not yet a phyſician, he was appointed to accompany the duke de Tallard, as his medical attendant, on his embaſſy to England, in 1698. In London he was much eſteemed by ſir Hans Sloane, and other men of ſcience, and was elected a member of the Royal Society. From England he went to Holland; and afterwards to Italy in 1700, with the abbé de Louvois. Natural hiſtory and the materia medica were among the principal objects of his enquiries; for his father intended him for his ſucceſſor in his eſtabliſhment at Paris: but he aimed at the higher walk of the profeſſion, and with the conſent of his father at length took the degree of batchelor in 1702, and that of doctor in 1704. His diſpoſition was mild and kind to his patients, who, on his outſet in practice, were alarmed by the ſolemn air which his ſympathy for their ſufferings occaſioned him to aſſume; but his reputation ſoon increaſed, and he was called in conſultation even by the moſt diſtinguiſhed members of the profeſſion. In 1709, he was appointed by Louis XIV. to the profeſſorſhip of medicine, vacant by the death of Tournefort. In his new office he undertook to deliver to his pupils a complete hiſtory of the materia medica, upon which ſubject he had been for a long time collecting information. He completed his account of the *mineral* ſubſtances employed in medicine, of which he gave a moſt correct and ample hiſtory: and was employed on the *vegetable* kingdom, which he treated alphabetically, and carried no farther than the article *Meliſſa*: on the *animal* kingdom he had not touched; but the whole of what he had delivered in his lectures was found among his papers in good order, and afterwards publiſhed. In 1712, he ſucceeded Fagou as profeſſor of chemiſtry in the king's garden. In 1726, he was elected dean of the faculty, in the exerciſe of the functions of which he was led into ſome active and anxious diſputes, which, together with the duties of his profeſſion, and of his other offices, deſtroyed his health, which was naturally very delicate. He lingered from the beginning of the year 1730 till the 6th of January, 1731, when he died. Notwithſtanding his malady, however, he had the reſolution to complete a work, which had been deemed neceſſary by preceding deans, but never accompliſhed; namely, a pharmacopeia, containing a collection of the compound medicines requiſite to be kept by apothecaries, "Le Code Medicamentaire de la Faculté de Paris," of which two editions, enlarged and corrected, were afterwards publiſhed. His papers on the materia medica were publiſhed under the following title: "Tractatus de Materia Medica, ſive, de Medicamentorum ſimplicium hiſtoria, virtute, delectu, et uſu," Paris 1741, 3 vols. 8vo. under the inſpection of Antoine de Juſſieu. Several editions have been ſubſequently publiſhed. It was tranſlated into French by Ant. Bergier, who publiſhed 7 vols. 12mo. in 1743, and the remainder in 3 vols. in 1750. Arnault de Nobleville, and Salerne, phyſicians of Orleans, publiſhed a continuation of this work, under the title of "Hiſtoire Naturelle des Animaux," Paris 1756, 1757, in 6 vols. 12mo, which is deemed not unworthy to be ranked with the production of Geoffroy. Eloy. Dict. Hiſt.

GEOGLOSSUM, in *Botany*, from *γεα*, the *earth*, and *γλωσσα*, the *tongue*, Perſoon Syn. Fung. 607. Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi*.—Sect. *clavæformes*.

Eſſ. Ch. *Receptacle* club-ſhaped, fleſhy, generally compreſſed, ſhort, with a prominent margin next to the ſtalk.

This genus of *Fungi* is founded by Perſoon on the *Clavaria ophioglоſſoides* of other authors, with ſome different ſpecies which reſemble it, and which have the appearance of a little tongue, growing out of the earth upon a ſtalk. He enumerates and defines ſeven ſpecies. His *G. hirſutum* is *Clavaria ophioglоſſoides* of Sowerby's Fungi, t. 83; his *G. glabrum* is a ſmaller and ſmooth fungus, very like the fructifying ſpike of the fern *Ophiogloſſum*, except in being nearly black.

GEOGNOSY. See Geology and Mineralogy.

GEOGRAPHICAL Mile is a minute, or the ſixtieth part of a degree of a great circle. See Degree and Mile.

Geographical *Table*. See Map.

GEOGRAPHY, formed of *γη*, *terra*, *earth*, and *γραφω*, *ſcribo*, *I write*, *I deſcribe*; the doctrine or knowledge of the earth, both as in itſelf and as to its affections; or a deſcription of the terreſtrial globe, and particularly of the known habitable part thereof, with all its ſubordinate diviſions. Geography conſtitutes a branch of mathematics, of a mixed kind; becauſe it conſiders the earth, and its affections, as depending on quantity; and conſequently, as meaſurable: *viz.* its figure, place, magnitude, motion, celeſtial appearances, &c. with the ſeveral circles imagined on its ſurface.

Geography is diſtinguiſhed from coſmography, as a part from the whole; this latter conſidering the whole viſible world, both heaven and earth.

From topography and chorography, it is diſtinguiſhed, as the whole from a part.

Golnitz conſiders geography as either *exterior* or *interior*: but Varenius more juſtly divides it into *general* and *ſpecial*; or *univerſal* and *particular*.

Geography, *general* or *univerſal*, is that which conſiders the earth in general, without any regard to particular countries, or the affections common to the whole globe; as its figure, magnitude, motion, land, ſea, &c. And this may be ſubdivided into *abſolute* geography, which reſpects the body of the earth itſelf, its parts and peculiar properties, &c.; *relative*, which accounts for the appearance and accidents owing to celeſtial cauſes; and *comparative*, which explains thoſe properties that ariſe from comparing different parts of the earth together.

Geography, *ſpecial* or *particular*, is that which conſiders the conſtitution of the ſeveral particular regions, or countries, their bounds, figure, &c. with the mountains, foreſts, mines, waters, plants, and animals, &c. therein; as alſo their climates, ſeaſons, heat, weather, diſtance from the equator, &c. and their inhabitants, arts, foods, commodities, cuſtoms, language, religion, policy, cities, &c.

Special geography may be ſubdivided, with regard to the ſeveral periods of its progreſs, into *ancient*, including a deſcription of the earth, conformably to the knowledge which the ancients had till the decline of the Roman empire; of this kind Cellarius's Ancient Geography is an excellent ſummary: the geography of the *mean* age, which extended from the fall of the Roman empire to the reſtoration of learning; and *modern* geography, comprehending the actual deſcription of the earth ſince that time. With regard to its objects and uſes, ſpecial geography may be divided into *natural*, which treats of the diviſions and diſtinctions which nature has made in the ſurface of the globe, and the complexion, language, &c. of its inhabitants; *hiſtorical*, comprehending the different revolutions which any country or town has undergone; *civil*, or *political*, including the government of any country; *ſacred*, deſcribing thoſe countries and places that are mentioned in ſcripture and eccleſiaſtical hiſtory; *eccleſiaſtical*, giving an account of the eccleſiaſtical juriſdiction eſtabliſhed and exerciſed in various countries; and *phyſical*, which conſiders not only the ſurface of the globe, but alſo its intrinſic nature and ſubſtance. Geography is very ancient, at leaſt the ſpecial part thereof; for the ancient writers ſcarcely went beyond the deſcription of countries. Of this kind is the geography which we find in the books of Moſes, written about the year 1452 B. C. and that of Homer, in his Iliad and Odyſſey, who flouriſhed, according to the Arundelian marbles, 907 years B. C. The geographical knowledge we derive from Herodotus, who flouriſhed about 445 years B. C., is very partial and imperfect. It chiefly relates to certain parts of Aſia, and divers others unknown, as well as the northern and weſtern parts of Europe; and alſo Africa, Egypt and Lybia excepted.

It appears (ſee Ptol. Geog. l. i. c. 9.) that the early geographers, being deſtitute of mathematical inſtruments

ſtruments and of aſtronomical obſervations, began firſt to determine the ſituation of places according to climates; and they were led to fix upon theſe climates from the form and colour of certain animals which were to be found in thoſe different countries. The appearance of negroes, or of thoſe called by them Ethiopians, and of animals of the larger ſize, ſuch as the rhinoceros and elephant, ſuggeſted to them the line of diviſion, where the limits of the Torrid Zone began towards the north, and terminated towards the ſouth. This groſſer manner of dividing their climates muſt be conſidered as the firſt rude outline of geography in the more illiterate ages of the world. However this be, the Chaldeans and Egyptians, who were diſtinguiſhed by their ſkill in geometry and aſtronomy, were of courſe the firſt perſons that paid any particular attention to geography; and it is ſaid that the firſt map was made by order of Seſoſtris I. who conquered Egypt.

This Egyptian king, ſays Euſtathius in his epiſtle, prefixed to his commentary on Dionyſius's περιηγησις, having traverſed great part of the earth, recorded his march in maps, and gave copies of his maps not only to the Egyptians, but to the Scythians, to their great aſtoniſhment. The Jews alſo ſeem to have had ſurveyors among them; and hence ſome have imagined that they had made a map of the Holy Land, when they gave the different portions to the nine tribes at Shiloh. (Joſh. xviii. 4. 8. 9.) And Joſephus tells us (l. v. c. 1.), that when Joſhua ſent out people from the different tribes to meaſure the land, he gave them as companions perſons well inſtructed in geometry, whoſe ſkill would prevent their deviating from the truth. We may therefore reaſonably preſume that a geometrical ſurvey was then made of the Holy Land.; though we cannot abſolutely determine whether their menſuration was only taken down in numbers, or regularly projected and digeſted into a map.

Beſides the method of dividing countries by climates, already mentioned, the Egyptians and Babylonians adopted another, which was that of determining the ſituation of places, or their diſtance from the equator, by obſerving the length of their longeſt and ſhorteſt days. This they performed by means of a gnomon, erected upon a horizontal plane, by which they were enabled to meaſure the length or ſhortneſs of the ſhadow in proportion to the height of the gnomon. For an account of this invention, and of the method of applying it, ſee Gnomon.

From the days of Thales,and his immediate ſucceſſors, who flouriſhed in the ſixth century before Chriſt, geography ſeems to have received little improvement for 200 years, till the eſtabliſhment of the famous ſchool of Alexandria; although Pythagoras and his diſciples were rightly informed with regard to the true ſyſtem of the world, as they placed the ſun in the centre, and aſcribed to the earth both its diurnal and annual revolutions. During this period we have an aſtronomical obſervation of conſiderable importance to geography, and the firſt Greek obſervation upon record; which is that of Meton and Euctemon, who obſerved the ſummer ſolſtice at Athens on a day correſponding to the 27th of June, 432 years B. C. This ſolſtitial obſervation muſt have given them an opportunity of determining the latitude of Athens at the ſame time, if they had known the ſimple manner of deducing the concluſion: for as the length of the ſhadow of the gnomon was attentively watched at the moment of the ſolſtice, the proportion of that to the gnomon's height was eaſily known, by which the angle of the ſun's altitude would be given; and though the ſun's greateſt declination was not then accurately known, yet ſtill the latitude of Athens might have been determined within the limitations of the error reſpecting the declination. We have reaſon to believe that Timocharis and Ariſtillus, who began to obſerve 295 years B. C, were the firſt who introduced the manner of determining the poſition of the ſtars, according to their longitudes and latitudes taken with reſpect to the equator. This we know from Ptolemy, who has preſerved many of their obſervations in his "Almageſt;" and particularly one, which gave riſe to the famous diſcovery of the *Preceſſion of the Equinoxes*: which ſee. It was after the preceſſion of the equinoxes was fully eſtabliſhed by Ptolemy, that the longitudes and latitudes of the ſtars were uniformly referred to the ecliptic inſtead of the equator. It was therefore, by an eaſy tranſition, that Hipparchus would be led to aſſort and diſpoſe the different parts of the earth according to latitude or longitude: this being only a new application or tranſpoſition of that artifice, which had been already ſo happily introduced in the arrangement of the conſtellations, and therefore equally proper to be adopted in tracing the meridians and parallels of the earth. Hipparchus muſt be univerſally allowed to have firſt fixed the ſolid foundation of geography by uniting it to aſtronomy, and thus rendering its principles ſelf-evident and invariable.

Pliny (N. H. l. ii. c. 12.) confirms this, when, after mentioning Thales and Sulpicius Gallus, who had both predicted eclipſes, he adds, "that Hipparchus had foretold the revolution (of the eclipſes) of the ſun and moon for 600 years, comprehending the months, days, and hours of different nations, and the ſituation of places," by which it would ſeem that the latitudes and longitudes of theſe places were particularly given. But the fulleſt and ſtrongeſt authority for appropriating this invention to Hipparchus, is that of Ptolemy in his "Geography," (l. i. c. 4.) who ſays, "that Hipparchus was the only author who had given *the elevations of the north pole of a few cities*, in proportion to the great number that were to be delineated, and ſuch too as lay under the ſame parallels, &c. &c." And yet it is ſomewhat remarkable that though latitudes and longitudes were in this manner introduced and pointed out by Hipparchus, yet they were ſo little attended to till the days of Ptolemy, that none of the intermediate authors, ſuch as Strabo, Vitruvius and Pliny, all of whom minutely deſcribed the geographical ſituation of places according to the length and ſhadows of the gnomon, have ever given us the leaſt hint of the latitude or longitude of any one place whatever in the language of degrees and minutes.

When the true principles of geography were thus pointed out by this new invention of latitude and longitude, it was no wonder that maps were from thence made to aſſume a new form of projection eſſentially different from thoſe in uſe prior to this period. For the hiſtory of the conſtruction of maps, ſee Map.

It was a conſtant cuſtom among the Romans, after they had conquered and ſubdued any province, to have a map, or painted repreſentation thereof, carried in triumph, and expoſed to the view of the ſpectators. Thus the Romans, as they were the conquerors, became the ſurveyors of the world. Every new war produced a new ſurvey and itinerary of the countries where the ſcenes of action occurred; ſo that the materials of geography were accumulated by every additional conqueſt. Polybius, (l. 3. p. 123. ed. Caſaub.) when he tells us, that at the beginning of the ſecond Punic war, Hannibal was preparing his expedition againſt Rome, by croſſing from Africa into Spain, and ſo through Gaul into Italy, ſays, "that all theſe places were meaſured or ſurveyed with the utmoſt care by the Romans."

Vegetius De Re Mil. (l. iii. c.6.) has well deſcribed the ſurveys of particular provinces, with which every Roman general was regularly furniſhed before his march. Æthicus, in the preface to his "Coſmographia," further informs us, that Julius Cæſar ordered a general ſurvey to be made of the whole Roman empire by a decree of the ſenate: ſelecting for this purpoſe perſons well inſtructed in every branch of philoſophy. The three ſurveyors were Zenodoxus, Theodotus, and Polyclitus, each of whom was appointed to ſurvey a different diviſion of the empire. This ſurvey commenced in the conſulſhip of Julius Cæſar and Marc Antony, in the year 44 B. C, and continued for twenty-five years one month and ten days, to the conſulſhip of Sentius Saturninus and Lucretius Cinna, in the year 19 B. C. The Roman itineraries that are ſtill extant, evidently ſhew with what accuracy their ſurveys were made in every province; and Pliny has filled the 3d, 4th, and 5th books of his Natural Hiſtory with the geographical diſtances that were thus meaſured.

Before the Romans engaged in this buſineſs, Neco, king of Egypt, ordered the Phœnicians to make a ſurvey of the whole coaſt of Africa; which they accompliſhed in three years: Darius procured the Ethiopic ſea, and the mouth of the Indus, to be ſurveyed. Thales of Miletus, Anaximander his diſciple, who is ſaid to have conſtructed the firſt map; Democritus, Eudoxus, &c. who made the uſe of maps common in Greece; Ariſtagoras of Miletus, who preſented to Cleomenes, king of Sparta, a table of braſs, on which he had deſcribed the known earth, with its ſeas and rivers; and other Greeks, availing themſelves of the aſſiſtance derived from the Chaldeans and Egyptians, proſecuted the ſtudy and enlarged the extent of this ſcience. It appears that in the time of Socrates geographical maps were uſed at Athens; for this philoſopher humbled the pride and boaſt of Alcibiades, by deſiring him to point out his territories in Attica in a map: and Pliny relates, (l. vi. c. 17.) that Alexander, in his expedition into Aſia, took two geographers, Diognetus and Bœton, to meaſure and deſcribe the roads, and that from their itineraries the writers of the following ages took many particulars. Indeed, this may be obſerved, that whereas moſt other arts are ſufferers by war, geography and fortification have been improved thereby. We alſo learn from Strabo, that a copy of Alexander's ſurvey was given by Xenocles, his treaſurer, to Patrocles the geographer, who, as Pliny informs us, was admiral of the fleets of Seleucus and Antiochus. His book on geography is often quoted both by Strabo and Pliny: and it appears that this author furniſhed Eratoſthenes with the principal materials and authorities for conſtructing the oriental part of his map of the then known world. For the voyages of Patrocles under Seleucus, upon the Caſpian ſea, and elſewhere, were a kind of ſupplement to thoſe meaſurements given by Bœton and Diognetus already mentioned, and by Nearchus and Oneſicritus, the two admirals who were employed under Alexander, and therefore Pliny quotes them immediately after. It appears likewiſe from the ſame paſſage, that Megaſthenes and Dionyſius were two ſurveyors ſent into India by Ptolemy Philadelphus, for the purpoſes of geography: and their authority was ſometimes ſet in oppoſition to Patrocles by Hipparchus, in his criticiſm upon Eratoſthenes's geography. (Strabo, lib. ii. paſſim.) From the memorable era of Alexander's expedition and conqueſt, and thoſe of his immediate ſucceſſors, geography began to aſſume a new face and form. For Eratoſthenes, who is deſervedly conſidered as the great father of chronology, diſtinguiſhed himſelf by the cultivation of the ſcience of geography. (See the article ERATOSTHENES.)

We ſhall now recite the names of ſome of the principal perſons who have contributed to the improvement of geography. Pytheas, the famous geographer of Marſeilles, flouriſhed in the time of Alexander; and Ariſtotle ſeems to have been no leſs converſant with geography than philoſophy: after Alexander, Seleucus Nicanor, Theophraſtus the diſciple of Ariſtotle, Eratoſthenes, who publiſhed three books of geographical commentaries, and corrected a chart of Anaximander, Hipparchus, who corrected the obſervations of Eratoſthenes, and thus furniſhed occaſion for a diſpute which greatly contributed to the improvement of geography, Agatharcides of Cnidus, who lived under Ptolemy Philometor, and Mneſias, who, about fifty years after him, publiſhed a deſcription of the whole world, Artemidorus of Epheſus, who gave a deſcription of the earth in eleven books, often cited by Strabo and Pliny, and many others, whoſe names it would be tedious to enumerate, diſtinguiſhed themſelves by the cultivation and improvement of this ſcience. Geography was tranſmitted, with the other arts, from Greece to Rome, as we have already mentioned. Varro's works contain many geographical remarks: Zenodoxus, Theodorus and Polyclitus were employed under the conſulſhip of Julius Cæſar and Marc Antony, in ſurveying and meaſuring the globe. (See the preceding part of this article). The commentaries of Cæſar are well known. Ptolemy encouraged Poſidonius, who made an imperfect menſuration of the earth by celeſtial obſervations, in different places under the ſame meridian. (See DEGREE). Auguſtus was a diſtinguiſhed patron and promoter of this ſcience; under whom Strabo publiſhed his geography. And the taſte for the ſtudy and advancement of geography was greatly encouraged under Tiberius, Claudius, Veſpaſian, Domitian, and Adrian. Iſidore of Charax, who lived to the commencement of the firſt century of the Chriſtian era; Pomponius Mela, who publiſhed a book entitled "De Situ Orbis;" Metius Pompoſianus, who, having depicted the earth on a parchment, fell a ſacrifice to the jealouſy of Domitian, the emperor ſuſpecting that he aimed at the empire; Pliny the naturaliſt, who has deſcribed the countries known in his time in the third, fourth, fifth and ſixth books of his Natural Hiſtory; Marinus the Tyrian, who corrected and enlarged the diſcoveries of preceding geographers; and the emperor Antoninus, deſerve particular mention. This abſtract of the hiſtory of ancient geographers, notwithſtanding whoſe ſucceſſive labours geography was ſtill in a very imperfect ſtate, brings us to a period, about the 150th year of the Chriſtian era, in which Ptolemy of Alexandria contributed greatly to the improvement of this ſcience, by a more ample and accurate deſcription of the terreſtrial globe than any had yet given of it. He availed himſelf of numerous obſervations and ancient charts; he corrected the miſtakes and ſupplied many defects of others; and by reducing the diſtances of places on the earth to degrees and minutes, after the manner of Poſidonius, making uſe of the degrees of longitude and latitude, and ſettling the ſituation of places by aſtronomical obſervations, he reduced geography into a regular ſyſtem, and laid a foundation for thoſe farther diſcoveries and improvements, which naturally reſulted from the progreſſive, and at preſent advanced ſtate of geometry, aſtronomy, navigation, and commerce.

In order to form a proper judgment of the benefits accruing to geography from the labours of Ptolemy, we ought to take into account the materials that were extant in his time, and which he had actually in his poſſeſſion. Theſe conſiſted of various particulars, ſome of greater and others of a leſs degree of authenticity. The principal were the "proportions of the gnomon" to its ſhadow, taken by different aſtronomers at the times of the equinoxes and ſolſtices; "calculations" founded upon the length of the longeſt days; "the meaſures" or computed diſtances of the principal roads contained in their ſurveys and itineraries, and the various "reports of travellers and navigators," who often determined the intervals of places by hear-ſay and gueſs-work. All of theſe were to be compared together, and digeſted into one uniform body or ſyſtem, and after this, were converted and tranſlated by him into a new mathematical language, expreſſing their different degrees and minutes of latitude and longitude, according to the invention of Hipparchus, but which Ptolemy had the merit of carrying into full practice and execution, after it had been neglected for upwards of 250 years. We have no reaſon to ſuppoſe, that Ptolemy had in his poſſeſſion real aſtronomical obſervations ſufficient to determine all the longitudes and latitudes which he has given; ſo that we ought always to remember, that their degrees of accuracy depended upon the veracity of the fact or ſuggeſtion communicated to him, from which they were afterwards deduced. We have therefore no reaſon to be aſtoniſhed at the multitude of errors that are to be found in it, when his original materials were ſo imperfect for executing ſo large a work, as that of fixing the longitudes and latitudes of all the places, coaſts, bays, and rivers of the then known world; an undertaking which, even in our days, has not hitherto been brought to any ſufficient degree of accuracy. The miſtakes of Ptolemy ought to be regarded with candour, as they aroſe from the ignorance of the age in which he lived, which could give him no better information, and not from ignorance or inattention on his own part. Nevertheleſs, Ricciolus, Cellarius, Paul Merula, and Salmaſius have been too ſevere in their criticiſm and cenſures; as if they were diſappointed in not ſeeing this ſcience in its full maturity in the writings of Ptolemy, at a time when it was evidently but juſt beginning to advance beyond the verge of its earlieſt infancy. They might with equal juſtice condemn the modern geographers for giving no better account of Nova Zembla, or New Holland, or of thoſe continents and iſlands that lie on the northern or ſouthern extremities of the great South ſea towards the two Poles; of which the knowledge which they could obtain was very imperfect. The principal miſtakes in Ptolemy took their riſe from certain aſtronomical obſervations and ſurveys, which were ſuppoſed to have been made with accuracy in a prior age, and which were adopted by this great geographer as genuine; and they have been, for want of better information, copied by ſucceeding geographers and inſerted in their maps, as being, in their opinion, of acknowledged and undoubted authority. Theſe miſtakes, thus introduced, maintained their places in all maps, by a kind of unqueſtioned preſcription, even to the commencement of the laſt century, and it unfortunately happened that theſe errors related to that part of the world which was beſt known to the ancient Greeks and Romans. Thus, Ptolemy ſtates the latitude of Byzantium to be 43° 5′ inſtead of 41° 1′, the latitude according to modern obſervations. In this particular Ptolemy was miſled by Hipparchus, who is mentioned by Strabo (l. i.) as having viſited Byzantium, and made this obſervation in perſon. The latitude of Marſeilles, which was ſuppoſed to be under the ſame parallel with Byzantium, was not, however, ſo much miſtaken, as by modern obſervations it has been found to be 43° 17′ 45″; and allowance being made for the now acknowledged diminution of the obliquity of the ecliptic, (ſee ECLIPTIC,) the reſult will be nearer the truth. Another error of Ptolemy relates to the latitude of ancient Carthage, which he has placed in 32° 20′ inſtead of 36° 52′, the true latitude according to the beſt obſervations. This erroneous latitude ſeems to have been copied or tranſlated from a paſſage in Strabo (l. ii.), in which it is ſtated that at Carthage the gnomon has the ſame proportion to the equinoctial ſhadow, which 11 has to 17, whence by plain trigonometry we ſhall have the latitude of 32° 28′, very near that of Ptolemy. The third capital miſtake of Ptolemy relates to the length of the Mediterranean, which is generally meaſured from the ſtraits of Gibraltar to the bottom of the bay of Iſſus, where Alexandretta, or Scanderoon, now ſtands, whoſe ancient name was Alexandria ad Iſſum. The difference of longitude of Alexandria ad Iſſum and Gibraltar, according to Ptolemy, is 62° 0′; whereas the difference of longitude between theſe two places, according to the lateſt obſervations, is 41° 28′, and Ptolemy's error is 20° 32′. This error, which continued in all our maps, more or leſs, till the beginning of the laſt century, took its riſe from the ſuppoſed ſurveys of perſons of reputation, recorded by Strabo. (See DEGREE, EARTH, and LONGITUDE.) But to return from this digreſſion:—many valuable geographical works appeared under Diocleſian, Conſtantius, and Maximian, &c. Under the emperor Theodoſius the provincial and itinerary chart or table, ſince known under the name of Peutinger, was digeſted and formed; and the laſt work, that ought to be claſſed with thoſe of the ancients, was the Notitia Imperii, attributed to Æthicus, who lived between the years 400 and 450 of the Chriſtian era. The ages of barbariſm ſucceeded the fall of the Roman empire; and the arts and ſciences were obliged to ſeek refuge and protection from the Arabians and Orientaliſts in Aſia; the principal of whom, diſtinguiſhed by their attention to geography, were Almamom, caliph of Babylon, and Abulfeda, a Syrian prince. (See DEGREE.) After the revival of learning in Europe, and particularly during the two laſt centuries, geography has derived very conſiderable acceſſions from travels, voyages, and a variety of nautical and aſtronomical obſervations.

The great misfortune of ancient geography, and which indeed confined it to ſuch a lingering ſtate of infancy, was, that the true method of determining with accuracy the difference of longitudes was a matter of ſuch difficulty, and remained ſo long unknown. One of the firſt attempts to rectify the length of the Mediterranean was made under the auſpices of M. de Peireſk in 1635; and he alſo, with a direct view of correcting the errors in the longitudes of different places, took particular pains to get obſervations made at Marſeilles, Aleppo, and Grand Cairo, of an eclipſe of the moon, which happened Auguſt the 27th 1635. Before that time the difference of longitude between Marſeilles and Aleppo had been ſuppoſed to be 45°, but by theſe obſervations it was found only to amount to 30° (the real difference has been ſince found to be 31° 58′); ſo that by this a very conſiderable correction was made in the length of the Mediterranean, by taking off the difference of one whole hour, or 15°, at once. About this time eclipſes of the ſun and moon were thought ſufficient to determine the longitudes of all places with a tolerable accuracy. But, in the event, the ableſt aſtronomers ſoon found that from theſe eclipſes, however carefully obſerved, no clear deduction could be made of the longitude of any one place to any ſufficient degree of exactneſs. Hence ſeveral eminent aſtronomers, ſuch as Fournier, Kircher, and even Ricciolus, who had collected the obſervations of no leſs than 56 eclipſes of the ſun and moon, between the years 1560 and 1658, gave up the correction of geography by the application of eclipſes of the ſun and moon alone, as a fruitleſs and deſperate undertaking. At length recourſe was had to the eclipſes of the ſatellites of Jupiter, and they were found effectual for the purpoſe. It was ſome time, however, before the theory of the ſecondary planets was regularly reduced to tables; and though Simon Marius firſt, and after him Baptiſta Hodierna, compoſed ephemerides of their motions, yet nothing of that ſort was found to be ſufficiently accurate for the purpoſes of longitude, till M. Caſſini publiſhed his tables of the revolutions and eclipſes of the ſatellites in 1668. The firſt opportunity of effectually applying this theory to the rectifying of geography was ſuggeſted by M. Caſſini, and taken by M. Picard in 1671 and 1672, who, at the obſervatory of Tycho Brahe at Uraniburgh, obſerved two immerſions and three emerſions of the firſt ſatellite of Jupiter, which were afterwards compared with the ſame obſerved by M. Caſſini at the obſervatory at Paris. This firſt experiment gave at once the difference of longitude in the cleareſt manner beyond the poſſibility of a doubt; and it likewiſe afforded the certain proſpect of rectifying the whole extent of geography as to longitude, upon principles that were ſelf-evident, and not liable to any miſtake whatever. In conſequence of this ſucceſs, M. Picard and M. De la Hire, were immediately employed in correcting the map of France; in doing which, they were obliged to contract it every where within leſs boundaries than it was ſuppoſed, according to their former maps, to have occupied; inſomuch that Lewis XIV. jocoſely ſaid, that he found by their journey he had ſuffered a loſs of part of his kingdom. Other academicians determined by the ſame method the longitude of the iſle of Gorée, near cape Verd, on the coaſt of Africa, and of Guadaloupe and Martinico in the Weſt Indies. And when M. Caſſini had corrected his tables of the ſatellites of Jupiter, and publiſhed a new edition of them in 1693, M. Chazelles was ſent up the Levant, to obſerve the longitudes and latitudes of Scanderoon, Alexandria, and Conſtantinople, in order to determine the length and breadth of the Mediterranean, which he executed with great ability.

Since the correction of longitudes has been introduced by means of the ſatellites of Jupiter, other methods have been alſo adopted and deviſed, which are proper and effectual for that purpoſe; ſuch as "the tranſits of Mercury and Venus" over the body of the ſun; "occultations" of the fixed ſtars by the moon; and ſince the lunar tables have been improved by M. Mayer and others, another mode, equally applicable to this important object, has occurred, by meaſuring from time to time the exact "diſtances of the moon from the ſun," and "from a fixed ſtar" of the firſt and ſecond magnitude. In this mode there is a limitation of error, which ſo far gives a degree of ſatisfaction, and prepares the way for bringing the point that is thus unſettled to a more ſpeedy and certain determination. Inſtruments of obſervation have alſo been improved; and time-pieces have been conſtructed, free in a great degree from the error and uncertainty of thoſe that were formerly in uſe. See CHRONOMETER and CLOCK. See alſo EPHEMERIS and LONGITUDE.

For a fuller account of the hiſtory of ancient geography, ſee the preface to Bertius's edition of Ptolemy's Theatrum Geographiæ Veteris, fol. For a brief hiſtory of the riſe and progreſs of geography, ſee Varenius's Geog. and the Introduction to Blair's Tables of Chronology.

The art, however, muſt needs have been exceedingly defective; as a great part of the globe was then unknown: particularly all America, the northern parts of Europe and Aſia, with the Terra Auſtralis, and Magellanica; and as they were ignorant of the earth's being capable of being ſailed round, and of the torrid zones being habitable, &c.

The principal writings on this art, among the ancients, are Ptolemy's eight books; among the moderns are, Johannes De Sacroboſco De Sphæra, with Clavius's comment; Ricciolus's Geographia and Hydrographia Reformata; Weigelius's Speculum Terræ; Dechales's Geography, in his Mundus Mathematicus; and above all, Varenius's Geographia generalis, with Jurin's additions; to which may be added, Leibnecht's Elementa Geographiæ generalis; Sturmius's Compendium Geographicum; Wolfius's Geographia, in his Elementa Matheſeos; the preface to M. Robert's Atlas; the introduction to Buſching's Geography; the works of Duval, Briet, Deliſle, D'Anville, Bonne, Birache, Mentelle, the Sanſons, Homann Morvilliers, Martiniere; Pinkerton's Geography, Gordon's, Salmon's and Guthrie's Grammars, &c. Hornii Orb. ant. delineatio, Cluverius, Cellarius, Pomp. Mela, &c. &c.

The reader will find under the appropriate terms in this Cyclopædia, ſuch information concerning the ſubjects which they expreſs, as is conſiſtent with the nature and limits of the work; and it would be, therefore, altogether ſuperfluous to detail them in this place, and, in ſo doing, to tranſcribe articles that will be found in their proper places. See ALTITUDE, AMPHISCII, ANTIPODES, ANTÆCI, CIRCLES, CLIMATE, COLURES, DEGREE, EARTH, ECLIPTIC, EQUATOR, EQUINOCTIAL, GLOBE, HETEROSCII, HORIZON, LATITUDE, LONGITUDE, MAP, MERIDIAN, MOUNTAIN, OCEAN, PARALLELS, PERIÆCI, PERISCII, POLE, SPHERE, *Sphere* OBLIQUE, PARALLEL, and RIGHT, TROPICS, ZONES, &c. &c. &c.

GEOLOGY, in a ſtrict ſenſe of the word, or GEOGNOSY, is the ſcience which illuſtrates the ſtructure, relative poſition, and mode of formation of the different mineral ſubſtances that compoſe the cruſt of the earth. This intereſting part of mineralogy principally owes the diſtinguiſhed rank it now holds among the ſciences to the celebrated profeſſor of Freyberg, who has however ſeparated geognoſy, or the ſcience to which the above-given definition applies, from geology in the ſenſe in which the word is taken by him; conſidering the latter as a merely ſpeculative branch of knowledge, and as having nearly the ſame relation to the former which aſtrology has to aſtronomy. While geognoſy, leſs intent upon enquiring into the primordial ſtate of the globe, is contented with the merit of obſerving, of collecting and arranging ſimple facts in order to aſcertain what *can* be known reſpecting the relative ſituation and ages of mineral ſubſtances.

Geology (in the ſenſe in which the word is taken by Werner) aſpires to the higher merit of recording the events of periods, when the planetary ſyſtem of which the earth forms a part was yet uncreated, and of aſſigning cauſes to effects, and explaining phenomena, before it is aſcertained whether they really have exiſtence, or are merely the offspring of fancy and ignorance. The framers of moſt of thoſe tiſſues of extravagant notions, known by the appellation of *theories of the earth* (ſee EARTH and THEORIES *of the Earth*,) have been ſatisfied with a very moderate ſhare of materials for their ſtructures, not to mention that moſt of them were utterly unacquainted with the nature of the ſubſtances, the origin of which they undertook to elucidate. Nothing is better calculated to flatter ſelf-love than to be mentioned as the creator of a theory of the earth; nothing eaſier, with a moderate ſhare of imagination and leſs knowledge of facts, than to frame a new theory ſufficiently diſtinct from all its precurſors to be noticed; and nothing ſafer than to broach opinions which, though they cannot be proved true by their authors, are certain to be left unrefuted by others. And who would be deſirous to waſte his time in refuting, or even remembering, all the theories of the earth now extant? Their number, amounting already to above half a hundred, appears to be daily increaſing, and ſtands in need of claſſification to aſſiſt the memory; which, it muſt be allowed, might be more profitably employed in retaining thoſe general obſervations which, unconnected with any theory of the earth, or with the Moſaic account, have in latter times been preſented to the world by a few unprejudiced geognoſians. Inſtead of prematurely endeavouring to accommodate the little geognoſtic knowledge we poſſeſs to the events hinted at in the ſacred hymn of creation, which was by no means intended for a ſyſtem of geology; we ſhould commence our reſearches in this field of knowledge with ſubjecting to a careful examination what nature produces as it were under our eyes, ſuch as the manifold alterations that have taken place in the phyſiognomy of tracts of country almoſt within the memory of man. How little are we acquainted with the means which nature employs to form the very ſoil on which we tread, by converting into mould the various animal and vegetable exuviæ! How ſcanty are the genuine obſervations we poſſeſs on the proceſs of alluvial depoſition! on the detritus accumulated at the foot of mountains by means of the decompoſition of the various rocks! how little do we know of the proceſs employed to produce petrifactions! and how little of the circumſtances under which the latter occur! And yet many of theſe, and other phenomena within the ſphere of human obſervation, will admit of conſiderable elucidation, and may lead to very intereſting reſults, by applying to them ſound principles of logic and induction. But reſearches of this nature require what few are inclined to beſtow upon them, the patient obſervation of many years; and, what falls to the lot of few obſervers, a facility of combining and generalizing inſulated facts. As an inſtance both of the difficulty and utility of ſuch reſearches, if properly conducted, and of the little attention that has hitherto been paid to conſiderations that ſhould precede any attempt at framing a ſyſtem of geology, we advert only to the highly intereſting diſcoveries made within the laſt twelve years, by Cuvier in the neighbourhood of Paris. It is in the confined ſpace of the well known gyps-formation of that part of France that this incomparable naturaliſt has found the oſſeous remains of no leſs than fifteen quadrupeds, unlike any ſpecies now known to exiſt. Have theſe organized beings, it may be aſked, lived in the places where their remains are found, or have they been carried thither? and are they ſtill to be met with living, or to be conſidered totally or partly deſtroyed? It is obvious that the cauſes to be aſſigned for the occurrence of thoſe petrifactions muſt be diametrically oppoſite according as theſe two ſimple queſtions are anſwered in the affirmative or negative; and yet ſomebody has thought it worth while to ſatisfy himſelf reſpecting this circumſtance; nor have any of the authors of the ten or twelve hypotheſes that profeſs to explain the formation of the baſin of Paris, been aware that in a ſolitary ſmall corner of that baſin, namely, at Grignon, there have been diſcovered by Lamarck, in the courſe of ſeveral years, about ſix hundred unknown ſpecies of ſhells, beſides forty or fifty, of which the prototypes are ſuppoſed to be ſtill exiſting.

We ſhall not attempt in this article to give a hiſtory of geology, which would be nothing more than a chronological expoſition of the different theories of the earth (ſee EARTH, and THEORIES *of the Earth*): nor is it to naturaliſts of earlier periods than the latter end of the laſt century, that we are indebted for genuine obſervations in this department of ſcience. But much as we owe to the exertions of a Lehmann, Deluc, Dolomieu, and particularly Sauſſure, who, in his celebrated *agenda*, has proved how well he knew the deſiderata of geology, and what remained to be done to give this branch of knowledge all the perfection it is ſuſceptible of; yet the merit of arranging, into a harmonious whole, a multiplicity of materials furniſhed by an intimate acquaintance with the internal ſtructure of a conſiderable and highly intereſting tract of country, is entirely due to Werner; who, being aſſiſted by the moſt profound knowledge of the various mineral ſubſtances, and gifted with a happy facility of generalizing facts, has produced a ſyſtem of geognoſy, at once ſimple and practical, and much more free from gratuitous aſſumption than all the reſt. Profeſſor Jameſon is the firſt in this country who has given an expoſition of the Wernerian geognoſy, conſtituting the third volume of his "Mineralogy." The following is intended only as a brief ſketch of that ſyſtem, fuller details of which will be found under the various articles referred to.

The ſurface of the globe, conſidered relative to its inequalities, is divided into highland, lowland, and the bottom of the ſea. The *highland* comprizes, 1. Alpine land, compoſed of mountain groups or ſeries of mountain chains; 2. Mountain chains, formed by a ſeries of thoſe ſtill more ſimple inequalities, called 3. Mountains: in the former we conſider their length, height, form, and connection; the parts of the latter are the foot, the acclivity, and the ſummit. See MOUNTAINS, and MOUNTAIN GROUPS.

Lowland we call thoſe extenſive flat tracts which are almoſt entirely deſtitute of ſmall mountain groups, which latter, if they occur in them, generally occupy the middle part of the lowland. The principal lowland in Europe is the eaſtern part of Great Britain, the north of France, the cidevant Netherlands, the northern part of Germany and Sileſia, the whole of Poland, the N. W. part of Ruſſia, towards the Ural mountains, a very ſmall part of Sweden, namely, Gothland. The ſecond extenſive lowland plain is in the centre of Aſia; it is known by the name of the Steppes, and includes almoſt the whole N. E. part of Ruſſia; ſome ſmaller ones are in Arabia. The extent of the lowland of Africa is not known. America has two conſiderable lowland plains: the one, in its northern half, is traverſed by the Miſſiſippi and Miſouri, and borders towards the eaſt by the Apalachian mountains, and the Weſt India iſlands; the ſecond, in South America, borders on the Andes. With theſe plains of the lowland are connected the *river-courſes*, or river valleys, in which we have to conſider the bed of the river and the holm or haugh land, the high and low bank of the river. (See RIVER-*courſe*.) The inconſiderably riſing ground with which the lowland plains are frequently marked, is, by German geognoſians, called *Land-höhen* when they are nearly of equal length and breadth, and *Land-rücken* when they have an elongated form.

The bottom of the ſea, or that part of the globe which is ſtill covered by water, may equally be conſidered with a view to its depreſſions and elevations; to the latter belong the flat, the rocky bottom, the ſhoals, reefs, and iſlands. See SEA and ISLAND.

It is only after a diligent ſtudy of the inequalities juſt pointed out, that we can with advantage undertake to explore the means employed by nature to produce them; and the firſt ſtep is to proceed to the examination of the phyſical cauſes of the ſlow, but unceaſing changes of the globe. Obſervation teaches us, that moſt of the elevations and hollows we meet with on the ſurface of the earth owe their origin to the action of the atmoſphere, to that of the ocean, and to volcanic fire. Theſe powerful agents may be conſidered with regard to their *deſtroying*, and, in conſequence of this deſtruction, with regard to their *forming* effects. The waters of the ocean poſſeſs the former of theſe powers in a ſuperior degree; whole maritime diſtricts are known to have been overwhelmed by their irregular action upon the land; but alſo the regular motion of the ſea, ebb and flood tide, currents, &c. conſiderably contribute to gradually changing the face of the bottom of the ſea, and of the ſhores on which they act. The deſtroying effects of the atmoſpheric waters are both mechanical and chemical; the former are produced by long continued rain, water-ſpouts, ice, ſnow, thaws, and conſequent floods, by which conſiderable portions of rocks are detached and carried, together with other looſe materials they meet, to more or leſs diſtant places, according as the bulk of theſe materials or the nature of the country, either favours or impedes their progreſs. The chemically deſtroying effects of water are leſs rapid, and depend on the ſolubility of the different rocks over which they flow. The forming effects of water, both mechanical and chemical, are the natural conſequence of its deſtructive effects; examples of the former are ſandbanks, changes of coaſts, &c. Of the latter, beds of ſalt, calcareous, and other depoſitions, &c. See Waters, *Atmoſpheric*, and Ocean.

The effects of volcanic fire are deſtroying by means of the conſumption of the inflammable materials, by deſiccation and fuſion; and forming by ſublimation, and by the production of lavas and other volcanic ejections, by ſublimation, &c. See Volcano.

From the deſcription of the inequalities of the ſurface of the earth, and of the means employed in forming them, the Wernerian ſchool proceeds to the conſideration of the internal ſtructure of the earth, the knowledge of which we derive from a careful examination of the order which nature has followed in the depoſition of the mountain maſſes, and which is principally laid open to view in the chaſms and ſections produced by floods, &c. in natural caverns and in the interior of mines. By theſe means we may become acquainted with four different ſtructures, beſides that of the ſimple foſſil, which is the object of Oryctognoſy; 1. The ſtructure of *rocks* or *mountain rocks*; theſe are either ſimple (ſuch as limeſtone, clay-ſlate, ſerpentine), or aggregated, in which caſe the principal kinds of texture of the component parts are granular, ſlaty, porphyritic, and amygdaloidal. (See Rocks.) 2. A more general ſtructure is that of *mountain maſſes*; theſe have either a ſimply ſtratified ſtructure, *viz.* when a mountain, or mountain maſſes are compoſed of one ſpecies of rock divided into parallel tabular maſſes or ſtrata; or they conſiſt of alternating ſtrata of different rocks, which in this caſe are called *beds*. Mountain maſſes alſo diſplay what is termed *ſeamed* ſtructure, in which diſtinct concretions on a large ſcale are obſervable, ſuch as the columnar, the large globular, and the club-ſhaped ſtructure, ſeveral modifications of which are obſerved in baſalt. Another variety of this ſtructure is called *tabular ſeamed* ſtructure, which is not unlike ſtratification. (See Mountain Masses, and Strata.) A ſtill more general ſtructure is 3. The *ſtructure of formations*, which term Werner applies to a determinate aſſemblage of ſeveral ſimilar and diſſimilar rock maſſes which conſtitute an independent whole. If the maſs is uniform throughout; if, for inſtance, it conſiſts entirely of ſandſtone, granite, &c. it is termed *ſimple*, whereas it is a *compound* formation, if it exhibits diſſimilar maſſes, ſuch as black coal with fletz-trap, &c. Some formations conſtitute the principal maſs of a mountain in which they occur, (gneiſs, clay-ſlate, porphyry, &c.) while others occur only imbedded (porphyry, lime-ſtone, &c.); and theſe beds, if they occur in different principal formations, and always under the ſame circumſtances, notwithſtanding the difference of the rocks in which they are found, and if, moreover, they form members of a ſeries of formations, are conſidered as, and denominated *independent formations*. If the reverſe of all this is obſerved in ſingle beds, they are called *ſubordinate* to the formation in which they are imbedded, as is the caſe with the beds of roe-ſtone, in the ſecond ſand-ſtone, &c. For ſome further diſtinctions, ſee Repositories, *mineral*. The moſt general of the ſtructures we know is, 4. That of the *cruſt of the earth*, compoſed of rock formations, which cover each other in certain directions, and in a regular manner. As to the original extent of formations in general, Werner terms *univerſal* formations thoſe which, without great interruption, ſurround the whole globe, and thus conſtitute the greater part of its cruſt; to it belong almoſt the whole of the primitive, tranſition, and fletz-formation. *Partial* formations, on the other hand, are thoſe that appear only in detached ſpots, and exhibit characters diſtinct from thoſe of the univerſal formation: thus the depoſition at Wehrau in Luſatia (which Werner ſuſpects to be the reſult of a ſmall and partial flood) is compoſed of ſand-ſtone, lime-ſtone, bituminous ſhale and iron-clay, which all reſt on looſe ſand. The preſent extent and continuity of formations are ſo far different from the original, that thoſe called *univerſal* often appear broken into ſmall detached portions, frequently reſembling partial formations, and they receive different names according to their different ſhapes, and the ſituations in which they are found. Other conſiderations relative to the ſtructure of the cruſt of the globe are derived from the poſition and direction of the ſtrata in regard to the fundamental or ſubjacent rock, from the direction of the ſtrata without reference to the fundamental rock, and from the relation of the *outgoings* (*i. e.* the upper extremities of the different ſtrata as they appear at the ſurface of the earth), to the exterior of the mountain; for which ſee Strata.

A compariſon of the different claſſes of rocks, and their ſucceſſion and ſtratification, points out the following diſtinctions. The claſs of rocks on which all others reſt, and which, on that account, is conſidered as the oldeſt, is the claſs of the *primitive rocks*, whoſe texture is often more or leſs cryſtalline, a quality denoting previous chemical ſolution. They comprehend granite, gneiſs, mica-ſlate, talc-ſlate, hornblende ſlate, ſyenite, porphyry, ſerpentine, and lime-ſtone. Theſe rocks are moſtly diſpoſed in conformable and unbroken ſtratification, each newer ſtratum with lower level, as is the caſe with gneiſs, mica-ſlate, and clay-ſlate, while the granite beneath will ſometimes appear to riſe up through them, encompaſſed, in various manners, by the other rocks. (See Rocks, *Primitive*.) The rocks next in ſucceſſion are ſuch as are likewiſe principally compoſed of chemical productions, but in which mechanical depoſition is obſerved more abundantly the nearer they approach the following claſs; the rocks conſtituting this intermediate claſs are called tranſition-rocks. Lime-ſtone occurs more frequently in this than in the preceding claſs: the other rocks it contains are principally grey-wacke, grey-wacke ſlate, and clay-ſlate. (See Transition-*Rocks*). To this ſucceeds, as of ſtill later origin, the claſs of fletz-rocks, in which the mechanical depoſits occur in greater abundance, at the ſame time that the chemical precipitation diſappears. (See Fletz-*Rocks*.) The next claſs which bears the character of ſtill more recent formation, is entirely compoſed of mechanical depoſits, ſuch as ſand, clay, &c. (See Rocks, *Alluvial*.) But, beſides theſe formations, the outgoings of which ſhow gradually diminiſhing levels from the older to the newer, there are two others, the ſtrata of which, inſtead of having paralleliſm with, are ſuperincumbent on, the outgoings of the other ſtrata: they are called the *neweſt fletz-trap*, and the *newer porphyry formation*, and are ſeen to reſt both on fletz-ſtrata of very recent formation, and on elevated primitive mountains. The former of theſe formations is particularly intereſting, as including rocks, whoſe origin has been, and continues to be, a ſubject of controverſy between the Neptuniſts and Volcaniſts, ſuch as baſalt, wacke, &c. all of which, according to Werner, are the reſults of a deluge, or ſudden riſe of the water at a more recent period than that in which the fletz-mountains were formed. (See FLETZ-*Rocks* and TRAP-*Formation.*) The ſecond of theſe great formations, occurring in the ſame unconformable ſtratification, conſiſts of porphyry, ſyenite, and pitch-ſtone, and is ſuppoſed of much older origin than the neweſt fletz-trap-formation, with which, however, it agrees in many reſpects. See PORPHYRY.

No geologiſt before Werner has pointed out the ſucceſſion in which the different ſuites of formations have been depoſited from the water at different periods; a ſucceſſion which ſhows the alterations that fluid has undergone with regard to the ſubſtances it held, at different times, either chemically diſſolved, or mechanically floating. Thus the oldeſt of the primitive rocks contain metals almoſt peculiar to them, and which, therefore, were not again depoſited in ſucceeding periods, ſuch as tin, molybdena, and tungſteen; and in ſeveral caſes, one and the ſame ſubſtance, (ſuch as lime-ſtone,) though it be repeated at conſiderable intervals, ſtill adopts in each of them a peculiar character. Theſe ſuites are, 1. That of the *lime-ſtone formation*, beginning with the primitive cryſtalline granular lime-ſtone, and paſſing, by inſenſible gradations, through the tranſition, and fletz-lime ſtones, into the lowermoſt links of the ſeries, *viz.* chalk and calcareous tuf. 2. That of the *ſlate formation:* its central point is clay-ſlate (from which this formation derives its name), paſſing, on one hand, through mica-ſlate into gneiſs, when the ſlaty ſtructure gradually diſappears, and a paſſage is formed into the oldeſt member, namely granite; and, on the other hand, through tranſition-ſlate, grey-wacke ſlate, and grey-wacke, into the ſeries of fletz ſand-ſtones, and from thence into the alluvial ſeries, conſiſting of ſlate clay, loam, ſand, and gravel. 3. The *trap-formation ſuite* paſſes from the primitive hornblende-ſlate, characterized by its cryſtalline nature, and from the primitive green-ſtone, and green-ſtone ſlate, through the tranſition green-ſtone, into the fletz-trap, formed chiefly of amygdaloid, and from thence into the neweſt fletz-trap formation, conſiſting principally of baſalt and wacke, unconformably ſuperincumbent on rocks of various antiquity. 4. The *porphyry formation ſuite* is equally characteriſtic in its different members, from old primitive porphyry down to that mentioned above, as of ſimilar origin with the neweſt fletz-trap formation: the nature of the different members of this formation ſtands, however, in need of further examination. (See PORPHYRY.) 5. The *gyps-formation* comprises three principal members, the oldeſt of which, or the primitive gypſum, [illegible] in mica-ſlate and clay-ſlate; the ſecond and third are fletz-gypſum, the former of them accompanying the following, or 6. *Salt-formation*, which conſtitutes two ſeries, one of which occurs only with fletz-gypſum, (ſee FLETZ-*Rocks*), while the other is ſtill forming on the bottom of lakes, &c. (See ROCK-*ſalt*.) 7. The *coal-formation-ſuite*, [illegible] the independent coal formation, various [illegible] of coal belonging to the fletz-trap formation, and [illegible]; the members of this ſuite require farther inveſtigation. (See FLETZ-*Rocks*, and COAL.) 8. The *ſerpentine-formation ſuite* is compoſed, as far as we know, of two members, the firſt or older occurring with primitive rocks, eſpecially primitive lime-ſtone, in conformable ſtratification; and the ſecond or newer, found in an unconformable and overlying poſition on the older rocks. See SERPENTINE.

For further particulars relating to the Wernerian ſyſtem of geognoſy, we refer to the articles STRATA, VEIN, and WATERS, *Diminution of.*

GEOMANCY, GEOMANTIA, a kind of divination, performed by means of a number of little points, or dots, made on paper at random: and conſidering the various lines and figures which thoſe points preſent: and thence forming a pretended judgment of futurity, and deciding any queſtion propoſed.

The word is formed of the Greek γη, *terra*, *earth;* and μαντεια, *divination;* it being the ancient cuſtom to caſt little pebbles on the ground, and thence to form their conjectures; inſtead of the points afterwards made uſe of.

Polydore Virgil defines geomancy a kind of divination performed by means of clefts, or chinks made in the ground; and takes the Perſian Magi to have been the inventors thereof.

GEOMETRICAL, ſomething that has a relation to *geometry*.

Thus we ſay, a geometrical method, a geometrical genius, geometrical ſtrictneſs, geometrical conſtruction, geometrical demonſtration.

Geometry itſelf ſeems to lead us into errors; after once reducing a thing to geometrical conſideration, and finding that it anſwers pretty exactly, we purſue the view, are pleaſed with the certainty and agreeableneſs of the demonſtrations, and apply the geometry farther and farther, till we often outrun nature.

Hence it is, that all machines do not ſucceed: that all compoſitions of muſic, wherein the concords are the moſt rigidly obſerved, are not agreeable: that the moſt exact aſtronomical computations do not always foretell the preciſe time and quality of an eclipſe, &c.

The reaſon is, that nature is not a mere abſtract; mechanical levers and wheels are not geometrical lines and circles; as they are often ſuppoſed to be: the taſte for tunes is not the ſame in all men; nor at all times in the ſame man: and as to aſtronomy, as there is no perfect regularity in the motions of the planets, their orbits hardly ſeem reducible to any fixed, known figure.

The errors, therefore, we fall into in aſtronomy, muſic, mechanics, and the other ſciences to which geometry is applied, do not properly ariſe from geometry, which is an infallible ſcience, but from the falſe uſe, or the miſapplication of it.

GEOMETRICAL *Conſtruction* of an equation, is the contriving and drawing of lines and figures, whereby to demonſtrate the equation, theorem, or canon, to be geometrically true. See CONSTRUCTION *of Equations*.

GEOMETRICAL *Line* or *Curve*, called alſo *algebraic line* or *curve*, is that wherein the relations of the abſciſſas to the ſemi-ordinates may be expreſſed by an algebraic equation. See CURVE.

Geometrical lines are diſtinguiſhed into claſſes, orders, or genera, according to the number of the dimenſions of the equation that expreſſes the relation between the ordinates and the abſciſſas: or, which amounts to the ſame, according to the number of points in which they may be cut by a right line.

Thus a line of the firſt order will be only a right line: thoſe of the ſecond, or quadratic order, will be the circle, and the conic ſections; and thoſe of the third, or cubic order, will be the cubical and Nelian parabolas, the ciſſoid of the ancients, &c.

But the curve of the firſt gender (becauſe a right line cannot be reckoned among the curves) is the ſame with a line of the ſecond order; and a curve of the ſecond gender, the ſame with a line of the third order; and a line of an infiniteſimal order is that which a right line may cut in infinite points; as the ſpiral, cycloid, the quadratrix, and every line generated by the infinite revolutions of a radius.

However, it is not the equation, but the deſcription, that makes the curve a geometrical one; the circle is a geometrical line, not becauſe it may be expreſſed by an equation, but becauſe its deſcription is a poſtulate: and it is not the ſimplicity of the equation, but the eaſineſs of the deſcription, which is to determine the choice of the lines for the conſtruction of a problem. The equation that expreſſes a parabola is more ſimple than that which expreſſes a circle; and yet the circle, by reaſon of its more ſimple conſtruction, is admitted before it.

The circle and the conic ſections, if you regard the dimenſions of the equations, are of the ſame order; and yet the circle is not numbered with them in the conſtruction of problems; but by reaſon of its ſimple deſcription is depreſſed to a lower order; *viz.* that of a right line; ſo that it is not improper to expreſs that by a circle, which may be expreſſed by a right line, but it is a fault to conſtruct that by the conic ſections, which may be conſtructed by a circle.

Either, therefore, the law muſt be taken from the dimenſions of equations, as obſerved in a circle, and ſo the diſtinction be taken away between plane and ſolid problems: or the law muſt be allowed not to be ſtrictly obſerved in lines of ſuperior kinds; but that ſome, by reaſon of their more ſimple deſcription may be preferred to others of the ſame order, and be numbered with lines of inferior orders.

In conſtructions that are equally geometrical, the moſt ſimple are always to be preferred: this law is ſo univerſal as to be without exception. But algebraic expreſſions add nothing to the ſimplicity of the conſtruction; the bare deſcriptions of the lines here are only to be conſidered; and theſe alone were conſidered by thoſe geometricians, who joined a circle with a right line. And as theſe are eaſy or hard, the conſtruction becomes eaſy or hard: and therefore it is foreign to the nature of the thing, from any thing elſe to eſtabliſh laws about conſtructions.

Either, therefore, with the ancients, we muſt exclude all lines beſide the circle, and perhaps the conic ſections, out of geometry; or admit all according to the ſimplicity of the deſcription: if the trochoid were admitted into geometry, we might, by its means, divide an angle in any given ratio: would you therefore blame thoſe who would make uſe of this line to divide an angle in the ratio of one number to another; and contend, that this line was not defined by an equation, but that you muſt make uſe of ſuch lines as are defined by equations?

If, when an angle were to be divided, for inſtance, into 1001 parts, we ſhould be obliged to bring a curve defined by an equation of above a hundred dimenſions to do the buſineſs; which nobody could deſcribe, much leſs underſtand; and ſhould prefer this to the trochoid, which is a line well known, and deſcribed eaſily by the motion of a wheel, or circle: who would not ſee the abſurdity?

Either, therefore, the trochoid is not to be admitted at all in geometry; or elſe, in the conſtruction of problems, it is to be preferred to all lines of a more difficult deſcription; and the reaſon is the ſame for other curves. Hence, the triſections of an angle by a conchoid, which Archimedes, in his Lemmas, and Pappus, in his Collections, have preferred to the invention of all others in this caſe, muſt be allowed to be good; ſince we muſt either exclude all lines, beſide the circle and right line, out of geometry, or admit them according to the ſimplicity of their deſcriptions; in which caſe the conchoid yields to none except the circle. Equations are expreſſions of arithmetical computation, and properly have no place in geometry, except ſo far as quantities truly geometrical (that is, lines, ſurfaces, ſolids, and proportions) may be ſaid to be ſome equal to others: multiplications, diviſions, and ſuch ſort of computations, are newly received into geometry, and that apparently contrary to the firſt deſign of this ſcience: for whoever conſiders the conſtruction of problems by a right line and a circle, found by the firſt geometricians, will eaſily perceive that geometry was introduced that we might expeditiouſly avoid, by drawing lines, the tedioufneſs of computation

It ſhould ſeem, therefore, that the two ſciences ought not to be confounded together: the ancients ſo induſtriouſly diſtinguiſhed them, that they never introduced arithmetical terms into geometry; and the moderns, by confounding both, have loſt a great deal of that ſimplicity, in which the elegance of geometry principally conſiſts. Upon the whole, that is arithmetically more ſimple, which is determined by more ſimple equations; but that is geometrically more ſimple which is determined by the more ſimple drawing of lines; and in geometry, that ought to be reckoned beſt which is geometrically moſt ſimple.

GEOMETRICAL *Locus*, or *Place*, called alſo ſimply *locus*. See LOCUS.

GEOMETRICAL *Medium*. See MEDIUM.

GEOMETRICAL *Method of the Ancients*. It is to be obſerved that the ancients eſtabliſhed the higher parts of their geometry on the ſame principles as the elements of that ſcience, by demonſtrations of the ſame kind; and that they ſeem to have been careful not to ſuppoſe any thing done, till by a previous problem they had ſhewn how it was to be performed. Far leſs did they ſuppoſe any thing to be done that cannot be conceived, as a line or ſeries to be actually continued to infinity, or a magnitude to be diminiſhed till it becomes infinitely leſs than what it was. The elements into which they reſolved magnitudes were finite, and ſuch as might be conceived to be real. Unbounded liberties have been introduced of late, by which geometry, which ought to be perfectly clear, is filled with myſteries. See Maclaurin's Fluxions, Intr. p. 39, ſeq.

GEOMETRICAL *Oſculum*. See CURVE, EVOLUTE, and OSCULUM.

GEOMETRICAL *Pace*, is a meaſure conſiſting of five feet. See PACE, and FOOT.

GEOMETRICAL *Plan*, in *Architecture*. See PLAN.

GEOMETRICAL *Plane*. See PLANE.

GEOMETRICAL *Progreſſion*. See *Geometrical* PROGRESSION.

GEOMETRICAL *Proportion*, called alſo abſolutely, and ſimply, *proportion*, is a ſimilitude or identity of ratios. See RATIO.

Thus, if A be to B, as C to D, they are in geometrical proportion: ſo 8, 4, 30, and 15, are geometrical proportionals. See PROPORTION.

GEOMETRICAL *Solution* of a problem, is when the problem is directly ſolved according to the ſtrict principles and rules of geometry, and by lines that are truly geometrical.

In this ſenſe we ſay, geometrical ſolution in contradiſtinction to a mechanical, or inſtrumental ſolution, where the problem is only ſolved by ruler and compaſſes.

The ſame term is likewiſe uſed in oppoſition to all indirect and inadequate kinds of ſolutions, as by infinite ſerieſes, &c.

We have no geometrical way of finding the quadrature of the circle, the duplicature of the cube, or two mean proportionals; but mechanical ways, and others, by infinite ſerieſes, we have.

The ancients, Pappus informs us, in vain endeavoured at the triſection of an angle, and the finding out of two mean proportionals by a right line, and a circle. Afterwards they began to conſider the properties of ſeveral other lines; as the conchoid, the ciſſoid, and the conic ſections; and by ſome of theſe endeavoured to ſolve thoſe problems. At length, having more thoroughly examined the matter, and the conic ſections being received into geometry, they diſtinguiſhed geometrical problems into three kinds; *viz.*

1. *Plane* ones, which, deriving their original from lines on a plane, may be regularly ſolved by a right line, and a circle.

2. *Solid* ones, which are ſolved by lines deriving their original from the conſideration of a ſolid; that is, of a cone.

3. *Linear* ones, to the ſolution of which are required lines more compounded.

According to this diſtinction we are not to ſolve ſolid problems by other lines than the conic ſections; eſpecially if no other lines but right ones, a circle, and the conic ſections, muſt be received into geometry.

But the moderns, advancing much farther, have received into geometry all lines that can be expreſſed by equations; and have diſtinguiſhed, according to the dimenſions of the equations, thoſe lines into kinds; and have made it a law, not to conſtruct a problem by a line of ſuperior kind, that may be conſtructed by one of an inferior kind.

GEOMETRICAL *Square.* See SQUARE.

GEOMETRICAL *Table.* See PLAIN *Table.*

GEOMETRICALLY PROPORTIONALS, are quantities in continual proportion; or which proceed in the ſame conſtant ratio: as 6, 12, 24, 48, 96, 192, &c.

They are thus called, in contradiſtinction to equi-different quantities; which are called, though ſomewhat improperly, *arithmetically proportionals.*

GEOMETRY, the ſcience, or doctrine of extenſion, or extended things; that is, of lines, ſurfaces, or ſolids.

The word is Greek *γεωμετρια*, formed of *γεα* or *γη*, *earth*, and *μετρεω*, *meaſure;* it being the neceſſity of meaſuring the earth, and the parts and places thereof, that gave the firſt occaſion to the invention of the principles and rules of this art; which has ſince been extended and applied to numerous other things; inſomuch that geometry, with arithmetic, is now the general foundation of all mathematics.

Herodotus, lib. ii. p. 102. edit. Weſſelingii, Diodorus, lib. i. § 81, or vol. i. p. 91. edit. Amſt. 1746. and Strabo, lib. xvii. vol. ii. p. 1139. edit. Amſt. 1707. aſſert, that the Egyptians were the firſt inventors of geometry; and that the annual inundations of the Nile were the occaſion of it; for that river bearing away all the bounds and landmarks of men's eſtates, and covering the whole face of the country, the people, ſay they, were obliged to diſtinguiſh their lands by the conſideration of their figure and quantity; and thus, by experience and habit, formed themſelves a method, or art, which was the origin of geometry. A farther contemplation of the draughts of figures, of fields thus laid down, and plotted in proportion, might naturally enough lead them to the diſcovery of ſome of their excellent and wonderful properties; which ſpeculation continually improving, the art became gradually improved, as it continues to do to this day. Joſephus, however, ſeems to attribute the invention to the Hebrews: and others, among the ancients, make Mercury the inventor. Polyd. Virgil, De Invent. Rer. lib. i. cap. 18.

From Egypt geometry paſſed into Greece, being carried thither, as ſome ſay, by Thales; where it was much cultivated and improved by himſelf, Pythagoras, Anaxagoras of Clazomene, Hippocrates of Chios, and Plato, who teſtified his conviction of the neceſſity and importance of geometry in order to the ſucceſsful ſtudy of philoſophy by the following inſcription on the door of his academy, *ουδεις αγεωμετρητος εισιτω*, *let no one ignorant of geometry enter here.* Plato, conceiving that geometry was too mean and reſtricted an appellation for this ſcience, ſubſtituted for it the more extenſive name of "Menſuration;" and others have denominated it "Pantometry." Other more general and comprehenſive appellations are more ſuitable to its extent, more eſpecially in the preſent advanced ſtate of the ſcience; and accordingly ſome have defined it as the ſcience of inquiring, inventing, and demonſtrating all the affections of magnitude. Proclus calls it the knowledge of magnitudes and figures, with their limitations; as alſo of their ratios, affections, poſitions, and motions of every kind. About fifty years after Plato, lived Euclid, who collected together all thoſe theorems which had been invented by his predeceſſors in Egypt and Greece, and digeſted them into fifteen books, entitled the Elements of Geometry; and thoſe propoſitions which were not ſatisfactorily proved, he more accurately demonſtrated. (See EUCLID.) The next to Euclid of thoſe ancient writers, whoſe works are extant, is Apollonius Pergæus, who flouriſhed in the time of Ptolemy Euergetes, about two hundred and thirty years before Chriſt, and about a hundred years after Euclid. (See his biographical article.) The third ancient geometer, whoſe writings remain, is Archimedes of Syracuſe, who was famous about the ſame time with Apollonius. (See ARCHIMEDES.) We can only mention Eudoxus of Cnidus, Archytas of Tarentum, Philolaus, Eratoſthenes, Ariſtarchus of Samos, Dinoſtratus, the inventor of the quadratrix, Menechmus, his brother and the diſciple of Plato, the two Ariſteuſes, Conon, Thraſideus, Nicoteles, Leon, Theudius, Hermotimus, and Nicomedes, the inventor of the conchoid; beſides whom, there are many other ancient geometers, to whom this ſcience is indebted.

The Greeks continued their attention to geometry even after they were ſubdued by the Romans. Whereas the Romans themſelves were ſo little acquainted with this ſcience, even in the moſt flouriſhing time of their republic, that they gave the name of mathematicians, as Tacitus informs us, to thoſe who purſued the chimeras of divination and judiciary aſtrology. Nor were they more diſpoſed to cultivate geometry, as we may reaſonably imagine, during the decline, and after the fall of the Roman empire. The caſe was different with the Greeks; among whom we find many excellent geometers ſince the commencement of the Chriſtian era, and after the tranſlation of the Roman empire. Ptolemy lived under Marcus Aurelius; and we have extant the works of Pappus of Alexandria, who lived in the time of Theodoſius; the commentary of Eutocius, the Aſcalonite, who lived about the year of Chriſt 540, on

Archimedes's menſuration of a circle; and the commentary on Euclid, by Proclus, who lived under the empire of Anaſtaſius.

The conſequent inundation of ignorance and barbariſm was unfavourable to geometry as well as to the other ſciences; and thoſe few who applied themſelves to this ſcience, &c. were calumniated as magicians. However, in thoſe times of European darkneſs, the Arabians were diſtinguiſhed as the guardians and promoters of ſcience; and from the ninth to the fourteenth century they produced many aſtronomers, geometers, geographers, &c. from whom the mathematical ſciences were again received into Spain, Italy, and other parts of Europe, ſomewhat before the beginning of the 15th century. Some of the earlieſt writers after this period are Leonardus Piſenus, Lucas Paciolus or de Burgo, and others between 1400 and 1500. After this period appeared many editions of Euclid, or commentaries upon his Elements; *e. g.* Orontius Fineus, in 1530, publiſhed a commentary on the ſix firſt books; as did James Peletarius in 1557; and about the ſame time Nicholas Tartaglia publiſhed a commentary on the whole 15 books. We might here mention other editions or commentaries; ſuch are thoſe of Commandine, Clavius, Billingſly, Schéubelius, Harlinus, Daſypodius, Ramus, Herigon, Stevinus, Saville, Barrow, Tucquet, Dechales, Furnier, Scarborough, Keill, Cann, Stone, and many others. (See ELEMENTS.)

At the revival of letters, there were few Europeans capable of tranſlating and commenting on the works of the ancient geometers; and geometry made little progreſs till the time of Des Cartes, who publiſhed his Geometry in 1637. However, not to mention all thoſe who extended geometry beyond its elementary parts, ſuch as Theodoſius in his Spherics, Serenus in his ſections of the cone and cylinder, Kepler in his Nova Stereometria, &c.; in 1635, Bonaventure Cavalerius, an Italian of the order of Jeſuits, publiſhed his "Geometry of Indiviſibles;" Torricelli his "Opera Geometrica;" Viviani, his "Divinationes Geometricæ," "Exercitatio Mathematica," "De Locis Solidis," "De Maximis et Minimis," &c.; Vieta, his "Effectio Geometrica," &c.; Gregory St. Vincent, in 1647, publiſhed his treatiſe, entitled "Quadratura Circuli & Hyperbolæ," a work abounding with excellent theorems and paralogiſms; and Paſcal, about the ſame time, publiſhed his treatiſe of the cycloid. Geometry, as far as it was capable of deriving aid and improvement from the arithmetic of infinites, was indebted to the labours of Fermat, Barrow, Wallis, Mercator, Brounker, J. Gregory, Huygens, and others, to whom we may add Newton and Leibnitz. (See FLUXIONS.) But ſir Iſaac Newton contributed to the progreſs of pure geometry by his two treatiſes, "De Quadratura Curvarum," and "Enumeratio Linearum Tertii Ordinis" (ſee CURVE): and ſtill farther by his incomparable and immortal work, entitled "Philoſophiæ Naturalis Principia Mathematica," which will always be conſidered as the moſt extenſive and ſucceſsful application of geometry to phyſics. We cannot forbear tranſcribing in this place the compliment paid to this author by the editors of the Encyclopedie, who, conſidering the various monuments of the author's genius, and that he had made his principal diſcovery before the age of twenty-four, are tempted, they ſay, to ſubſcribe to the words of Pope, that the ſagacity of Newton aſtoniſhes even celeſtial intelligences, and that they contemplate him as a being occupying a kind of middle ſtation between man and themſelves; or at leaſt they cannot forbear exclaiming, *homo homini quid præſtat!* what a diſtance does there ſubſiſt between one man and another!

The modern geometers are innumerable; and the names of Cotes, Maclaurin, R. Simſon, T. Stewart, T. Simpſon, &c. not to mention living writers, will always be held in eſteem and veneration by thoſe that are devoted to the ſtudy of geometry and mathematics. See ELEMENTS.

The province of geometry is almoſt infinite: few of our ideas but may be repreſented to the imagination by lines, upon which they become of geometrical conſideration: it being geometry alone that makes compariſons, and finds the relations of lines.

Aſtronomy, muſic, mechanics, and, in a word, all the ſciences which conſider things ſuſceptible of more and leſs, *i. e.* all the preciſe and accurate ſciences, may be referred to geometry; for all ſpeculative truths conſiſting only in the relations of things, and in the relations between thoſe relations, they may be all referred to lines. Conſequences may be drawn from them; and theſe conſequences, again, being rendered ſenſible by lines, they become permanent objects, which may be conſtantly expoſed to a rigorous attention and examination: and thus we have infinite opportunities both of enquiring into their certainty, and purſuing them farther.

The reaſon, for inſtance, why we know ſo diſtinctly, and mark ſo preciſely, the concords called *octave, fifth, fourth,* &c. is that we have learnt to expreſs ſounds by lines, *i. e.* by chords accurately divided; and that we know, that the chord, which ſounds octave, is double of that with which it makes octave; that the fifth is the ſeſquialterate ratio, or as three to two; and ſo of the reſt. The ear itſelf cannot judge of ſounds with ſuch a nice preciſion; its judgments are too faint, vague, and variable, to form a ſcience. The fineſt beſt-tuned ear cannot diſtinguiſh many of the differences of ſounds; whence many muſicians deny any ſuch differences; as making this ſenſe their judge. Some, for inſtance, admit no difference between an octave and three ditones: and others, none between the greater and leſſer tone; the comma, which is the real difference, is inſenſible to them; and much more the ſchiſma, which is only half the comma.

It is only by reaſon, then, that we learn, that the length of the chord which makes the difference between certain ſounds being diviſible into ſeveral parts, there may be a great number of different ſounds contained therein, uſeful in muſic, which yet the ear cannot diſtinguiſh. Whence it follows, that had it not been for arithmetic and geometry, we ſhould have had no ſuch thing as regular fixed muſic; and that we could only have ſucceeded in that art by good luck, or force of imagination; *i. e.* muſic would not have been any ſcience founded on inconteſtible demonſtrations: though we allow, that the tunes compoſed by force of genius and imagination, are uſually more agreeable to the ear than thoſe compoſed by rule. So, in mechanics, the heavineſs of a weight, and the diſtance of the centre of that weight from the fulcrum, or point by which it is ſuſtained, being ſuſceptible of plus and minus, they may both be expreſſed by lines: whence geometry becomes applicable to this ſcience; in virtue of which, infinite diſcoveries have been made, of the utmoſt uſe in life.

Geometrical lines and figures are not only proper to repreſent to the imagination the relations between magnitudes, or between things ſuſceptible of more and leſs; as ſpaces, times, weights, motions, &c. but they may even repreſent things which the mind can no otherwiſe conceive, *e. gr.* the relations of incommenſurable magnitudes.

It muſt be obſerved, that this uſe of geometry among the ancients was not ſtrictly ſcientifical, as among us; but rather ſymbolical: they did not argue, or deduce things and properties unknown, from lines; but repreſented or delineated by them things that were known. In effect, they were not uſed as means or inſtruments of diſcovering, but as images or characters, to preſerve, or communicate, the diſcoveries that were already made.

"The Egyptians," Gale obſerves, "uſed geometrical figures, not only to expreſs the generations, mutations, and deſtructions of bodies; but the manner, attributes, &c. of the ſpirit of the univerſe, who, diffuſing himſelf from the centre of his unity, through infinite concentric circles, pervades all bodies, and fills all ſpace. But of all other figures they moſt affected the circle and triangle; the firſt, as being the moſt perfect, ſimple, capacious, &c. of all figures: whence Hermes borrowed it to repreſent the divine nature; defining God to be an intellectual circle or ſphere, whoſe centre is everywhere, and circumference nowhere." See Kirch. Œdip. Ægyptiac. and Gale Phil. General. lib. ii. cap. 2.

The ancient geometry was confined to very narrow bounds, in compariſon of the modern. It only extended to right lines and curves of the firſt order, or conic ſections; whereas into the modern geometry new lines of infinitely more and higher orders are introduced.

Geometry is commonly divided into four parts, or branches; planimetry, altimetry, longimetry, and ſtereometry; which ſee reſpectively.

Geometry, again, is diſtinguiſhed into *theoretical* or *ſpeculative*, and *practical.*

The firſt contemplates the properties of continuity; and demonſtrates the truth of general propoſitions, called *theorems.*

The ſecond applies thoſe ſpeculations and theorems to particular uſes in the ſolution of *problems.*

Geometry, *ſpeculative*, again may be diſtinguiſhed into *elementary* and *ſublime.*

Geometry, *elementary* or *common*, is that employed in the conſideration of right lines, and plane ſurfaces, and ſolids generated from them.

Geometry, *higher*, or *ſublime*, is that employed in the conſideration of curve lines, conic ſections, and bodies formed of them.

The writers who have cultivated and improved geometry may be diſtinguiſhed into elementary, practical, and thoſe of the ſublimer geometry.

The principal writers of elements, ſee enumerated under Elements.

Thoſe of the higher geometry are Archimedes, in his books De Sphæra, Cylindro, and Circuli Dimenſione; as alſo De Spiralibus, Conoidibus, Sphæroidibus, De Quadratura Parabolæ, and Arenarius: Kepler, in his Stereometria Nova; Cavalerius, in his Geometria Indiviſibilium; and Torricellius, De Solidis Sphæralibus; Pappus Alexandrinus, in Collectionibus Mathematicis; Paulus Guldinus, in his Mechanics and Statics; Barrow, in his Lectiones Geometricæ; Huygens, De Circuli Magnitudine; Bullialdus, De Lineis Spiralibus; Schooten, in his Exercitationes Mathematicæ; De Billy, De Proportione Harmonica; Lalovera, De Cycloide, For. Erneſt. Com. ab Harbenſtein, in Diatome Circulorum; Viviani, in Exercit. Mathemat. de Formatione & Menſura Fornicum; Bap. Palma, in Geomet. Exercitation. and Apoll. Pergæus, De Sectione Rationis.

For practical geometry, the fulleſt and completeſt treatiſes are thoſe of Mallet, written in French, but without the demonſtrations; and thoſe of Schwenter and Cantzlerus, both in High Dutch. In this claſs are likewiſe to be ranked Clavius's, Tacquet's, and Ozanam's Practical Geometries; De la Hire's Ecole des Arpenteurs; Reinholdus's Geodæſia; Hartman Beyers's Stereometria; Voigtel's Geometria Subterranea; all in High Dutch: Hulſius, Galileus, Goldmannus, Scheffelt, and Ozanam, on the Sector. &c. &c. &c.

The ſcience of geometry is founded on certain axioms, or ſelf-evident truths (ſee Axiom); it is introduced by definitions of the various objects which it contemplates, and the properties of which it inveſtigates and demonſtrates, ſuch as points, lines, angles, figures, ſurfaces, and ſolids:—lines again are conſidered as ſtraight or curved; and in their relation to one another, either as inclined or parallel, or as perpendicular:—angles as right, oblique, acute, obtuſe, external, vertical, &c.:—figures, with regard to their various boundaries, as triangles, which are, in reſpect of their ſides, equilateral, iſoſceles, and ſcalene, and in reference to their angles, right-angled, obtuſe-angled, and acute-angled; as quadrilaterals, which comprehend the parallelogram, including the rectangle and ſquare, the rhombus and rhomboid, and the trapezium and trapezoid; as multilaterals or polygons, comprehending the pentagon, hexagon, heptagon, &c.; and as circles:—and as ſolids, including a priſm, parallelepipedon, cube, pyramid, cylinder, cone, ſphere, and the fruſtum of either of the latter. We ſhall not here attempt to compile a complete ſyſtem of geometry, as it would occupy too many of our pages, in a work from its nature protracted and enlarged to a very great extent; and this is the leſs neceſſary, becauſe the reader will find under the titles above enumerated, and others naturally connected with and derived from them, the moſt eſſential and important principles of geometry, together with the operations that are founded upon them; and becauſe any perſon who is deſirous of acquainting himſelf with the ſcience of geometry, in its whole extent and application, will have recourſe to one or other of thoſe numerous treatiſes, in a more enlarged or more compendious form, which may be eaſily procured. The Elements of Euclid by Dr. R. Simpſon occur firſt to our recollection, and deſerve particular recommendation; but the object of the geometrical ſtudent may be ſatisfactorily attained by T. Simpſon's Geometry, or by the treatiſes of Emerſon, Hutton, Bonnycaſtle, Leſlie, &c. &c.

But as the analytic method of treating geometrical queſtions is leſs generally known, and as complete treatiſes on this ſubject are only to be found in foreign works, we have been induced to devote a conſiderable ſpace to this part of the ſcience; the following treatiſe is chiefly compiled from the "Feuilles d'Analyſe" by Monge, which were publiſhed in ſeparate portions for the uſe of the polytechnic ſchool, and afterwards collected in a quarto volume. A more elementary work has lately been publiſhed by Garnier in octavo, to which the reader is referred.

Geometry, *Analytic.*—Method of defining the poſition of a point in a plane.

A point M (*Analyſis*, *Plate* VIII. *fig.* 1.) is defined by referring its poſition to two lines, as A Y, A X, generally at right angles to each other, but they may be inclined at any given angle.

If M Q be drawn perpendicular to A Y, and M P perpendicular to A X, then Q M, M P, are called the co-ordinates of the point M; the diſtance of the point from A Y is uſually denoted by x, and its diſtance from A X by y.

The point of interſection of the two lines A Y, A X is called the origin of the co-ordinates, and the lines A Y, A X, produced each way to Y′ and X′, are called axes.

If the diſtance of the point M from theſe axes is given, *viz.* $MQ = a$, $MP = b$, then $x = a$, $y = b$ is the equation to the point M.

But if the point M be ſituated in any other of the angles, the ſign of a and b will vary, and theſe variations are governed by the ſame rules, as the ſines and coſines in trigonometry.

For inſtance, if the point M is ſituated in the angle

Y A X,

Y A X, then $x = +a,\ y = +b$
The equation of M' is $x = -a,\ y = +b$
M'' is $x = -a,\ y = -b$
M''' is $x = +a,\ y = -b$

If the point M is ſituated on the line A X, then $y = 0$, $x = a$.

If it is ſituated on A Y, then $x = 0$; $y = b$, and at the point A, $x = 0$; $y = 0$.

The point M may likewiſe be defined by the length of the line A M, and by the angle ϕ, which it makes with the axis A X. If this length be expreſſed by z, and the angle by ϕ,

$$z = c\,;\ \phi = A$$

A° being the number of degrees contained in the angle ϕ, and c the value of z.

The poſition of a ſtraight line is determined in a plane by the co-ordinates of two of its points, or by the co-ordinates of a ſingle point, and the angle which it makes with one of its axes: the latter is the method moſt uſually employed.

If the line paſſes through the origin of the axes, its poſition is determined by the angle which it makes with the axis.

We ſhall firſt conſider this caſe as being the moſt ſimple. Let it be propoſed to determine the relation between the co-ordinates of any point in ſuch a ſtraight line.

Let us take, for example, a point M′ (*fig.* 2.) whoſe abſciſſa is A $P' = x'$. $P'M' = y'$: theſe co-ordinates, like thoſe of the other points, making an angle β with each other, which is that of the axes, we ſhall have this equation;

$$\frac{y'}{x'} = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)}\,;$$

and for the points M″, M‴, &c. whoſe co-ordinates would be x'', y''; x''', y''', &c. we have

$$\frac{y''}{x''} = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)},\ \frac{y'''}{x'''} = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)},\ \&c.$$

If x, y repreſent the co-ordinates of any point in A L, the general equation will be

$$\frac{y}{x} = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)} \text{ .... } (1)$$

thus x becoming ſucceſſively x', x'', &c. y changes to the correſponding ordinates y', y'', &c. The formula (1) is called the equation of a ſtraight line; it is the algebraic enunciation of a property common to all its points, and is thus written;

$$y = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)}\,x \text{ .... } (2)$$

The abſciſſa x being given, the ordinate y may be deduced.

When the angle α varies, the line changes its poſition, turning round the point A; thus another ordinate y correſponds to the ſame abſciſſa x, which alſo happens if β varies, but it is eſſential to obſerve that for all the values both of α and β, the equation (2) retains the ſame form.

If it ſhould be required to find the relation between the co-ordinates of the point of a ſtraight line R′ L′, ſituated in any manner whatever, then if A L be drawn parallel to R′ L′, paſſing through the point A, we ſhall obſerve that for the ſame abſciſſa x every ordinate of A L, for example; P′ M′ will be augmented by the ſame quantity A $R = b$; let $y + b$ be repreſented by y, equation of R′ L′ will be according to (2);

$$y = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)}\,x + b \text{ .... } (3)$$

Here α and b give the poſition of the ſtraight line R′ L′; when theſe quantities are known it may be conſtructed, but if the line is ſubject to any particular conditions, as, to paſs through a given point; to be either parallel or perpendicular to a given line; to paſs through two points, &c. α and b become unknown quantities, as we ſhall ſee immediately.

Let us ſuppoſe the quantities a, β, and b given, and that it is required to conſtruct the ſtraight line $y = \frac{\text{ſin. }\alpha}{\text{ſin. }(\beta - \alpha)}\,x + b$; the problem is reduced to finding two of theſe points; we endeavour to find the points in which the line cuts the two axes A X, A Y, (*fig.* 3.) the interſection R being the only point of the line in which $x = 0$, and R′ the only point of the ſame line in which $y = 0$; we ſuppoſe, ſucceſſively, $x = 0$, $y = 0$, and we ſhall find $y = b =$ A R, $x = -\frac{\text{ſin. }(\beta - \alpha)}{\text{ſin. }\alpha}\,b =$ A R′; taking, then, A R′ on the other ſide of the point A, if it is negative, and A R on A Y if it is poſitive, the line drawn through theſe two points will be that belonging to the equation.

If the equation to a ſtraight line $y = x + 1$ be ſuppoſed to refer to two axes, making an angle of 45° with each other, and the inclination, α, which the line makes with the axis X be required; ſince $\frac{\text{ſin. }\alpha}{\text{ſin. }45^\circ - \alpha} = 1$, ſin. $\alpha = \frac{1}{\sqrt{2}}$ coſ. $\alpha - \frac{1}{\sqrt{2}}$ ſin. α; conſequently, tang. $\alpha = \frac{1}{1 + \sqrt{2}}$.

The value of b remaining conſtant, the line takes every poſſible poſition round the point R (*fig.* 2.) for every poſſible angle from 0 to 360°; for every angular value of α, taken with every ordinate b, poſitive and negative, the line will paſs through every point of the axis Y Y′. There exiſts, therefore, no line in the ſame plane that cannot be defined by equation (3), provided b and α are taken of a proper value.

The angle β has no influence on the poſition of the line; the variations of this angle only affect the inclination of the ordinate upon the axis of the abſciſſæ; ſo that for the ſame abſciſſæ, the ordinate correſponds with another point in the line.

But, in general, the co-ordinates are ſuppoſed rectangular; in which caſe, ſin. $\beta =$ ſin. $90^\circ = 1$, and ſin. $(\beta - \alpha) =$ coſ. α; and equation (3) becomes $y = x$ tang. $\alpha + b = ax + b$, a being ſuppoſed the tang. α.

When the ſtraight line paſſes through the origin of the co-ordinates, its equation becomes $y = ax$.

This equation is conſtructed by taking A $P = 1 =$ radius, and then ſetting off from a ſcale of equal parts the value of a on the perpendicular P M (*fig.* 4.); PM being equal to α, M will be a point in the required line.

We may now conſtruct the equation $y = x + 1$, $y = -x - 1$.

Theſe two lines cut the axis A X in the ſame point, and are ſituated ſimilarly to it, one above, the other below; they are moreover perpendicular to each other.

The ſtraight lines $y = -x - 1$, $y = -x + 1$, are parallel, becauſe they make the ſame angle with the axis, having the ſame tangent, -1.

The ſtraight line expreſſed by the equation $y = x\sqrt{-1} - 1$ is reduced to a point on the axis Y below the origin, and diſtant from it by a quantity equal to unity, ſince, for every other value than zero, the ordinate is imaginary.

The problems relating to a ſtraight line, in general, require the unknown quantities a and b to be determined, ſo that the required line $y = ax + b$ (1) may have the required poſition.

Problem I.

To make a ſtraight line paſs through two given points. Let the co-ordinates of one point be x', y', and of the other x'', y''; which ſignifies that when the ordinate generally expreſſed by y becomes y', the ordinate x becomes x'; and when $x = x''$, $y = y''$, we have therefore two equations of condition:

$$(2) \ldots\ldots\ldots\ldots y' = ax' + b, \quad y'' = ax'' + b \ldots\ldots\ldots\ldots (3)$$

from whence we obtain

$$a = \frac{y'' - y'}{x'' - x'} = \frac{y' - y''}{x' - x'}:$$

and by ſubſtituting for a its value,

$$b = \frac{y'x'' - y''x'}{x'' - x'}$$

Or equation (2) may be ſubtracted from equation (1), then $y - y' = a\,(x - x')$; and ſubſtituting for a in this equation its value, as found above, the equation of the line required is

$$y - y' = \frac{y' - y''}{x' - x''}\,(x - x') \ldots\ldots\ldots\ldots (4)$$

in which equation we may obſerve that when x becomes x', the ſecond term becomes equal to zero, and $y = y'$.

If $y' = y''$, then $y = y'$, or $y = y''$, which denotes that the line is parallel to the axis A X.

If $x' = x''$, $a = \dfrac{y' - y''}{0} = \infty$, the angle which the line makes with the axis is in this caſe a right one.

Problem II.

To determine the diſtance between two given points in a plane.

The diſtance M′ M″ (*fig.* 5.) is the hypothenuſe of the right-angled triangle M′ M″ m'': if it be repreſented by D, then $D = \sqrt{\overline{M''m''}^2 + \overline{M'm''}^2} = \sqrt{(y'' - y')^2 + (x'' - x')^2}$. If the point M is at the origin, the co-ordinates $x'\,y'$ become nothing, and the preceding expreſſion is reduced to $D^2 = \sqrt{y''^2 + x''^2} = x''\sqrt{1 + a^2}$, becauſe then the equation to the ſtraight line is $y = ax$; and as this alſo takes place when $x = x''$, $y = y''$, it gives $y'' = ax''$.

Problem III.

To determine the equation of a ſtraight line that ſhall paſs through a given point, and be parallel to a given ſtraight line.

Theſe two conditions are ſufficient to determine the two elements of poſition for the required ſtraight line.

Let the equation of the given ſtraight line be $y = ax + b$ ……… (1), and that of the line required $y = a'x + b'$ ……… (2): a and b are, in this caſe, given, and a' and b' required. Let x', y' denote the co-ordinates of the given point; and ſince this point is in the required line, we have $y' = a'x' + b'$ ……… (3).

From equation (1) take equation (3), and $y - y' = a'$ $(x - x')$ ……… (4).

The ſame reſult may be obtained by taking the value of b' in equation (3), and ſubſtituting it in equation (2). Moreover, the two ſtraight lines being parallel, their trigonometric tangents are the ſame, that is, $a = a'$: introducing this condition in equation (4), that of the line required will be $y - y' = a\,(x - x')$ ……… (5).

If the given point be taken on the given line, then y' is the value of y, which correſponds to $x = x'$; and equation (1) becomes

$$y' = ax' + b.$$

Subſtituting this value of y' in equation (5), we obtain

$$y = ax + b$$

which ſhews that the required line and the given line are identical, which is, indeed, ſelf-evident.

Problem IV.

The equation of two ſtraight lines being given to determine the angle which they make with each other, (*fig.* 6.) The angles C A X, C B X, are given, the angle to be found is A C B. Put C A X $= \alpha$, C B X $= \alpha'$; A C B $=$ V, tang. $\alpha = a$, tang. $\alpha' = a'$; then $\alpha' = \alpha +$ V, and tang. V $=$ tang. $(\alpha' - \alpha) = \dfrac{a' - a}{1 + aa'}$. If the ſtraight lines are parallel, tang. V $= 0$, and $a' = a$; if they are perpendicular, tang. V $= \infty$, or $\dfrac{1}{\text{tang. V}} = 0$; therefore $1 + aa' = 0$.

Problem V.

To determine the equation of a ſtraight line that ſhall paſs through a given point, and make a given angle with a given ſtraight line. Let the equation of the given line be - - $y = ax + b$ ……… (1)
and that required - $y = a'x + b'$ ……… (2)
a and b are given; from whence a' and b' are to be determined by the conditions of the problem. Since the required line is to paſs through a point whoſe co-ordinates are x', y', its equation muſt ſubſiſt when $x = x'$, and $y = y'$; hence

$$y' = a'x' + b' \ldots\ldots\ldots (3), \text{ and conſequently}$$

$$y - y' = a'\,(x - x') \ldots\ldots\ldots (4);$$

b' being determined from one of the conditions, it remains to determine a' from the other. Now, m being the trigonometric tangent of the angle which the two lines make with each other (by Problem IV.), $m = \dfrac{a' - a}{1 + aa'}$; hence $a' = \dfrac{a + m}{1 - ma}$. Subſtituting this value of a' in equation (4), we have the equation required,

$$y - y' = \frac{a + m}{1 - ma}\,(x - x') \ldots\ldots\ldots (5).$$

Problem VI

To determine the condition under which three lines, drawn from the angles of a triangle, will meet in a ſingle point. Let x', y'; x'', y''; x''', y''' be the co-ordinates of the angles D, B, C (*fig.* 7.); the equations to the three ſtraight lines drawn from theſe angles will be $y - y' = a'$ $(x - x')$; $y - y'' = a''\,(x - x'')$; $y - y''' = a'''\,(x - x''')$; a', a'', a''' being the trigonometrical tangents of the angles which they make with the axis A X. For theſe lines to meet in a point, it is requiſite that the ſame ſyſtem of values of x, y, ſhould ſubſiſt for the three equations, which is equivalent to finding the value of x and y by means of any two of them, and making the reſult of their ſubſtitution in the third equal to zero; we thus find the equation of condition

$$a'(y'' - y''') + a''(y''' - y') + a'''(y' - y'') + a'a''(x' - x'') = 0 \quad (1)$$
$$+ a''a'''(x'' - x''')$$
$$+ a'''a'(x''' - x')$$

Let us ſuppoſe the required ſtraight lines to be perpendicular to the ſides of the triangle, and then examine if, upon this ſuppoſition, the equation (1) ſubſiſts.

The equation to B C is $y - y'' = \frac{y'' - y'''}{x'' - x'''}(x - x'')$; and that of the ſtraight line drawn through D is $y - y' = a'(x - x')$.

Now as this latter ſtraight line ſhould be perpendicular to the other, the equation $aa' + 1 = 0$, from whence $a' = -\frac{1}{a}$, ought to exiſt between the trigonometrical tangents; but here $a = \frac{y'' - y'''}{x'' - x'''}$, therefore $a' = \frac{x'' - x'''}{y'' - y'''}$.

The ſtraight line drawn through B being perpendicular to D C, we conclude

$$y - y' = \frac{y' - y'''}{x' - x'''}(x - x'),\; y - y'' = a''(x - x'')$$

and the ſtraight line drawn through C being perpendicular to D B, we have likewiſe

$$y - y' = \frac{y' - y''}{x' - x''}(x - x'),\; y - y''' = a'''(x - x''')$$

Hence the values of a'', a''', are

$$a'' = -\frac{x''' - x'}{y''' - y'};\quad a''' = -\frac{x' - x''}{y' - y''};$$

and likewiſe

$$\left.\begin{aligned} a'a''(x' - x'') &= \frac{(x' - x'')(x'' - x''')(x''' - x')}{(y' - y'')(y'' - y''')(y''' - y')}(y' - y'') \\ a''a'''(x'' - x''') &= \frac{\text{N}}{\text{D}}(y'' - y''') \\ a'''a'(x''' - x') &= \frac{\text{N}}{\text{D}}(y''' - y') \end{aligned}\right\}\ldots(2)$$

N and D being the numerator and denominator of the fraction which multiplies $y' - y''$. By the ſubſtitution of all theſe values the equation of condition is ſatisfied, for it becomes

$$-(x'' - x''' + x''' - x' + x' - x'') + \frac{\text{N}}{\text{D}}(y' - y'' + y'' - y''' + y''' - y') = 0$$

(*fig.* 8). If the ſide B C be placed on the axis of the abſciſſæ, which does not alter the general nature of the reſults, and alſo the point B be placed at A, then $y'' = 0$, $x'' = 0$, $y''' = 0$, and the equation of condition is ſimplified, and becomes $-a''y' + a'''y' + a'a''x' - a''a'''x''' + a'''a'(x''' - x') = 0 \ldots\ldots (3)$. In this poſition of the triangle, $a' = -\frac{x'' - x'''}{y'' - y'''} = \infty$, and in fact the line D R is perpendicular to A X. If in equation (3) the terms which do not include a' be ſuppreſſed, to expreſs that the tangent is infinite, the equation (3) will be ſimplified, and expreſſed, thus, $a'a''x' + a'''a'(x''' - x') = 0$; and dividing by a', $a''x' + a'''(x''' - x') = 0$; but in this poſition of the triangle, we have $a'' = \frac{x''' - x'}{y'}$; $a''' = -\frac{x'}{y'}$; and by theſe values the preceding equation is ſatisfied.

If from the points A and C lines be drawn to the middle of the oppoſite ſides, the trigonometrical tangent will be $a'' = \frac{y'}{x''' - x'}$, $a''' = \frac{y'}{x' - 2x'''}$. The ſubſtitution of theſe values in equation (3) will give, after dividing by y,

$$a'\left\{\frac{x'}{x''' + x'} + \frac{x''' - x'}{x' - 2x'''}\right\}$$
$$= \frac{y'}{x''' + x} - \frac{y'}{x' + 2x'''} + \frac{y'x'''}{(x''' + x')(x' - 2x''')};$$

from which we deduce $a' = \frac{-2y'}{x''' - 2x'}$; and as this is found to be the value of a', that is, of the trigonometrical tangent of the angle which the line D M makes with A X, it may be concluded that this third line paſſes through the point of interſection of the two firſt.

Let us conſider the perpendiculars drawn from the centres of the ſides of the triangle A D C (*fig.* 9.), the equation

of A D is $y = \frac{y'}{x'}x$

of D C, $y - y' = \frac{y'}{x' - x'''}(x - x')$

of A C, $y = 0$

The equations of the perpendiculars to theſe ſides are,

$$y - \tfrac{1}{2}y' = -\frac{x'}{y'}(x - \tfrac{1}{2}x')$$
$$y - \tfrac{1}{2}y' = -\frac{x' - x'''}{y'}\left(x - \frac{x' + x'''}{2}\right)$$
$$x = \frac{x'''}{2}.$$

The equation of condition may be immediately formed by determining x from the two firſt equations, and employing this value in the third; which ought to be ſatisfied by this ſubſtitution if there exiſts a point of interſection; now x is found $= \frac{x'''}{2}$; therefore theſe three lines interſect in a point.

Method of determining the Poſition of a Point in Space.—Let A X, A Y, A Z, be three ſtraight lines reciprocally perpendicular to each other (*fig.* 10.) at the point A; each of them will be perpendicular to the two others, becauſe it is perpendicular to two ſtraight lines which interſect at its extremity in this plane. Therefore each of theſe planes will be at the ſame time perpendicular to the two others. Theſe three planes form then the three faces of a rectangular parallelopipedon, and the ſolid trihedral angle A. Let us ſuppoſe the planes Z A X and Z A Y vertical, and the plane Y A X horizontal. Let a point in ſpace be repreſented by M, ſituated out of the planes Z A X, Z A Y, Y A X in real poſition, for example, before the firſt plane, to the right of the ſecond, and above the third; and let us ſuppoſe perpendiculars M M′, M M″, M M‴, from the point M to theſe three planes; theſe perpendiculars will meaſure the ſhorteſt diſtances from the point to each of theſe planes. The planes drawn through the perpendicular M M′ and M M″, M M′ and M M‴, M M″ and M M‴ will encloſe the parallelopipedon, and the point M will be the ſummit of the ſolid trihedral angle M oppoſite to the angle A.

The diſtance M M′ from the point M, to the plane Z A X is in real length equal to M″ *m*′ or A *m*″; the diſtance M M″ from the ſame point to the plane Z A Y is M‴ *m*″ or A *m*, and the diſtance from this point to the horizontal plane Y A X is M M''' or M' *m* or A *m'*. Thus theſe diſtances may be found on the fixed lines A Y, A X, A Z.

The points M', M'', M''', of the perpendiculars let fall from the point M on the planes to which we refer the poſition of this point, are called the *vertical* and *horizontal projections* of the point M, *vertical* in conſidering M' and M'', and *horizontal* when conſidering M'''.

Two of theſe projections are ſufficient to determine the point; for if from each of them perpendiculars be drawn to the plane which contains it, they will interſect in the point M.

The third projection evidently reſults from each of the two others, as may be ſeen in the figure.

Since the poſition of a point is completely defined by its diſtance from three rectangular planes of projection, if we denote the diſtance of the point from the plane Y A Z by x, the diſtance of the ſame point from the plane Z A X by y, and its diſtance from the plane Y A X by z, and the linear values of theſe diſtances be denoted by a, b, c, its poſition will be indicated by $x = a$, $y = b$, $z = c$: the formulæ $x = a$, $z = c$, denote the poſition of the projection M': the formulæ $y = b$, $z = c$, denote the projection M''; and theſe two projections are ſufficient, as we have ſeen, to find the poſition of the point; and theſe two ſyſtems of formulæ compriſe the data of the three diſtances. When the point is in the horizontal plane, $z = 0$, and its poſition is fixed by $x = a$, $y = b$: when it is in the plane Z A X, $y = 0$, and its poſition is determined by $x = a$, $z = c$; and if in the plane Z A Y we have $x = 0$, and it is defined by $y = b$, $z = c$.

For a point ſituated on the axis A X, we have $z = 0$, $y = 0$, $x = a$.

If on the axis A Y, $z = 0$, $x = 0$, $y = b$; and if on A Z, $x = 0$, $y = 0$, $z = c$.

At A, the origin of theſe diſtances, we have $x = 0$, $y = 0$, $z = 0$.

Every point in the plane, M M' *m* M''', and conſequently the plane itſelf, is denoted by $x = a$, becauſe a is the common diſtance of each of its points from the plane Y A Z.

The plane M M'' *m''* M''' is denoted by $y = b$, and the plane M M' *m'* M' is deſcribed by $z = c$.

The poſition of theſe three planes gives that of the point M, and conſequently this point will be defined, as we have already ſaid, by the formulæ $x = a$, $y - b$, $z = c$.

Of the Equations to a ſtraight Line.—The equations of a ſtraight line, ſituated in ſpace, expreſs the relation which exiſts between the co-ordinates x, y, z, of any point whatever of the ſtraight line: let us ſuppoſe it projected on the planes $x z$, and $y z$; theſe projections will be other ſtraight lines, which have for their equations

$$x = a z + \alpha \quad . \quad . \quad . \quad . \quad y = b z + \beta:$$

eliminating z from theſe equations, the reſulting equation is $b x - a y = b a - \alpha \beta$, which belongs to the plane $x y$.

The equations of theſe three projections, of which any two imply the third, are the equations of the ſtraight line, whoſe poſition in ſpace depends on the conſtant quantities $a b$, $\alpha \beta$.

To obtain the co-ordinates of the points in which this ſtraight line cuts the three planes, we muſt make ſucceſſively the three values $x = 0$, $y = 0$, $z = 0$, which gives $x = \alpha$, $y = \beta$, for the point where the ſtraight line interſects the plane $x y$; $z = -\frac{\beta}{b}$ $x = -\frac{\alpha \beta}{b} + \alpha$ for the point where it interſects $x z$; $z = -\frac{\alpha}{a}$, $y = \frac{b a}{a} + \beta$ for the point where it meets the plane $y z$.

The ſtraight line, whoſe equation is $x = a z + \alpha$; makes, with the axis z, an angle, whoſe tangent is a: it cuts the axis x in a point, whoſe diſtance from the origin of the co-ordinates is equal α, ſince, if in this equation $z = 0$, $x = \alpha$.

If two ſtraight lines are ſituated in the ſame plane; ſuppoſe that of x, z, then let the equation to the firſt be $x = a z + \alpha$, and to the ſecond $x = a' z + \alpha'$; for theſe ſtraight lines to be parallel, a' muſt $= a$, and, if perpendicular, $1 + a a' = 0$, or $a' = -\frac{1}{a}$.

The equation of two ſtraight lines, ſituated in ſpace being, for the firſt,

$$x = a z + \alpha,\ y = b z + \beta$$
$$x = a' z + \alpha',\ y = b' z + \beta';$$

the equation, which expreſſes that theſe lines meet each other, is $(\alpha' - \alpha)(b' - b) - (\beta' - \beta)(a' - a) = 0$, which reſults from the elimination of x, y, z, from the four equations of the two ſtraight lines.

Problems relating to a ſtraight Line.—PROB. I. To draw a ſtraight line through a point given in ſpace parallel to a given ſtraight line. Let the three rectangular co-ordinates be x, y, z; z being ſuppoſed vertical; and let the equations of the projections of the ſtraight line on the vertical planes be $x = a z + b$, $y = a' z + b'$; then the equation of the horizontal projection will be $a y - a' x = a b' - a' b$.

If x', y', z', repreſent the co-ordinates of the given point, the equations of the required line will be

$$x - x' = a\,(z - z')$$
$$y - y' = a'\,(z - z')$$
$$a\,(x - x) = a\,(y - y')$$

of which any two imply the third.

PROB. II.

To determine the equation of a ſtraight line drawn through two points given in ſpace. Let x', y', z', be the co-ordinates of the firſt point; x'', y'', z'', thoſe of the ſecond, the ſtraight line paſſing through the firſt point, its equations will be of the form

$$x - x' = a\,(z - z')$$
$$y - y' = b\,(z - z')$$

(See Prob. I. of the plane)

And ſince it muſt paſs through the ſecond, its equations muſt alſo be

$$x - x'' = \alpha\,(z - z'')$$
$$y - y'' = b\,(z - z'')$$

a and b being eliminated from their four equations, the equations of the required ſtraight line will be

$$x\,(z' - z'') = z\,(x' - x'') + x'' z' - x' z''$$
$$y\,(z' - z'') = z\,(y' - y'') + y'' z' - y' z''.$$

The co-ordinates of the two extremities of a right line being x', y', z'', for the firſt, and x'', y'', z'', for the ſecond, the diſtance between the exremities, or length of the line joining them, will be

$$\sqrt{(x' - x'')^2 + (y' - y'')^2\,(z' - z'')}.$$

PROB. III.

To determine the conditions requiſite for two ſtraight lines to meet in ſpace. Let the equations of one ſtraight line be

$$x = a z + \alpha$$
$$y = b z + \beta$$

and of the other

$$x = a' z + \alpha'$$
$$y = b' z + \beta$$

To determine the relation between the elements of poſition $a, b, a', b'; \alpha, \beta, \alpha', \beta'$, eliminate x, y, z, from the four equations, and $(a' - a)\ (b' - b) - (\beta' - \beta)\ (\alpha' - \alpha) = 0$.

Of the Equation to a Plane.—A plane being given by its interſection with two co-ordinate planes, it may be conceived as generated by one of theſe lines moving parallel to itſelf in the direction of the other.

Let $z = ax + c$, and $z = by + e$, be the equations to the two given interſecting lines, the generating line being parallel to itſelf, and to the interſecting line on the plane xz, its equations in any one poſition will be

$$z = ax + y,\ y = \beta.$$

But if it ſhould meet the ſecond line, whoſe equations are

$$x = 0$$
$$z = by + e;$$

hence this equation of condition

$$b\beta + c = \gamma;$$

from which it follows, that the equation of the generating line of the plane, in any given poſition, depending on β, are

$$z = ax + b\beta + c$$
$$y = \beta.$$

Eliminating β from theſe two equations, that of the plane is obtained,

$$z = ax + by + c,$$

in which a and b are the tangents of the angles which the interſections of the plane make with the axes x and y; c is the co-ordinate z, correſponding to the origin of the ordinates; ſince, if in the equation of the plane, x and y are made $= 0$, $z = c$. This equation may be more commodiouſly expreſſed by the following form:

$$Ax + By + Cz + D = 0,$$

in which, of the four conſtant quantities A, B, C, D, three only are neceſſary; hence $\begin{cases} -\dfrac{A}{C} = a \\ -\dfrac{B}{C} = b \\ -\dfrac{D}{C} = c. \end{cases}$

The equation of a plane has been determined from its interſections with the planes of the co-ordinates. Theſe interſections may likewiſe be determined by the equation to the plane.

Let $ax + by + c = z$, make ſucceſſively $x = 0$, $y = 0$, $z = 0$, and there reſult $\begin{cases} z = 0 \\ ax + by + c = 0 \end{cases} \begin{cases} y = 0 \\ z = ax + c \end{cases}$ $\begin{cases} x = 0 \\ z = by + c, \end{cases}$ which equations belong to the interſections of the given plane with the three planes xy, xz, and xy.

The equation of a ſtraight line, ſituated in one of the co-ordinate planes, is likewiſe that of a plane paſſing through this line, and perpendicular to the plane of the co-ordinates which contains it. When the plane is perpendicular to one of the axes, as x, its equation is $x = c$ (conſtant): $y = \beta$, $z = \gamma$, are the equations of two other planes, one perpendicular to the axis y, and the other perpendicular to the axis z.

In the equation to the plane make ſucceſſively $\begin{Bmatrix} z = 0 \\ y = 0 \end{Bmatrix}$, $\begin{Bmatrix} x = 0 \\ z = 0 \end{Bmatrix}$, $\begin{Bmatrix} y = 0 \\ x = 0 \end{Bmatrix}$; values will then be obtained for x, y, z; which are the diſtances of the origin of the co-ordinates from the points of interſection of the plane with the axes of the co-ordinates: let the equation to the planes be $z = az + by + c$, theſe diſtances will be $-\frac{c}{a}, -\frac{e}{b}, c$.

Two planes which are parallel have parallel interſections; therefore, if the equation to the firſt plane be

$$z = ax + by + c$$

the ſecond, $z = a'x + b'y + c'$

the condition of paralleliſm will be expreſſed by the equations $a = a'$, $b = b'$.

PROBLEM I.

Problems relating to a ſtraight Line and a Plane.—To draw a plane parallel to a given plane, let the equation to the given plane be

$$z = ax + by + d$$

and that of the plane required

$$z = a'x + b'y + d$$

then the condition of paralleliſm will be

$$a' = a,\ b = b.$$

PROBLEM II.

To determine the equation of a plane which ſhall paſs through three given points, let the co-ordinates of the given points be

1 . . . . x', y', z',
2 . . . . x'', y', z'',
3 . . . . x''', y''', z''',

The equation of the plane required being ſuppoſed

$$Ax + By + Cz + D = 0$$

the three following conditions are obtained;

$$Ax' + By' + Cz' + D = 0$$
$$Ax'' + By'' + Cz'' + D = 0$$
$$Ax''' + By''' + Cz''' + D = 0$$

from which are deduced the following equations;

$$A = y'(z'' - z''') + y''(z''' - z') + y'''(z' - z'')$$
$$B = z'(x'' - x''') + z''(x''' - x') + z'''(x' - x'')$$
$$C = x'(y'' - y''') + x'''(y''' - y') + x'''(y' - y')$$
$$D = x'(y''z''' - y'''z'') + x'(y'''z' - y'z''') + x'''(y'z'' - y''z')$$

The three co-efficients to determine are $\frac{A}{C}, \frac{B}{C}, \frac{D}{C}$ from the ſame number of equations. If the triangle formed by the ſtraight lines joining the given points be projected on the three planes zy, xz, yx, the areas of theſe reſpective projections will be $\frac{A}{2}, \frac{B}{2}, \frac{C}{2}$, and it will be ſhewn that D is ſix times the ſolidity of a pyramid whoſe baſe is the triangle in ſpace, and whoſe vertex is the origin of the co-ordinates.

Let a triangle, as $z' z'' z'''$, repreſent the projections of the above three points on the plane of xz, the area of the trapezium $z'' x'' x''' z'''$ will be $\frac{(x'' - x'')}{2} + \frac{z(x''' - x'')}{2}$

the area of the trapezium $x' z' z'' x''$ will be

$$\frac{z''(x'' - x')}{2} + \frac{z'(x''' - x'')}{2}$$

and that of the trapezium $x' z' z''' x'''$ will be

$$\frac{z'''(x''' - x')}{2} + \frac{(z' x''' - x')}{2}$$

From the ſum of the two firſt ſurfaces, take the laſt, the difference will be the area of the triangle projected on the plane xz, which will be $t' = \frac{B}{2}$. In the ſame manner, t and t'' repreſenting the projections of the ſame triangle on the planes yz, xy, we have

$$t = \tfrac{1}{2}A,\ t'' = \tfrac{1}{2}C.$$

PROBLEM III.

Given the co-ordinates of a point, and the equations of a ſtraight line, to find the equation of the plane which paſſes through the ſtraight line and the given point, let x', y', z' be the co-ordinates to the point;

$$\left.\begin{aligned} x &= az + \alpha \\ y &= bz + \beta \\ b &= (x - a) = a(y - \beta) \end{aligned}\right\} \text{be the equations of the line}$$

Then ſince the plane, whoſe equation is required, paſſes through the given point, and likewiſe through the point where the given line interſects the plane $x y$, the co-ordinates to which points are $z = 0$, $x = \alpha$, $y = \beta$. If the equation to the plane be ſuppoſed

$$z = A x + B y + D,$$

in which A, B, D, are co-efficients to be determined, then

$$z' = A x' + B y' + D \ldots\ldots (1)$$
$$0 = A \alpha + B \beta + D \ldots\ldots (2)$$

Now the right lines being in the plane, ſuppoſe them both moved parallel to themſelves till the plane paſſes through the origin of the co-ordinates, the equations there will be, for the ſtraight line,

$$x = a x,\ y = b z,\ a y = b x$$

and for the plane $x = A x + B y$.

In this poſition the line is ſtill in the plane, ſo that their co-ordinates are ſtill the ſame; therefore,

$$z = A a z + B b z, \text{and } 1 = A a + B b \ldots\ldots (3)$$

The equations 1, 2, 3, will give A, B, D in terms of a, b, α, β, and the equation of the plane will be

$$(x - x')(y' - b z' - \beta) - (y - y')(x' - a z - \alpha)$$
$$+ (z - z') \left\{ (b x' - \alpha) - a (y' - \beta) \right\} = 0.$$

Problem IV.

Given the equations of a ſtraight line, and of a plane to determine the conditions; 1ſt, that the plane and ſtraight line may be rectangular; 2d. The co-ordinates of the points where they meet; 3d. The diſtance of this point from a given point, either in the *given line* or given plane.

When a plane is perpendicular to a ſtraight line, the interſection of the plane with the co-ordinate planes and the projection of the line with theſe ſame planes are perpendicular to each other.

Let $x = a z + \alpha$, $y = b z + \beta$, be the equations to the line; $z = A x + B y + C$ the equation to the plane; the equations to the interſections of this plane with the rectangular planes of $x z$, and $x y$, are $z = A x + C \ldots\ldots z = B y + C$, but the plane being perpendicular to the line is $A = -a$, $B = -b$; therefore the equation of a plane perpendicular to the line, is $a x + b y + z = C$: combining this equation with thoſe of the ſtraight line $x = a z + \alpha$, $y = b z + \beta$ we may deduce the values of x, y, z, the co-ordinates of the point in which the ſtraight line interſects the plane. If the plane is given by the equation $a x + b y + z = C$, and the perpendicular to it be required to be drawn through a point whoſe co-ordinates are x, y, z, the equation to this perpendicular will be $x - x' = a (z - z') \ldots\ldots\ldots y - y' = b (z - z')$ and the equation to the plane may be expreſſed in this form

$$a (x - x') + b (y - y') + z - z' = C - a x' - b y' - z'$$

Let X, Y, Z, be the co-ordinates of the point of interſection of the plane and perpendicular, then

$$Z = z' + \frac{C - a x' - b y - z'}{1 + a^2 + b^2}$$

$$Y = y' + \frac{b (C - a x - b y' - z'}{1 + a^2 + b^2}$$

$$X = \frac{a (C - a x' - b y' - z'}{1 + a^2 + b^2}$$

The length of the perpendicular comprehended between the points X, Y. Z and the points x', y', z' is =

$$\sqrt{(X - x')^2 + (Y - y')^2 + (Z - z')^2}$$

$$[illegible] = \frac{C - a x' - b y' - z'}{\sqrt{[illegible]}}$$

Hence it follows that the perpendicular drawn from the origin of the co-ordinates upon a plane whoſe equation is $a x + b y + z = C$ is expreſſed by $\frac{C}{\sqrt{1 + a^2 + b^2}}$

Having the equations of a ſtraight line $\left\{ \begin{matrix} x = a z + \alpha \\ y = b z + \beta \end{matrix} \right\}$ the equation of a plane perpendicular to this line drawn through the point x', y', z', is $a (x - x') + b (y - y') + z - z' = 0$.

To find the co-ordinates of the point of interſection of the plane, the equations of the ſtraight line may be put under the following form;

$$x - x' = a z + \alpha - x'$$
$$y - y' = b z + \beta - y'$$

Let X′, Y′, Z′, be the co-ordinates of the points of interſection; then

$$Z = \frac{a (x' - \alpha) + b (y' - \beta) + z'}{1 + a^2 + b}$$

$$Y = \frac{b (a (x' - \alpha) + b (y' - \beta) + z'}{1 + a + b^2}$$

$$X = \frac{a (a (x' - \alpha) + b (y' - \beta) + z'}{1 + a + b^2}$$

Subſtituting for X′, Y′, Z′, their values in the radical

$$\sqrt{(X' - x)^2 + (Y - y')^2 + (Z - z')^2}$$

an expreſſion is obtained for the perpendicular contained between the given point of the ſtraight line, of which the co-ordinates are X′, Y′, Z′. When the ſtraight line paſſes through the origin of the co-ordinates, its equations become $x = a z$, $y = b z$ and the radical $\sqrt{X'^2 + Y'^2 + Z'^2}$ expreſſes tle length of the ſtraight line, drawn from the origin of the co-ordinates to its interſection with the perpendicular let fall from the point x', y', z', upon it: on this ſuppoſition, $\alpha = 0$, $\beta = 0$

$$Z' = \frac{a x' + b y' + z}{1 + a^2 + b^2};\ Y' = b z';\ X' = a z';$$ therefore $$\sqrt{X'^2 + Y'^2 + Z'^2} = \frac{a x' + b y' + z'}{\sqrt{1 + a^2 + b^2}}.$$

This expreſſion is uſed in finding the angle which two ſtraight lines make with each other.

4. The equation of two ſtraight lines being given to find the angle which they make with each other, and if they do not interſect each other to determine the angle which their projections form on a plane that is parallel to them, let the equations of the given lines be

$$1ſt \left\{ \begin{matrix} x = a z + \alpha \\ y = b z + \beta \end{matrix} \right.$$
$$2d \left\{ \begin{matrix} x = a' z + \alpha' \\ y = b' z + \beta' \end{matrix} \right.$$

If they interſect, the angle which they make is equal to the angle formed by their parallels which paſs through the origin of the co-ordinates; the equations to their parallels being $\left\{ \begin{matrix} x = a z,\ y = b z \\ x = a' z,\ y = b' z \end{matrix} \right\}$. If a point be taken on the ſecond parallel, whoſe co-ordinates are x', y', z', and a perpendicular be let fall from this point to the firſt parallel; then in the right-angled triangle formed by this perpendicular, and by the ſtraight lines drawn from the origin of the co-ordinates to the two extremities of this perpendicular, there are given the two ſides which contain the required angle; the expreſſion for one of theſe ſides is

$\sqrt{x'^2 + y'^2 + z'^2}$, the other, as found in the preceding problem, is $\frac{a x' + b y' + z'}{\sqrt{1 + a^2 + b^2}}$.

Therefore the coſine of the required angle is equal

$$\frac{a x' + b y' + z'}{\sqrt{1 + a^2 + b^2} \times \sqrt{x'^2 + y'^2 + z'^2}}.$$

But $x' = a' z'$, $y = b' z'$; therefore the coſine of the angle formed by the two given ſtraight lines

$$\frac{1 + a a' + b b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a'^2 + b'^2}}.$$

It appears from this expreſſion, that when two ſtraight lines have for their equations

$$\begin{cases} 1 \ldots\ldots\ldots\ldots\ldots x = a z, \; y = b z \\ 2 \ldots\ldots\ldots\ldots\ldots x = a' z, \; y = b z \end{cases}$$

if they are perpendicular to each other, the following equation of condition will be obtained, $1 + a a' + b b' = 0$, which equation may be likewiſe obtained directly as follows: the plane perpendicular to the firſt line drawn through the origin of the co-ordinates has for its equation $a x + b y + z = 0$. But the perpendicular to the firſt ſtraight line muſt be contained in the plane perpendicular to it; therefore the equations to the perpendicular $x = a' z'$, $y = b' z$, and the equation of the plane muſt ſubſiſt at the ſame time; therefore $1 + a a' + b b' = 0$. The angle of the two planes may be thus determined. Let $a x + b y + z = C$, $a' x + b' y + z = C$ be the equations of the planes; theſe make with each other the ſame angle as the ſtraight lines which are perpendicular to them, and which are drawn from the origin of the co-ordinates; therefore the coſine of the angle formed by the two given planes, is

$$\frac{1 + a a' + b b'}{\sqrt{1 + a^2 + b^2} \times \sqrt{1 + a'^2 + b'^2}}.$$

If the angle be required between one ſtraight line and one plane, then ſuppoſe a parallel drawn to the given lines through the origin of the ordinates, and a perpendicular to the plane, the angle contained between theſe two ſtraight lines will be the complement of the required angle; and conſequently, the coſine of the angle of the two lines is the ſine of the angle required.

The ſtraight line, whoſe equations are $x = a z$, $y = b z$, makes with the axes x, y, z, angles whoſe coſines are

$$\frac{x}{\sqrt{x^2 + y^2 + z^2}}, \quad \frac{y}{\sqrt{x^2 + y^2 + z^2}}, \quad \frac{z}{\sqrt{x^2 + y^2 + z^2}}$$

$$\frac{a}{\sqrt{1 + a^2 + b^2}}, \quad \frac{b}{\sqrt{1 + a^2 + b^2}}, \quad \frac{1}{\sqrt{1 + a^2 + b^2}}$$

The ſame expreſſions are the values of the coſines of the angles which a plane perpendicular to the ſtraight line, and whoſe equation is $a x + b y + z = 0$, makes with the co-ordinate planes $x y$, $z y$, $x z$. If the equation of the plane is $A x + B y + C z + D = C$, the coſines of the angles which it makes with the co-ordinate planes are

$$\frac{A}{\sqrt{A^2 + B^2 + C^2}}, \quad \frac{B}{\sqrt{A^2 + B^2 + C^2}}, \quad \frac{C}{\sqrt{A^2 + B^2 + C^2}}$$

and the expreſſion found above for the perpendicular, let fall from the origin of the co-ordinates on the plane, becomes

$$\frac{D}{\sqrt{A^2 + B^2 + C^2}}.$$

It has been already remarked, that if T be the triangle formed by the three lines which join, two and two, the three given points, and t, t', t'' its projections on the co-ordinate planes, then $t = \frac{1}{2} A$, $t' = \frac{1}{2} B$, $t'' = \frac{1}{2} C$; $\frac{D}{6}$ being the ſolidity of a pyramid which has for its baſe the triangle T, and whoſe vertex is the origin of the co-ordinates. Now the ſolidity of this pyramid is the product of the baſe T, by one third of its height $\frac{D}{\sqrt{A^2 + B'' + C^2}}$; therefore $\frac{D}{6} = T \times \frac{D}{3 \sqrt{A^2 + B^2 + C^2}}$, or ſubſtituting for A, B, C their values $2 t$, $2 t'$, $2 t''$, $T^2 = t'^2 + t + t''^2$.

If S be the area of another triangle whoſe projections are s, s', s'', and ſituated in the ſame plane as the triangle T; then

$$S^2 = S^2 + S'^2 + S''^2$$

Since $T = \frac{1}{2} \sqrt{A^2 + B^2 + C^2}$, $\frac{T}{t} = \frac{1}{\left(\frac{A}{\sqrt{A^2 + B^2 + C^2}}\right)}$ in like manner $\frac{T}{t'} = \frac{1}{\left(\frac{B}{\sqrt{A^2 + B^2 + C^2}}\right)}$; $\frac{T}{t''} = \frac{1}{\left(\frac{C}{\sqrt{A^2 + B^2 + C^2}}\right)}$ which ſignifies that any triangle is to its projection on one of the co-ordinate planes, as radius is to the coſine of the angle which the plane of the triangle makes with the plane on which it is projected.

But the triangle S being in the ſame plane with the triangle T

$$\frac{t}{T} = \frac{s}{S}, \quad \frac{t'}{T} = \frac{s'}{S}, \quad \frac{t''}{T} = \frac{s''}{S};$$

therefore if the equation $T^2 = t^2 + t'^2 + t''^2$ be put under this form, $T = \frac{t}{T} t + \frac{t'}{T} t' + \frac{t''}{T} t''$, it will become $T S = t s + t' s' + t'' s''$; but $(T^2 + S)^2 = T^2 + 2 T S + S^2 = t^2 + t'^2 + t''^2 + 2 t s + 2 t' s' + 2 t'' s'' + s^2 + s'^2 + s''^2$; therefore $(T + S)^2 = (t + s)^2 + (t' + s')^2 + (t'' + s'')^2$.

Taking in the ſame manner in the ſame plane a third triangle R, whoſe projections on the rectangular planes are r, r', r'', it may be ſhewn that $(R + S + T)^2 = (r + s + t)^2 + (r' + s' + t')^2 + (r'' + s'' + t'')^2$; hence if any plane figure whatever be projected on three rectangular planes, the ſquare of the area of this figure will be equal to the ſum of the ſquares of the areas of its three projections.

Problem V.

Two ſtraight lines being given, 1ſt, to determine the equations to a ſtraight line perpendicular to each of them on which their ſhorteſt diſtance is meaſured; 2d, to find an expreſſion for this ſhorteſt diſtance.

The direction of a plane parallel to two ſtraight lines given in poſition may be determined: this plane being drawn through any point in ſpace, we may conceive a plane to paſs through each of the ſtraight lines perpendicular to it: the interſection of theſe two planes is evidently the line required, therefore the equations to theſe planes will be thoſe of the line required.

Let $x = a z + \alpha$, $y = b z + \beta$, be the equations to the firſt line, it will meet the plane $x y$ in a point P, of which the co-ordinates $z = 0$, $y = \beta$, $x = a$.

The ſecond ſtraight line having for its equations $x = a' z + \alpha'$, $y = b' z + \beta$, it meets the plane $x y$ in a point P′, whoſe co-ordinates are $z = 0$, $y = \beta$, $x = \alpha$.

The equations of the planes drawn through the points P and P′ parallel to the two given ſtraight lines are of the form

$$A\ (x - \alpha) + B\ (y - \beta) + z = 0 \ \ldots\ldots\ (c)$$
$$A\ (x - \alpha') + B\ (y - \beta') + z = 0 \ \ldots\ldots\ (c')$$

A and B being two conſtant quantities determinable by the following equations

$$\left.\begin{array}{l} 1 + A\,a + B\,b = 0 \\ 1 + A\,a' + B\,b' = 0 \end{array}\right\}\ \text{hence}$$

$$A = \frac{b - b'}{a\,b' - a'\,b}\ (1)$$

$$B = \frac{a' - a}{a\,b' - a'\,b}\ (2)$$

The perpendiculars to theſe parallel planes drawn through the points P, P' have their equations

1ſt - - - $x = A\,z + \alpha;\ y = B\,z + \beta$
2d - - - $x = A\,z + \alpha';\ y = B\,z + \beta'$

The plane drawn through the firſt of theſe perpendiculars, and the firſt given line, has for its equation

$$L\ (x - \alpha) + M\ (y - \beta) + z = 0\ (E)$$

L and M being given by the two equations

$$1 + L\,A + M\,B = 0\ (3)$$
$$1 + L\,a + M\,b = 0\ (4)$$

The equation of the plane drawn through the ſecond perpendicular, and the ſecond ſtraight line is

$$L'\ (x - \alpha') + M'\ (y - \beta') + z = 0\ (E')$$

L' and M' being determinable by theſe equations

$$1 + L'\,A + M\,B = 0$$
$$1 + L'\,a' + M'\,b' = 0$$

Now each of theſe laſt planes contains the required line, therefore the equations of their line of interſection will be thoſe required.

The equations (1) (2) give the values of A and B, and combining them with equations (3) (4) the following values are obtained for L M, L' M';

$$L = \frac{a - a' + b\,(a\,b' - a'b)}{a\,(a' - a) + b'\,(b' - b)}$$

$$L' = \frac{a - a' + b'\,(a\,b' - a'b)}{a\,(a' - a) + b'\,(b' - b)}$$

$$M = \frac{b - b' - a\,(a\,b' - a'b)}{a\,(a' - a) + b\,(b' - b)}$$

$$M' = \frac{b - b' - a'\,(a\,b' - a'b)}{a\,(a' - a) + b\,(b' - b)}$$

Subſtituting theſe values in equations (E) (E') we have

$$(x - \alpha)\ \left\{a - a' + b\ (a\,b' - a'\,b)\right\} + (y - \beta)\left\{b - b' - a\ (a\,b' - a'\,b)\right\} + z'\ \left\{a\ (a' - a) + b\ (b' - b)\right\} = 0;$$

$$(x - a')\ \left\{a - a' + b'\,(a\,b' - a'\,b)\right\} + (y - \beta')\left\{b - b' - a'\,(a\,b' - a'\,b)\right\} + z\left\{a'\ (a' - a) + b'\ (b' - b')\right\} = 0;$$

where the ſecond equation may be deduced from the firſt by changing a, b, α, β into a', b', α', β', and a', b' into a, b.

From theſe two equations which repreſent the required line, its projections on the planes $y\,z$, $x\,z$, may be found by ſucceſſively eliminating x and y.

It remains now to determine the abſolute length of the ſhorteſt diſtance between the two lines.

If from the origin of the co-ordinates a perpendicular be let fall on each of the parallel planes, theſe, having the ſame direction, will become one and the ſame ſtraight line: their difference, or the diſtance between the two planes, will be the ſhorteſt diſtance required. The length of theſe perpendiculars will, by the laſt problem, be

$$P = \frac{A\,\alpha + B\,\beta}{\sqrt{(1 + A^2 + B^2}},\ \text{for the plane}$$

$A\ (x - \alpha) + B\ (y - \beta) + z = 0$; D being $= A\,\alpha + B\,\beta$;

$$\text{and } P' = \frac{A\,\alpha' + B\,\beta'}{\sqrt{1 + A^2 + B^2}},\ \text{for the plane}$$

$A\ (x - \alpha') + B\ (y - \beta') + z = 0$, where $D' = A\,\alpha + B\,\beta'$.

$$\text{The difference } P' - P = \frac{A\,(\alpha' - \alpha) + B\,(\beta' - \beta)}{\sqrt{(1 + A^2 + B^2)}}$$

ſubſtituting for A and B their values

$$P' - P = \frac{(\alpha' - \alpha)\ (b' - b) - (\beta' - \beta)\ (a' - a)}{\sqrt{\left\{(a' - a)^2 + (b' - b)^2 + (a'b - a\,b')\right\}}}$$

When the ſtraight lines meet each other, this diſtance being nothing, $(\alpha' - \alpha)\ (b' - b) - (\beta' - \beta)\ (a' - a) = 0$; the ſame equation, as has been already found, expreſſing two right lines which interſect each other.

On the transformation of the Co-ordinates.—Given the co-ordinates of a point in relation to three rectangular planes, to determine the co-ordinates of this point, in reſpect to three other planes.

Theſe three new planes being given in poſition in reſpect to three primitive planes, their equations are given.

Let theſe be, for the

1ſt, $A\,x + B\,y + C\,z + D = 0$
2d, $A'\,x + B'\,y + C'\,z + D' = 0$
3d, $A''\,x + B''\,y + C''\,z + D'' = 0$

Theſe three planes interſect each other two by two in three ſtraight lines which are the new axes. The new co-ordinates of the point are meaſured on the lines drawn through this point parallel to the new axis. The length of any one of theſe co-ordinates is the part of one of theſe lines contained between the point, and the plane of the co-ordinates to which this line is parallel.

Let x, y, z, be the co-ordinates of the point in relation to the primitive planes, and u, v, w, its co-ordinates in relation to the three new planes. For conciſeneſs let

$$L^2 = \frac{(A\,(C'B'' - C'B') + B\,(A'C'' - A''C') + C\,(B'A'' - B''A')^2}{(C'B'' - C''B')^2 + (A'C'' - A''C')^2 + (B'A'' - B''A')^2}$$

$$L'^2 = \frac{(A'\,(C\,B'' - C''\,B) + B'\,(A\,C'' - A''\,C) + C'\,(B'\,A'' - B''\,A)^2}{(C\,B'' - C'B)^2 + (A\,C'' - A''C)^2 + (B\,A'' - B''A)^2}$$

$$L''^2 = \frac{A''\,(C\,B' - C'B) + B''\,(A\,C' - A'C)^2 + C''\,(B\,A' - B'\,A)^2}{(C\,B' - C'B)^2 + (A\,C' - A'C)^2 + (B\,A' - B'A)^2}$$

The values of the new co-ordinates will be

$$u = \frac{A\,x + B\,y + C\,z + D}{L}$$

$$v = \frac{A'\,x + B'\,y + C'z + D'}{L'}$$

$$w = \frac{A''\,x + B''\,y + C''\,z + D''}{L''}$$

If the three new planes be ſuppoſed perpendicular to each other, then $A\,A' + B\,B' + C\,C' = 0'$; $A\,A'' + B\,B'' + C\,C'' = 0$; $A'\,A'' + B'\,B'' + C'\,C'' = 0$.

Multiplying the firſt of theſe three equations by B'', the ſecond by B', and ſubtracting, we have $C\ (C\,B'' - C''\,B) - A\ (B'\,A'' - B''\,A) = 0$. Multiplying the firſt by A'', the ſecond by A', and ſubtracting, we have,

$$B\ (B'\,A'' - B''\,A') - C\ (A'\,C'' - A''\,C') = 0.$$

Multiplying the firſt by C'', the ſecond by C', and ſubtracting, we have

A (A'

$$A\,(A'C'' - A''C') - B\,(C'B'' - C''B') = 0.$$

By means of theſe three equations the expreſſion for L is reduced to $\sqrt{A^2 + B^2 + C^2}$.

By a ſimilar calculation,

$$L' = \sqrt{A'^2 + B'^2 + C'^2};\ L'' = \sqrt{A''^2 + B''^2 + C''^2};$$

which gives for the new co-ordinates u, v, w,

$$u = A\ x + B\ y + C\ z + D\ \div \sqrt{A^2 + B^2 + C^2}$$
$$v = A'\,x + B'\,y + C'\,z + D' \div \sqrt{A'^2 + B'^2 + C'^2}$$
$$w = A''\,x + B''\,y + C''\,z + D'' \div \sqrt{A''^2 + B''^2 + C''^2}$$

The values of u, v, w, might have been determined directly, ſince they are the perpendiculars drawn from the points x, y, z, upon three planes, whoſe equations are known.

If it be required to transform one ſyſtem of rectangular co-ordinates into another ſyſtem likewiſe rectangular, and having the ſame origin as the firſt, the three new axes may be given by the equations of the three new rectangular planes. Of the ſix conſtant quantities which enter theſe equations, three are determined by the condition that the planes are perpendicular to each other, and their values are to be calculated from that which is aſſigned to the three others; but this calculation may be avoided by determining the poſition of the new axes by means of any three angles ψ, θ, ϕ. This transformation is uſeful in the application of analyſis to mechanics. The following method is that uſed by La Place in the "Mechanique celeſte."

Let the primitive planes be deſignated by two of the three co-ordinates x, y, z, which they contain, and the new planes by two of the co-ordinates x''', y''', z'''.

Let θ be the angle of the two planes $x\,y$ and $x'''\,y'''$.

ψ the angle which the axis x makes with the line of interſection of the plane $x'''\,y'''$ with the plane $x\,y$.

ϕ the angle which this line makes with the axis x'''.

It is now required to find the values of x''', y''', z''', in terms of x, y, z, and of the three angles ψ, θ, ϕ.

Let x', y', z', be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines. 1. The interſecting line of the plane $x'''\,y'''$ with the plane $x\,y$. 2. The projection of the axis z''' on the plane $x\,y$. 3. The axis z;

$$\begin{aligned} \text{then}\quad x &= x' \text{ coſ. } \psi + y' \text{ ſin. } \psi \\ y &= y' \text{ coſ. } \psi = x' \text{ ſin. } \psi \\ z &= z'. \end{aligned}$$

Let x'', y'', z'', be the co-ordinates of a point referred to the rectangular axes, reckoned upon the three following lines; 1. The interſecting line of the plane $x'''\,y'''$ with that of $x\,y$. 2. The perpendicular to this line on the plane $x'''\,y'''$. 3. The axis z'''; then

$$\begin{aligned} x' &= x'' \\ y' &= y'' \text{ coſ. } \theta + z'' \text{ ſin. } \theta \\ z' &= z'' \text{ coſ. } \theta - y'' \text{ ſin. } \theta: \end{aligned}$$

z''', y''', z''' being the co-ordinates of the point relative to the three axes x''', y''', z''', we have

$$\begin{aligned} x'' &= x''' \text{ coſ. } \phi - y''' \text{ ſin. } \phi \\ y'' &= y''' \text{ coſ. } \phi + x''' \text{ ſin. } \phi \\ z'' &= z'''. \end{aligned}$$

$$\text{Hence } x = \begin{cases} \quad x''' (\text{coſ. } \theta \text{ ſin. } \psi \text{ ſin. } \phi + \text{coſ. } \psi \text{ coſ. } \phi) \\ + y''' (\text{coſ. } \theta \text{ ſin. } \psi \text{ coſ. } \phi - \text{coſ. } \psi \text{ ſin. } \phi) \\ + z''' \text{ ſin. } \theta \text{ ſin. } \psi \end{cases}$$

$$y = \begin{cases} \quad x''' (\text{coſ. } \theta \text{ coſ. } \psi \text{ ſin. } \phi - \text{ſin. } \psi \text{ coſ. } \phi) \\ + y''' (\text{coſ. } \theta \text{ coſ. } \psi \text{ coſ. } \phi + \text{ſin. } \psi \text{ ſin. } \phi) \\ + z''' \text{ ſin. } \theta \text{ coſ. } \psi \end{cases}$$

$$z = z''' \text{ coſ. } \theta - y''' \text{ ſin. } \theta \text{ coſ. } \phi - x''' \text{ ſin. } \theta \text{ ſin. } \phi.$$

Multiplying theſe values of x, y, z reſpectively by the co-efficients of x''' in theſe values, we have

$$x''' = \begin{cases} \quad x\ (\text{coſ. } \theta \text{ ſin. } \psi \text{ ſin. } \phi + \text{coſ. } \psi \text{ coſ. } \phi) \\ + y\ (\text{coſ. } \theta \text{ coſ. } \psi \text{ ſin. } \phi - \text{ſin. } \psi \text{ coſ. } \phi) \\ - z\ \text{ ſin. } \theta \text{ ſin. } \phi. \end{cases}$$

And by multiplying theſe values of x, y, z reſpectively by the co-efficients of y''' in theſe values, and afterwards by the co-efficients of z''', we have

$$y''' = \begin{cases} \quad x\ (\text{coſ. } \theta \text{ ſin. } \psi \text{ coſ. } \phi - \text{coſ. } \psi \text{ ſin. } \phi) \\ + y\ (\text{coſ. } \theta \text{ coſ. } \psi \text{ coſ. } \phi + \text{ſin. } \psi \text{ ſin. } \phi) \\ - z \text{ ſin. } \theta \text{ coſ. } \phi. \end{cases}$$

$$z''' = x \text{ ſin. } \theta \text{ ſin. } \psi + y \text{ ſin. } \theta \text{ coſ. } \psi + z \text{ coſ. } \theta.$$

Another transformation is ſometimes uſed; a point being referred to three rectangular planes by the co-ordinates x, y, z, a ſtraight line is drawn from this point to the origin of the co-ordinates; the length of this line is given, as likewiſe the angles which it makes with the three rectangular axes. If r repreſent this line, and α, β, γ, the three angles, then $x = r \text{ coſ. } \alpha$, $y = r \text{ coſ. } \beta$, $z = r \text{ coſ. } \gamma$ (1).

Of theſe three angles two only are neceſſary; becauſe

$$\text{coſ. } \alpha^2 + \text{coſ. } \beta^2 + \text{coſ. } \gamma^2 = 1.$$

When the poſition of a point is thus determined by a line r and two angles, r is called the *radius vector*, and the origin of the co-ordinates becomes a pole, from which proceeds the *radii vectores* of different points in ſpace.

Sometimes the radius vector is projected upon one of the rectangular planes, ſuppoſe on $x\,y$: the angle of the radius, with its projection, is given, as likewiſe the angle of the projection with the axis of x, or y, if ϕ repreſent the firſt, and ψ the ſecond of theſe angles,

$$z = r \text{ ſin. } \phi\,;\ y = r \text{ ſin. } \phi \text{ ſin. } \psi\,;\ x = r \text{ ſin. } \phi \text{ coſ. } \psi.\ (1)$$

If the point, referred to three rectangular planes by the co-ordinates x, y, z, belongs to a ſurface, we have between theſe three co-ordinates an equation, $F(x, y, z,) = 0$. If the co-ordinates are transformed, and the new ones become u, v, w, we muſt ſubſtitute in $F = 0$ for x, y, z, their values in terms of u, v, w, and the reſulting equation will belong to the new ſurface referred to the new planes.

If in the equation $F = 0$, for x, y, z, we ſubſtitute the values given in equations (1) and (2), it will become what is termed the polar equation to this ſurface.

When a curve is given by two equations $f\,(x, y, z) = 0$, $f\,(x, y, z) = 0$, in ſubſtituting in theſe equations the values given by equation $F\,(x, y, z) = 0$, we obtain an equation to the curve, relating either to three new planes by the co-ordinates u, v, w, or to a pole, by the *radii vectores*, and their angles.

Of the centres of ſurfaces, and of their diametral planes.—The centre of a ſurface is defined to be a point, in which all the chords paſſing through this point are divided into two equal parts.

A diametral plane is that which divides a ſyſtem of parallel chords, each into equal parts.

Hence, if a ſurface has a centre, all the diametral planes which it can have, neceſſarily paſs through this centre.

Having given the algebraic equation of a ſurface, to determine, 1ſt, if it has a centre; 2d. if it has a diametral plane.

If the propoſed ſurface has a centre, let it be referred to three planes, the origin of whoſe co-ordinates is the centre itſelf.

Any ſtraight line drawn through the origin of theſe co-ordinates will be a diameter, and will cut the ſurface in two points, the co-ordinates of the firſt being x, y, z, and of the ſecond $-x, -y, -z$. Therefore, the equation to the ſurface muſt ſubſiſt in taking x, y, z, poſitive or negative; to ſatisfy this condition, the ſum of the exponents of the three co-ordinates in every form muſt be the ſame in every parity as the number which expreſſes the degree of the equation propoſed, that is; if even, even, if odd, odd. Thus, if $\varphi(r, s, t,) = 0$ be the equation to the ſurface referred to, any three planes, then, in this equation make

$$r = x + a, s = y + b, t = z + e;$$

and an equation of the ſurface will be obtained in terms of x, y, z referred to three new planes parallel to the firſt, and paſſing through the point ſuppoſed to be the centre of the ſurface: if, by the three particular values aſſigned to a, b, c, the terms can be made to diſappear, in which the ſum of the exponents of the three co-ordinates are of a different denomination as to even or odd, then the degree or dimenſion of the equation $\varphi(r, s, t) = 0$, the propoſed ſurface will have a centre.

Of diametral Planes—When, in all the terms of an equation of a ſurface, the exponent of one of the co-ordinates is an even number, the plane of each of the other co-ordinates divides the ſurface into two equal and ſimilar parts.

The equation being $\varphi(x, y, z,)$ if in all its terms the exponent of z is an even number, the plane of x and y will be a diametral, for it will give for z a value α, function of x, y, and conſtant quantities, and $z = \alpha$ will ſatisfy this equation; therefore, to the ſame values of x and y, two values of z will correſpond, differing only in the ſign; therefore the plane of x, y will be diametral, and for the ſame reaſon the two other planes of the co-ordinates will be diametral; when in each term the exponents of x, y are even numbers.

Let $\varphi(r, s, t,) = 0$ be the equation of the propoſed ſurface; by the transformation of the ordinate, the ſurface may be referred to three new planes, then $Ar + Bs + Ct + D = 0$; $A'r + B's + C't + D' = 0$; $A''r + B''s + C''t + D''' = 0$; in which equation there are nine conſtant quantities.

The ſurface propoſed has diametral planes, when, by aſſigning real and particular values to theſe conſtant quantities, the terms in which the exponents of the co-ordinates which are odd numbers, may be made to diſappear. The real root of the equation, obtained by making the co-efficients of theſe terms equal zero, determine the number of diametral planes.

In conſidering ſurfaces of the ſecond degree, great uſe may be made of theſe principles, in determining the centres and diametral planes of theſe ſurfaces.

Of Surfaces of the ſecond Degree.—Let the general equation of the ſecond degree, between three variable quantities x, y, z, be $ax^2 + by^2 + cz^2 + dxy + eyx + fxz + gx + hy + kz + 1 = 0$. To determine if the ſurface to which this equation belongs has a centre.

Making $x = x' + \alpha, y = y' + \beta, z = z' + \gamma, \alpha, \beta, \gamma$ being ſuppoſed the co-ordinates of the center, the equation becomes $a'x'^2 + b'y'^2 + c'z'^2 + d'x'y' + e'y'z' + f'x'z' + g'x' + h'y' + k'z' + 1 = 0$.

In this equation, which is likewiſe of the ſecond degree, there are only three terms in which the ſum of the exponents of the co-ordinates is an odd number; theſe terms may be made to diſappear, by making their co-efficients equal to zero, which gives $g' = 0$; $h' = 0$; $k' = 0$, making this ſubſtitution and taking only the terms multiplied by x', y', z', $2a\alpha + d\beta + fy + g = 0$, $2b\beta + d\alpha + e\gamma + h = 0$, $2c\gamma + e\beta + f\alpha + k = 0$.

Theſe equations being linear in α, β, γ, theſe quantities have real values; therefore, ſurfaces of the ſecond degree have a centre.

If a certain relation be eſtabliſhed between the conſtant quantities a, b, c, d, &c. this centre may be placed at an infinite diſtance from the origin of the co-ordinates. In effect, the value of α, β, γ are fractions whoſe common denominator is $ac^2 + bf^2 + cd^2 - 4abc - def$, therefore, when the following equation ſubſiſts between the conſtant quantities of the general equation of a ſurface of the ſecond degree, *viz.* $ae^2 + bf^2 + cd^2 + 4abc + def$; the co-ordinates of the centre of this ſurface are infinite. The ſurface of the ſecond degree has likewiſe diametral planes, for by tranſpoſing the ordinates it may be referred to three new planes, containing nine conſtant quantities; taking u, v, w for the new co-ordinates, the general equation becomes $Au^2 + Bv^2 + Cw^2 + Duv + Evw + Fuw + Gu + Hv + Kw + 1 = 0$; exterminating thoſe terms in which the exponent of any one of the co-ordinates is odd, the ſix following equations are obtained; $D = 0, E = 0, F = 0, G = 0, H = 0, K = 0$; (A). Of nine conſtant quantities, ſix only are determined by theſe equations; hence it follows, that three planes may cut a ſurface of the ſecond degree in four equal and ſimilar parts in an infinite number of ways; it has therefore an infinity of diametral and conjugate planes, and of theſe three perpendicular ones, which interſect each other on the three ſtraight lines on which are reckoned the axes of the ſurface. This property is analogous to that of curves of the ſecond degree, which have an infinity of conjugate diameters, and in theſe curves there are two conjugate diameters perpendicular to each other, called *axes*. The three equations which expreſs that the new planes of the co-ordinates are rectangular joined to the ſix equations (A), determine the nine conſtant quantities which enter into the equations of theſe planes.

Taking for granted what however may be demonſtrated, that theſe conſtant quantities have always real values, we may ſuppoſe, that referring the ſurface of the ſecond degree to its rectangular co-ordinates, its general equation will always be of this form, $Lx^2 + My^2 + Nz^2 - 1 = 0$. We ſhall firſt conſider the ſurfaces comprehended under the general equation, and next the caſe where the centre is removed to an infinite diſtance from the origin of the co-ordinates.

Every ſurface of the ſecond degree interſected by a plane, has for its ſection a curve of the ſecond degree; for whatever be the planes, it may become, by the tranſformation of its co-ordinates, one of the planes to which the ſurface is referred, ſo that after this tranſformation, the equation to the ſurface is ſtill of the ſecond degree; moreover, the equations of the ſections made on a ſurface by the planes of the co-ordinates cannot be of a higher dimenſion than the equation of the ſurface, therefore every ſurface of the ſecond degree cut by a plane has for its ſection a curve of the ſecond degree likewiſe.

If the interſecting plane moves parallel to itſelf, the ſection remains always ſimilar to itſelf: its axes remain always parallel, and its centre is always on the ſame diameter of the ſurface, which may be thus demonſtrated.

The equation of a curve of the ſecond degree may always be reduced to this form,

$$lx^2 + my^2 + nxy + p = 0.$$

If in this equation fx and fy be ſubſtituted for x and y, f being a conſtant quantity, the new equation which reſults from this ſubſtitution belongs evidently to a curve ſimilar to the firſt, and ſimilarly ſituated; it only differs from the firſt in the conſtant term, for after having divided all the terms by f^2, it becomes

$$lx^2 + my^2 + nxy + \frac{p}{f^2} = 0.$$

Therefore all curves of the ſecond degree, whoſe equations are of this form, differing only in the conſtant term, will be ſimilar and ſimilarly ſituated.

The general equation to a ſurface of the ſecond degree being

$$Lx^2 + My^2 + Nz^2 - 1 = 0,$$

Let the equation of any interſecting plane be

$$z = \mathrm{A}x + \mathrm{B}y + \mathrm{C}.$$

The projection of the interſection of the curve with the ſurface on the plane xy will have this equation,

$$\left.\begin{array}{l} x^2(\mathrm{L} + \mathrm{N}\mathrm{A}^2) + y^2(\mathrm{M} + \mathrm{N}\mathrm{B}^2) + 2\mathrm{A}\mathrm{B}\mathrm{N}xy \\ + 2\mathrm{A}\mathrm{C}\mathrm{N}x + 2\mathrm{B}\mathrm{C}\mathrm{N}y + \mathrm{N}\mathrm{C}^2 - 1 \end{array}\right\} = 0 \, (1)$$

If the interſecting plane be ſuppoſed to change its poſition by moving parallel to itſelf, A and B will remain conſtant, and C only will change its value; hence it follows that the co-efficients of x^2, y^2, xy, in the equation of projection, will remain the ſame, whatever be the value of C. But by the transformation of the co-ordinates this equation may be reduced to this form;

$$l u^2 + m' v^2 + n' u v + p' = 0;$$

in which equation the co-efficients $l\ m'\ n'$ only contain A and B; p' alone being ſome function of C. If C be made to vary, the value of p' may be ſuppoſed to become p'', and the preceding equation to become

$$l u^2 + m' v^2 + n' u v + p'' = 0$$

which as it only differs from the former in the conſtant quantity, evidently belongs to a ſimilar curve; hence it may be demonſtrated that all parallel ſections are ſimilar, and ſimilarly ſituated. Moreover, the locus of the centres of theſe ſections is in a diameter of the ſurface.

If in the equation $\mathrm{L}x^2 + \mathrm{M}y^2 + \mathrm{N}z^2 - 1 = 0$ we ſubſtitute for the co-efficients L, M, N, the conſtant quantities $\frac{1}{a^2}, \frac{1}{b^2}, \frac{1}{c^2}$, a being greater than b, and $b > c$; it becomes

$$b^2c^2x^2 + c^2a^2y^2 + a^2b^2z^2 = a^2b^2c^2 \ (\mathrm{E})$$

The advantage of this ſubſtitution is to render the ſign of each term of the equation independent of the particular values of the co-efficients, and to introduce as conſtant quantities (in the equations of the ſections of the ſurface by the planes of the co-ordinates) only the principal axes of theſe ſections.

From the different combinations of the ſigns three diſtinct caſes ariſe from equation E; for a full inveſtigation of which we muſt refer our reader to the original work from which this article was principally extracted. (Vide Application de l'Analyſe a la Geometric, par M. Monge.)

The three equations are

$$b^2c^2x^2 + c^2a^2y^2 + a^2b^2z^2 = a^2b^2c^2, \text{or } \mathrm{L}x^2 + \mathrm{M}y^2 - \mathrm{N}z^2 = 1$$
$$b^2c^2x^2 + c^2a^2y^2 - a^2b^2z^2 = a^2b^2c^2, \text{or } \mathrm{L}x^2 + \mathrm{M}y^2 - \mathrm{N}z^2 = 1$$
$$b^2c^2x^2 - c^2a^2y^2 - a^2b^2z^2 = a^2b^2c^2, \text{or } \mathrm{L}x^2 - \mathrm{M}y^2 - \mathrm{N}z^2 = 1$$

The former belongs to the ellipſoid and the two others to two different ſpecies of hyperboloids.

GEOMETRY, *Characters in.* See CHARACTER.

GEOMETRY, *Spherical.* See SPHERICAL.

GEOMORI, Γεωμοροι, in *Antiquity*, the diviſion or claſs of the ancient Athenians employed in agriculture.

GEONOMA, in *Botany*, from γεωνομος, a *ſetter out*, or *diſtributor of land*, alluding to the mode of growth of the firſt ſpecies of the genus in queſtion, as hereafter deſcribed.—Willd. Sp. Pl. v. 4. 593.—Claſs and order, *Monoecia Monadelphia.* Nat. Ord. *Palmæ.*

Gen. Ch. . . . .

Eſſ. Ch. General Spatha double, of two valves. Male, Calyx in three deep ſegments. Petals three. Filaments ſix, united into a cylinder.

Female, Calyx and Corolla like the male. Style one, lateral. Stigma of two lobes. Drupa dry, with one ſeed.

1. G. *pinnatifrons.* "Fronds pinnate; the pinnæ abruptly jagged."—Native of the Caracas, in ſhady woods on the lofty mountain of Buenaviſta. *Bredemeyer.*—The *trunk* is ſimple and ſlender, an inch in diameter, ſmooth, riſing to the height of fifteen feet, when, by the power of the wind on its ample foliage, it is blown down, but ſoon produces new ſhoots and roots from the top, whence a new trunk ſprings up to the ſame height of about fifteen feet, and in its turn is quickly laid proſtrate like the former. The *fronds* (rather *leaves*) are pinnate, their pinnæ irregular, ſomewhat folded, jagged abruptly at the ſummit. *Spatha* double, of two valves, wedge-ſhaped, ſomewhat compreſſed, acute, three inches long. *Spadix* fifteen inches in length, branched at the top, the branches round, bearing each from ſeven to nine alternate, cylindrical ſpikes, of the length of three inches each. *Flowers* conſtantly three, ſunk in a little hollow of the ſpike, two of which are male, one female. *Drupa* dry and fibrous, the ſize of a pea. *Nut* globoſe, black.

2. G. *ſimplicifrons.* "Fronds ſimple, wedge-ſhaped, cloven."—Found at the Caracas with the former. *Bredemeyer.*—The *trunk* of this is permanently upright, ten feet high, an inch thick. *Fronds* (or *leaves*) a foot long, ſimple, wedge-ſhaped, taper at the baſe, cloven, and divaricated at the ſummit, ſupported on very long ſtalks. *Spatha* double, of two valves. *Spadix* bearing at its extremity three or four cylindrical ſpikes. *Flowers* immerſed in little cavities, like the former. *Willdenow.*

GEOPONIC, ſomething deſcribing or relating to agriculture. Cato, Varro, Columella, Palladius, and Pliny, are ſometimes called geoponic writers.

GEORG, St., in *Geography*, a town of Germany, at the conflux of the rivers Teya and March, formerly a royal city, but now much reduced; 24 miles N.N.E. of Preſburg.—Alſo, a town of Hungary; 7 miles N.N.E. of Preſburg.

GEORGE, in *Biography*, ſurnamed the Cappadocian, was made biſhop of Alexandria when Athanaſius was driven from that ſee by the perſecutions of the emperor Conſtantius, about the year 355. (See ATHANASIUS.) He was a native of Epiphania, in Cilicia, where his father purſued the buſineſs of a fuller. From this obſcure ſituation the ſon raiſed himſelf, it is ſaid, not by the moſt honourable means, to the ſtation of a prelate in the church. At firſt he obtained a lucrative appointment as purveyor of bacon to the army: not contented with the regular profits of his office, he made uſe of every art, however baſe and corrupt, in the accumulation of wealth; ſo as to render a mean employment truly infamous. His depredations on the public purſe became ſo notorious, that he felt it extremely dangerous to wait the iſſue of a ſuit commenced againſt him. He fled from the purſuit of juſtice, and contrived to take with him his ill-gotten wealth. The place of his retreat was Alexandria, where he profeſſed great zeal for the Arian ſyſtem of theology, and being a man of ſuperior talents, he acquired conſiderable influence with his diſciples in that city. Here he collected a large and very valuable collection of books, which the emperor Julian afterwards made the foundation of the noble library eſtabliſhed by him in the temple erected in honour of the emperor Trajan, but which was burnt by the connivance of the emperor Jovian. When Athanaſius was driven from Alexandria, George was elected biſhop by the prevailing party. In this ſtation his conduct was in the higheſt degree cruel and oppreſſive. He perſecuted the Catholics with an unrelenting hand, and the other inhabitants of this vaſt dioceſe were objects of his tyranny and avarice. The merchants he impoveriſhed by unjuſt monopolies and cruel taxes; the Pagans, who had been excited with the hopes of freedom and toleration, did not eſcape his rapacity, and the rich temples of Alexandria were either pillaged or inſulted by him, who exclaimed, in a haughty and threatening tone of voice, "How long will theſe ſepulchres be permitted to ſtand." The people endured all theſe acts of oppreſſion till their patience was exhauſted; they then roſe as one man, and expelled him the city. With much difficulty he regained his authority, which he held till the year 362, when the acceſſion of Julian to the empire was the ſignal for the downfal of the biſhop. He, and two other perſons, who had been miniſters of his atrocities, were ignominiouſly dragged in chains to the public priſon. Here, after a confinement of a few days only, they were attacked by the Pagan populace, who forced open the doors of the dungeons, and with cruel inſults maſſacred the vile wretches. Their lifeleſs bodies were carried in triumph through the ſtreets on the back of a camel, and after having ſuffered every indignity, they were thrown into the ſea, with the avowed intention of diſappointing the devotion of Chriſtians, who, they foreſaw, would gladly canonize the tyrant as a martyr and ſaint. The fears of the Pagans were juſt, but their precautions ineffectual. The meritorious death, as it was denominated, of the prelate, obliterated the memory of his life, and the infamous George of Cappadocia has been transformed into the renowned St George of England, the patron of arms, of chivalry, and of the garter. The ſaints of Cappadocia, Baſil, and the Gregories, did not acknowledge their companion, and pope Gelaſius, about the year 494, is the firſt Catholic who acknowledges St. George, and who placed him among the martyrs of the churches. He rejects his acts as ſpurious, and as the compoſition of heretics. His fame and popularity in Europe, and eſpecially in England, proceeded from the cruſades. Gibbon, vols. iii. and iv. Moreri.

GEORGE *of Trebiſond*, a learned modern Greek, was born, in 1395, in the iſle of Crete. of a family originally from Trebiſond, from which he derives his name. He came to Italy about 1420, and obtained the patronage of Francis Barbaro, a noble of Venice, through whoſe means he was invited to a profeſſorſhip of Greek at Vicenza. Thence he removed to Venice, where he acquired great reputation as a grammarian and inſtructor in Grecian eloquence. After this he obtained an invitation from pope Eugenius IV. to ſettle at Rome, and, during the life of the pontiff, he was occupied in teaching rhetoric and philoſophy, and in tranſlating ſeveral ancient Greek authors into Latin. He was engaged in a ſimilar manner by pope Nicholas V., under whoſe patronage George might have lived happily, had not his own temper involved him in many diſputes with the learned men about the papal court. With Poggio he came to blows, and it was neceſſary to reſort to the authority of the apoſtolic ſecretaries to part them. His own conduct at length forced him from Rome, and he took refuge, in 1452, at Naples, where he was graciouſly received by king Alphonſo, but he did not partake of his liberality, and had great difficulty, at this period, in maintaining his family. It is ſuppoſed, that by the interference of his friend Filelfo, he was reconciled to the pope, and that he returned to the papal city: but in 1459 he was at Venice, where he preſented to the doge his verſion of Plato's book on laws, and was then engaged as a profeſſor of belles lettres. In 1464 he went to Crete, and paſſed thence to Conſtantinople. On his return he found his own ſcholar Paul II. on the papal throne, which led him to viſit Rome, but his treatment there did not, probably, correſpond with his expectations; he was, for ſome offence not known, caſt into priſon, where he was kept during a ſpace of four months. He died about the year 1480. He lived to a good old age, and was author of many works on rhetoric and ſubjects connected with polite literature; and he tranſlated many others, particularly of the fathers, from the Greek into the Latin. He is eſteemed very highly for the ſhare which he had in introducing Greek literature into the Weſt. His Latin ſtyle was far from pure; and in controverſy he dealt much in invective. The compariſon which he inſtituted between Ariſtotle and Plato gave great offence to the adherents of the latter, particularly to cardinal Beſſarion, who wrote an anſwer to him. Gen. Biog.

GEORGE, called alſo *Amira*, flouriſhed about the cloſe of the 16th century, and was at Rome under the pontificate of Clement VIII. He publiſhed "A Syriac and Chaldee Grammar" in 4to. in 1596. He was, after this, elected patriarch of the Maronites, among whom he introduced the uſe, and explained the principles, of the Gregorian calendar. He died about the year 1641. Moreri.

GEORGE LEWIS I., king of Great Britain, and elector of Hanover, the ſon of the elector Erneſt-Auguſtus, by Sophia, daughter of Frederick elector-palatine, and granddaughter of James I., king of England, was born in 1660, and trained to the profeſſion of arms under his father. When he had arrived to the ſtate of manhood, he engaged in the ſervice of the emperor againſt the Turks, and became illuſtrious as a warrior in three campaigns in Hungary. He next diſtinguiſhed himſelf in the war between the empire and France, and in the year 1700 he ſucceeded, on the death of his father, to the electorate. In the following year he marched to the aſſiſtance of the duke of Holſtein, who was attacked by the king of Denmark, and obliged the Danes to raiſe the ſiege of Tonningen. He joined the alliance againſt France in the ſucceſſion war, and forced the princes of the houſe of Wolfenbuttle to quit their alliance with the French. The command of the army of the empire was conferred upon him in 1707, but after the duties of three campaigns, in which he had been able to act only on the defenſive, he reſigned his command, and left his own troops in the ſervice of the allies. At the peace of Raſtadt, Lewis XIV. recognized the electoral dignity in the houſe of Lunenburg, as he had before, at the peace of Utrecht, the ſucceſſion of the ſame houſe to the crown of Great Britain. This event happened on the death of queen Anne in 1714, when the prince, now George I., was in the fifty-fourth year of his age. He was already celebrated for the wiſdom and juſtice of his government, and his perſonal qualities, though limited in his views by the intereſts of a German prince, and but little acquainted with the character of the nation he was about to rule. "It is evident," ſays an hiſtorian, "that the title of this prince was founded ſolely on the choice of the parliament, that is, of the people, and that the uſual order of ſucceſſion was entirely ſuperſeded. For, admitting the male line of the houſe of Stuart to have been extinguiſhed in the perſon of James II., the right of blood reſted in the houſe of Savoy, deſcended from Henrietta, ducheſs of Orleans, daughter of Charles I." Thus the rights of the people were fully exerciſed, and the family on the throne is in truth an elected family, though the general law of ſucceſſion remains unaltered. The king threw himſelf into the arms of the Whig party, who, indeed, alone openly maintained thoſe principles upon which the right of his crown was founded. Of theſe the fundamental one was the ſuperiority of the national will, in appointing a chief governor, to any claim derived from hereditary right. Such a principle had been already aſſumed, and was the only one that could juſtify the nation in ſetting aſide the more immediate heirs to the crown, on the plea of difference of religion. (See WHIGS.) As ſoon as this prince was ſettled on his throne, the late Tory miniſtry were called to account for their conduct, particularly with reſpect to the treaty of Utrecht, and ſeveral of the heads of it were impeached, and either impriſoned,

priſoned, or driven into exile. Theſe meaſures were the cauſe of great diſſatisfaction; tumults were excited in various parts of the kingdom, and at length, in September 1715, the earl of Marr ſet up the ſtandard of rebellion, and proclaimed, with due honours, the pretender. The plan was ill concerted, and very weakly ſupported, and early in the following year it was entirely quelled, but ſeveral of the leaders loſt their lives on the ſcaffold. Still a large body of the people were diſaffected to the new family, and the power of the Tory party was ſo formidable, that the miniſtry, to eſtabliſh their authority, had recourſe to ſeptennial parliaments, inſtead of triennial ones, according to the law of the land. It was agreed by men of all parties, who were not perſonally intereſted in the change, that this innovation was a moſt groſs violation of the principles of the conſtitution, which no temporary neceſſity could juſtify. The king had, about this period, acquired by purchaſe the duchies of Bremen and Verden, in order to extend his power as elector of Hanover. By the acquiſition he was involved in a quarrel with Charles XII. of Sweden, who threatened to invade Scotland in favour of the claims of the pretender. The czar Peter alſo concurred in the ſcheme. To obviate the danger, the king entered into a triple alliance with Holland and France, a fleet was ſent up the Baltic to awe the Swedes, and all commercial intercourſe with that nation was ſuſpended: but the death of Charles XII. in 1717, and the ſubſequent changes in the politics of Sweden, put an end to the alarm in that quarter, and ſecured George in the quiet poſſeſſion of his newly acquired continental acquiſitions. The ambition of the court of Spain, governed by cardinal Alberoni, diſturbed the peace of Europe, and occaſioned a quadruple alliance between the three powers above-mentioned, with the acceſſion of the emperor. The ſeizure of Sardinia, and invaſion of Sicily by the Spaniards, gave a pretext for ſending a powerful Engliſh fleet into the Mediterranean under ſir George Byng, who fell in with, and almoſt totally deſtroyed the Spaniſh fleet. This ſucceſs was followed by the recovery of Sicily and Sardinia, and Spain was under the neceſſity of acceding to a peace dictated by the allied powers. A pacification of the north of Europe was alſo effected by the mediation of England. The national deluſion and calamity in the year 1720, (ſee Bubble,) recalled the king from a viſit to his German dominions, and the prudent meaſures of parliament produced the reſtoration of public credit. In 1722 a new conſpiracy againſt the government was diſcovered, and ſeveral perſons were apprehended in conſequence of it, among whom was Dr. Atterbury, biſhop of Rocheſter, who was puniſhed with perpetual baniſhment. The miniſters of France and England, Fleury and Walpole, being friendly to peace, preſerved a good underſtanding between the two countries for many years. Several treaties were negociated under the pretence of maintaining the balance of power, but uſually other private ends were to be anſwered by them. The leading principle of George I. was the ſafety and proſperity of his German dominions, to the intereſts of which, thoſe of Great Britain were, on various occaſions, ſaid to be ſacrificed. In 1725, a treaty between the emperor and the king of Spain excited the jealouſy of king George ſo much, that he counteracted it by another at Hanover, compriſing moſt of the other European powers, and he ſent a fleet to the Weſt Indies under admiral Hoſier, in order to block up the Spaniſh galleons at Portobello. The death of the admiral and moſt of his crew from diſeaſe, was conſidered as one of the moſt inglorious diſaſters of the reign. The Spaniards then beſieged Gibraltar, but all differences were finally ſettled by a negociation. The king of England ſeemed at length to have ſurmounted all his political difficulties, and a proſpect of permanent peace and tranquillity appeared to open upon him. The toils, and dangers, and anxieties which he had felt during his whole reign ſeemed at laſt to be rewarded with glory, happineſs, and repoſe. He thought every circumſtance was favourable to his viſiting his electoral dominions, and embarked for that purpoſe at Greenwich, June 3, 1727. He landed in Holland on the 7th, but in his journey from thence to Hanover he ſuffered a paralytic ſeizure, and feeling that he was near the end of his long journey, he exclaimed to his attendant, "C'eſt fait de moi." He reached the palace of his brother, the biſhop of Oſnaburg, but could not advance farther. He died June 11, 1727, in the ſixty-eighth year of his age, and the 13th of his reign. He has been characterized as plain and ſimple in his appearance, grave and ſedate in his manner, but eaſy and familiar among his intimates, in whoſe ſociety he was fond of relaxing from the cares of the ſtate. He poſſeſſed much natural prudence and good ſenſe, and well underſtood his intereſts, at leaſt as far as the objects neareſt his heart were concerned. Acceding to the crown of Great Britain when far advanced in life, he ſeemed ever to conſider himſelf rather as elector than as king, and the influence and power of Great Britain were of little eſtimation in his eyes when directed to any other end than the aggrandizement of his native country. In the view of Europe at large, he ſuſtained the character of a prudent, able, and fortunate prince. His government was not without defects in the adminiſtration, but he was unqueſtionably a zealous friend to civil and religious liberty. He had female favourites, but was not governed by them. He had little or no taſte for literature and ſcience, and was unable to appreciate their value, yet he founded in each univerſity a profeſſorſhip of modern hiſtory. He was, however, a lover of muſic; and ſoon after his acceſſion eſtabliſhed regulations for the conduct of this part of the ſervice in the royal chapel. He had married in 1681, his couſin Sophia Dorothea, daughter of the duke of Zell, a match that was attended with little domeſtic happineſs. He left behind him one ſon, who ſucceeded him in his crown.

George Augustus II. king of Great Britain, ſon of the preceding, was born in 1683, and came to England with his father in 1714, where he received the rank and title of Prince of Wales. In 1716, he was appointed regent during the king's abſence. After this, on account of ſome private difference between father and ſon, the latter lived for ſome time in a ſtate of eſtrangement from the court. He ſucceeded to the throne in 1727, and adopted the ſame miniſters and meaſures which had governed the nation during the life of George I. He inherited alſo, in full force, the attachment which his father ſhewed to his German intereſts, which ſwayed the councils of his cabinet, though it was frequently obliged to give way to other conſiderations. Europe, for ſome time, was in a ſtate of peace, through the influence of the treaties of Seville and Vienna, the latter of which guaranteed the Pragmatic ſanction, or the law by which the female heirs of the emperor Charles VI. were to ſucceed to the hereditary dominions of Auſtria. In 1732 Walpole introduced into parliament the financial ſcheme of a great extenſion of the exciſe; but the violent oppoſition it met with from the nation obliged him to relinquiſh the object. What the people refuſed to ſubmit to at that period has been ſince adopted almoſt without a murmur. In the year 1737, complaints were made againſt the government for abridging liberty, by a bill for limiting the number of playhouſes, and ſubmitting dramatic writings to the inſpection of the lord chamberlain. Diſputes had long prevailed between Spain and England, on account of the trade carried on in the Weſt Indies by their reſpective ſubjects. In 1739, the matters in debate were compromiſed by a convention ſettled by the reſpective courts, but its terms were ſo little ſatisfactory to the traders, that Walpole found himſelf obliged by their clamours to prepare for hoſtilities. War was declared, and Portobello taken by admiral Vernon. The war, however, did not turn out ſo ſucceſsful as the people expected, ſo that a clamour was raiſed againſt the miniſter, and ſir R. Walpole was obliged to reſign in the year 1742. At the ſame period France, and the other powers in league with her, ſeemed determined, on the death of the emperor Charles VI., to ſtrip his daughter Maria Thereſa of her inheritance, which had been guaranteed to her by the Pragmatic ſanction. In defence of her juſt rights, George ſent an Engliſh army to the continent, and alſo a large body of forces from his electorate, who were taken into Britiſh pay. The king himſelf joined the army, which was under the command of the earl of Stair, and diſplayed great bravery. Victory declared itſelf in favour of the Britiſh, but they were forced to leave their wounded to the care of the enemy. Soon after, the command of the allied army devolved on the king's ſecond ſon, the duke of Cumberland, who was reckoned very deficient in talents as general of a great army. Under him was loſt the bloody battle of Fontenoi in 1744, and the French maintained an undoubted ſuperiority in Flanders during the remainder of the war. In the following year the adherents of the pretender encouraged him to try his fortune by a deſcent, in the northern part of the kingdom, where he might expect an immediate and deciſive declaration to be made in his favour. His ſon, accordingly, under the protection of the court of France, landed on the coaſt of Scotland, in the month of July. He was received with much reſpect and affection, and was immediately joined by ſeveral of the clans, with whom he proceeded to the ſouth, enlarging his ſmall army with all thoſe who would join in his cauſe. At Perth he proclaimed his father king, and immediately after took poſſeſſion of Edinburgh, defeated a body of the royal troops at Preſton Pans, and marched into England, where he had the ſtrongeſt aſſurances of being powerfully reinforced. He proceeded to Derby, but found the people no where zealouſly inclined to ſupport his cauſe; at length the duke of Cumberland arrived from Flanders, with ſeveral Engliſh regiments, engaged and defeated the rebels, and thus put an end to the hopes of the pretender, who could no longer be conſidered as an object of terror or alarm. The government of the houſe of Brunſwick was from this period more firmly eſtabliſhed; and it appeared that the greater part of the nation had indiſſolubly connected the intereſts of religion and liberty with the ſupport of thoſe principles which called the family of the reigning prince to the throne. In 1748, peace was negociated, and eſtabliſhed by the treaty of Aix-la-Chapelle; this treaty did not correſpond with the expectations of the people, but it was welcomed as a relief from the burthens neceſſarily impoſed by a ſtate of warfare. In 1751, the king loſt his eldeſt ſon Frederic, who had lived a conſiderable time at variance with his father, but who had made his peace with the court after the diſmiſſion of Walpole. This prince, the father of our preſent ſovereign, was amiable and well diſpoſed, and the fondeſt hopes had been entertained of the patriotiſm which he would have exhibited on the throne to which he was heir, and of which he was deprived by an early death. In 1755, a war broke out between Great Britain and France, the events of which, though truly important to the kingdom, are in no great degree connected with the character of the king. To his apprehenſions for the ſafety of his German dominions, was imputed the alliance formed with the king of Pruſſia, and the employment of a large force in continental warfare. This was the leaſt glorious part of the public tranſactions: and during the early years of the conteſt events were very unfavourable to England; but when, at the demand of the people, the king ſummoned to his councils the great William Pitt, afterwards earl of Chatham, the tide of ſucceſs ſet full in upon the meaſures of government. The French power in the Eaſt Indies was annihilated; and in America the reduction of Louiſburg was followed by that of Canada. The iſland of Guadaloupe, and the Britiſh ſettlement of Senegal, fell under the Britiſh dominion, and the famous battle of Minden exalted the reputation of the Britiſh ſoldiery. The navy of England reigned triumphant over the ſeas, while that of France was reduced to inſignificance, from which it never after completely recovered. Notwithſtanding all this ſucceſs the German war was unpopular, and miniſters were reproached for the ſacrifices which they had made, or were ſuppoſed to have made, to the perſonal wiſhes of the king. In this ſtate of affairs George II. ſuddenly died from a rupture of the right ventricle of the heart, which, without any previous illneſs or ſuffering, terminated his life on the 25th of October 1760, in his ſeventy-third year, and in the thirty-third of his reign. During this long period he had experienced many viciſſitudes of fortune, but he lived to ſee himſelf the moſt ſucceſsful of all the Engliſh monarchs. He was endowed by nature with an underſtanding by no means comprehenſive, and he had taken little pains to improve and expand his original powers by intellectual cultivation. Equally a ſtranger to learning and the arts, he ſaw the rapid increaſe of both under his reign, without contributing in the remoteſt degree to accelerate the progreſs by any mode of encouragement. He was haſty and obſtinate in his temper, yet a natural goodneſs of heart, a love of juſtice, and an honeſt openneſs of diſpoſition, conciliated the affection of his people, and have inſpired reſpect and veneration for his memory. He was a firm friend to the eſtabliſhed laws and liberties of the kingdom, and it muſt be admitted, highly to his honour, that the general principles of his adminiſtration, both civil and religious, were liberal and juſt. Many of the penal ſtatutes, which ſtill remain unrepealed, were in the reign of this prince meliorated, and virtually ſuſpended, by the mildneſs and equity of the executive government. And he will long be remembered for his declaration, "that during his reign, there ſhould be no perſecution for conſcience ſake." On various occaſions he had given ſignal demonſtrations of perſonal bravery, nor did the general tenour of his conduct afford proofs leſs ſtriking of his rectitude and integrity. If he cannot be ranked among the greateſt, he is certainly entitled to be claſſed with the moſt reſpectable princes of the age in which he lived.

George, *St.* a name whereby ſeveral orders, both military and religious, are denominated. It took its riſe from a ſaint famous throughout all the Eaſt, called by the Greeks Μεγαλομαρτυς, q. d. *great martyr.*

On ſome medals of the emperors John and Manuel Comneni, we have the figure of St. George armed, holding a ſword or javelin in one hand, and in the other a buckler, with this inſcription; an O, and therein a little
P
A, and ΓΕ—ΓΙΟΣ, making Ο ΑΓΙΟΣ ΓΕΟΡΓΙΟΣ, *O Holy*
O
George. He is generally repreſented on horſeback, as being ſuppoſed to have frequently engaged in combats in that manner.

He is highly venerated throughout Armenia, Muſcovy, and all the countries which adhere to the Greek rite: from the Greek, his worſhip has long ago been received into the Latin church; and England and Portugal have both choſen him for their patron ſaint. See GEORGE of *Cappadocia*.

GEORGE, *St.* is particularly uſed for an Engliſh order of knights, more commonly now called the *order of the Garter*. See GARTER.

GEORGE, *knights of St.* There have been various orders under this denomination, moſt of which are now extinct.

The order of *St. George*, at firſt called the order of the "Golden Angel," is ſaid to have been inſtituted by Conſtantine the Great, in the year 312. The collar is compoſed of fifteen oval plates of gold, richly chaſed on their edges, and enamelled blue. On 14 of theſe plates is the cypher of the name of Chriſt, compoſed of the Greek capital letters X and P between the two capitals A and Ω, ſignifying that Jeſus Chriſt is the beginning and end; but on the centre oval, which is edged with laurel leaves, the cypher X P is placed on a croſs patence gules, edged or, and having on its points the letters I. H. S. V.; and pendent from the bottom was the figure of St. George killing the dragon. The habit of the knights was a long cloak of ſky blue velvet, lined with white ſilk, tied at the neck with a cord of crimſon ſilk and gold intermixed, terminating at each extremity in a large taſſel; on the left breaſt of the cloak was embroidered the croſs of the order.

The order of *St. George* in Auſtria and Carinthia was inſtituted, as ſome ſay, by Rodolph, count of Habſburg, the firſt emperor of the houſe of Auſtria, about the year 1273 or 1290; or, as others ſay, by the emperor Frederic III. in order to guard the frontiers of Germany, Hungary, Auſtria, Carinthia, and Styria, from the inroads of the Turks. The badge of the order was a plain purple croſs edged with green.

The order of *St. George* in Burgundy was founded, in the year 1400, by Philbert de Miolans, a gentleman of Burgundy, on account of his having brought from the Eaſt ſome relics of St. George, which he depoſited in a chapel erected for the purpoſe, near to the pariſh church of Rougamont. The badge of the order is a St. George on horſeback, overthrowing a dragon, ſimilar to that on the collar of the order of the garter. It was worn pendent to a blue ribband tied to a button-hole. Women were admitted into this order.

The order of *St. George* in Auſtria was refounded by the laſt emperor Maximilian, who directed that the badge of the order ſhould be a croſs croſlet botonnée gules, encircled on the upper part with a ducal coronet or, and worn pendent from three chains of gold.

The order of *St. George* at Genoa was inſtituted in 1472. The doge of Venice is perpetual grand maſter of the order. The enſign of the order is a plain red croſs, worn round the neck, pendent to a ribband.

The order of *St. George* in Rome was founded by pope Alexander VI. in the year 1492. The collar of the order was a gold chain, to which was pendent, in enamel, the figure of St. George on horſeback, throwing down a dragon, and piercing it with a lance. The badge was a gold croſs within a circle of gold, like an open crown.

The order of *St. George* at Ravenna is ſuppoſed to have been inſtituted by pope Paul III. in 1534. It was aboliſhed by pope Gregory in 1572.

The order of *St. George*, defender of the immaculate conception of the bleſſed Virgin Mary, was inſtituted at Munich by Albert, elector of Bavaria, in the year 1729, and confirmed by the pope. The perſon admitted into this order muſt prove his gentility for five generations both on his mother's and father's ſide. The badge of the order is a ſtar of eight points; on the centre is enamelled the image of St. George on horſeback, ſlaying a dragon; the croſs is enamelled blue, and edged with white, and cantoned with a ſmaller croſs, enamelled blue and white; which, pendent to a ſky-blue watered ribband, edged with white, is worn ſcarfwiſe. On the left breaſt the knights alſo wear the ſame ſtar embroidered, having on the centre a red croſs. On feſtivals they wear a collar compoſed of oblong plates with crowns at each end, and columns ſurmounted with globes; each column ſupported by two lions, holding in their anterior paws ſcymitars, joined together with lozenge-chains enamelled blue and white: on the oblong plates is the following motto:—"In fide, juſtitia, et fortitudine."

The military order of *St. George* in Ruſſia, called alſo the order of "Merit," was inſtituted by the empreſs Catharine II. in 1769, has the precedence over that of St. Anne of Holſtein, and was divided into four claſſes.—The badge is a croſs of gold, enamelled white, on the centre of which is a medallion, with the figure of St. George ſlaying a dragon. This is worn pendent to a black ribband edged with orange colour, and two ſtripes of orange on the black. Thoſe of the firſt claſs wear it under their coat, paſſing from right to left; and on the left breaſt of their coat is a ſtar wrought in gold, in the ſhape of a lozenge: on the centre of the ſtar are embroidered the figure of St. George and the dragon. Thoſe of the ſecond claſs wear the badge pendent to a ribband paſſing round their neck, and a ſtar on their left breaſt. Thoſe of the third claſs wear the badge pendent to a narrow ribband which paſſes round their neck; but they have no ſtar. Thoſe of the fourth claſs wear the badge pendent at the button-hole of their coats. Each knight of the firſt claſs receives an annual ſalary of 700 roubles = 140*l*: each of the ſecond claſs has 400 roubles = 80*l.* per annum: each of the third claſs 200 roubles or 40*l.* per annum; and each of the fourth claſs 100 roubles or 20*l.* per annum. The fund of this order, aſſigned by the empreſs for the payment of their ſalaries, and other expences, is 40,000 roubles = 8000*l.* per annum. Of this 1,680 is deſtined for the firſt claſs; and 2000 for each of the remaining three. The number of knights is unlimited. In 1778, the firſt claſs, which is confined to commanders in chief, contained only four; the ſecond claſs comprized only eight knights; the third, forty-eight; and the fourth two hundred and thirty-four. No perſon can obtain this order without having performed ſome gallant exploit, or having ſerved in the rank of an officer 25 years by land, or 18 by ſea.

The order of *St. George* of Alfama, or the order of *Monteſa*, an order of knighthood in Spain. When the order of knights-templars became extinct in Spain, an order was inſtituted, about the year 1317, to ſupply their places, in conſequence of a permiſſion for that purpoſe obtained from pope John XXII. at which time Monteſa in Valencia was ſelected as a proper place for the reſidence of the knights. In the following year, James, king of Arragon and Valencia, built at Monteſa a noble college for their habitation, and dedicated it to St. George: and hence the order aſſumed its appellation of the order of St. George of Monteſa. The habit of this order is a white mantle, on the left breaſt of which is embroidered a plain red croſs. The badge of the order is a plain red croſs, enamelled on gold, which is worn ſcarfwiſe, pendent to a broad red watered ribband. The order of St. George of Alfama, was inſtituted about the year 1201, at a town of that name in the dioceſe of Tortoſa. In 1399 this order was united to that of Monteſa, by pope Benedict XIII. and that union was confirmed in the council of Conſtance.

GEORGE, *Religious of the order of St.* Of theſe there are divers orders and congregations; particularly canons regular of St. George in Alga, at Venice, eſtabliſhed by authority of pope Boniface IX. in the year 1404. The foundation of this order was laid by Bartholomew Colonna, who preached, in 1396, at Padua, and ſome other villages in the ſtate of Venice. Pope Pius V. in 1570, gave theſe canons precedence of all other religious. Another congregation of the ſame inſtitute in Sicily, &c.

St. GEORGE's *Croſs.* See CROSS.

GEORGE *noble*, a piece of gold, current at ſix ſhillings and eight-pence in the reign of king Henry VIII.

GEORGE *Bank*, in *Geography*, a rocky ſhoal, near the weſt coaſt of Sumatra. N. lat. 3° 48′. E. long. 96° 12′.

GEORGE, *Cape*, a cape on the S. coaſt of Kerguelen's Land. N. lat. 49° 54′. E. long. 70° 13′.—Alſo, a cape on the W. coaſt of Newfoundland. N. lat. 48° 28′. W. long. 59° 17′.—Alſo, a cape on the N. coaſt of the iſland of South Georgia. S. lat. 54° 17′. W. long. 36° 32′.—Alſo, a cape on the coaſt of Peru. S. lat. 23° 50′.—Alſo, a cape on the coaſt of New Holland, diſcovered on St. George's day by lieutenant Cook, and ſo called by him. S. lat. 35° 10′. W. long. 208° 51′.

GEORGE, *St.*, *Cape*, a cape on the W. coaſt of Newfoundland. N. lat. 49° 30′. W. long. 59°.—Alſo, the ſouthern extremity of New Ireland. S. lat. 5°. E. long. 152° 15′.

GEORGE *Creek*, a town of America, in Alleghany county, Maryland; 152 miles from Waſhington.—Alſo, a river of America, which runs into the Potowmack; 12 miles S.W. of Fort Cumberland.

GEORGE *Iſland*, an iſland of America, lying between lake Superior and lake Huron. N. lat. 46° 15′. W. long. 84° 20′.

GEORGE's *Iſlands*, two iſlands in the South Pacific occean, diſcovered by Commodore Byron in 1765, and ſo called by him in honour of his majeſty. They were again obſerved by captain Cook in 1774, in the paſſage from the Marqueſas to Otaheite. One of theſe iſlands, called by the inhabitants "Tiookea" was of an oval ſhape, and about 10 leagues in circuit, lying in the direction of E.S.E. and W.N.W., and ſituated in S. lat. 14° 27′ 30″, and W. long. 144° 56′. The inhabitants of this, and probably of the other low iſles, are of a much darker colour than thoſe of the higher iſlands, and ſeem to be of a much more ferine diſpoſition; which captain Cook attributes to their ſituation. Nature not having beſtowed her favours on theſe low iſlands with that profuſion ſhe has done to ſome others, the inhabitants are chiefly indebted to the ſea for their ſubſiſtence; conſequently they are much expoſed to the ſun and weather, and thus become more dark in colour, and more hardy and robuſt; for without doubt they are of the ſame nation. They were obſerved to be ſtout, well-made men, and on their bodies was marked the figure of a fiſh;—a very good emblem of their profeſſion. The other iſland was ſimilar to the former, extending N.E. and S.W. near four leagues, and from five to three miles broad. It lies S.W. by W. two leagues diſtant from the weſt end of Tiookea; and the middle is ſituated in S. lat. 14° 37′. W. long. 145° 10′. The natives of theſe iſlands appeared to be armed with long ſpears and clubs; their aſpect and movements were hoſtile: ſome of them, however, appeared to captain Cook to manifeſt a friendly diſpoſition; but they ſeemed to have no inclination to maintain any intercourſe with him. They ſupplied him with dogs, which were plentiful, and cocoa-nuts, which were the only fruit they ſaw. Theſe furniſhed them with almoſt all the neceſſaries of life, particularly food, ſails, cordage, timber, and veſſels to hold water; and with a view to this uſe of them, their habitations, which were mean low hovels, thatched with cocoa-nut branches, were ſelected near groves of theſe trees. Scurvy-graſs was obtained in great abundance. Their canoes, which they are dextrous in navigating, are large and curiouſly conſtructed. Commodore Byron obſerved the ſhore to be covered with coral, and the ſhells of very large pearl-oyſters; and he conceived that a very profitable pearl-fiſhery might be eſtabliſhed on theſe iſlands. The women had a piece of cloth, appearing to be fabricated of the ſame ſtuff with their ſails, which hung from the waiſt as low as the knee; but the men were ſtark naked. Near the huts of theſe people were buildings, that appeared to be burying-places, from the ſtructure of which it was inferred that they had great veneration for the dead. Freſh water is ſcarce. Each of theſe iſlands has in it a lagoon, or large ſalt-water lake. The people are much addicted to theft.

GEORGE *Lake*, a lake of Eaſt Florida, which is an enlargement of the river St. Juan, or St. John. It is alſo called "Great Lake," being about 15 miles wide, and generally about 15 or 20 feet deep, except at the entrance, which has a bar with 8 or 9 feet of water. This lake is beautified with two or three fertile iſlands, the largeſt of which is about two miles broad, commanding an extenſive proſpect, bearing evident marks of a large town of the Aborigines, and appearing to have been the choſen reſidence of an Indian prince.—Alſo, a lake that lies to the ſouthward of lake Champlain. The portage between the two lakes is one mile and a half. The water of this lake is very clear, and was formerly uſed by the French in Canada for ſacramental purpoſes, whence the lake was denominated lake "Sacrament." This lake is about 36 miles long, and from one to ſeven wide. It emboſoms more than two hundred iſlands; or, as ſome ſay, three hundred and ſixty-five; moſt of which are barren rocks, covered only with heath and a few cedar, ſpruce, and hemlock trees and ſhrubs, and abounding with rattle-ſnakes. The remains of Fort George ſtand at the ſouth end of the lake, about 14 miles N. by W. of Fort Edward, on Hudſon river. The famous fort of Ticonderoga, which ſtood on the north ſide of the outlet of the lake, where it diſcharges its water into lake Champlain, is now in ruins.—Alſo, a lake in Upper Canada, ſituated below the Falls of St. Mary, and N. of Muddy lake; it is about 25 miles long, with very ſhallow water.

GEORGE's *Sound.* See NOOTKA.

GEORGE, *St.*, the largeſt of the Bermudas iſlands, about 15 miles in length and three in breadth, containing about 500 houſes, ſurrounded and defended by a chain of rocks, which extend ſome way into the ſea, ſo that ſhips can approach it only in two places, and not without the aſſiſtance of an experienced pilot. It is divided into nine pariſhes or diſtricts. It has a town of the ſame name, containing a town-houſe, where the governor, council and magiſtrates aſſemble, a handſome church, and a library. N. lat. 32° 40′. W. long. 64° 32′. (See BERMUDAS).—Alſo, a town, or rather village, nearly in the centre of Newcaſtle county, in the ſtate of Delaware, N. America; ſituated on a creek of the ſame name, which falls into the Delaware river four miles below it, and a little above Reedy iſland; 45 miles S.W. of Philadelphia.—Alſo, a town and capital of the iſland of Grenada, and alſo one of its ſix pariſhes, formerly called by the French "Fort Royale." It is ſituated in a ſpacious bay, on the weſt ſide of the iſland, not far from the ſouth end, and poſſeſſes one of the ſafeſt and moſt commodious harbours in the Engliſh Weſt Indies, which has been lately fortified at a great expence, and being one of the ports of entry belonging to the iſland was made a ſea-port by 27 Geo. III. c. 27. The town of St. George is built chiefly of brick, and makes a handſome appearance. It is divided by a ridge, which, running into the ſea, forms on one ſide the carenage, and on the other the bay.—Accordingly here is the "Bay-town," which has a handſome ſquare and market-place, and the "Carenage-town," in which the principal merchants reſide; the ſhips lying land-locked, and in deep water cloſe to the wharfs. On the ridge between the two towns ſtands the church, and on the promontory above it is a large old fort, which was probably conſtructed by the firſt French inhabitants. It is built of ſtone, and is large enough to accommodate an entire regiment. N. lat. 12° 4'. W. long. 61° 31'. Edwards's Weſt Indies, vol. ii.—Alſo, one of the Azores iſlands, about 10 leagues in length, and two in breadth. The ſoil is generally level, except towards the north, where it is rocky and barren; it is elſewhere fertile in corn, and the other neceſſaries of life. It is chiefly remarkable for a great number of lofty and full-grown cedars, with which the natives carry on a conſiderable trade. N. lat. 38° 39'. W. long. 28°.—Alſo, a town of Hindooſtan, on the coaſt of Malabar; eight miles S. of Cochin.—Alſo, a ſea-port on the iſland of Sciro. N. lat. 38° 58'. E. long. 24° 37'.—Alſo, a ſmall iſland in the Grecian Archipelago, three miles E. of Milo.—Alſo, a ſmall iſland in the Grecian Archipelago, at the entrance of the gulf of Sandarlick. N. lat. 38° 48'. E. long. 26° 42'.—Alſo, a ſmall iſland in the Eaſt Indian ſea, near the coaſt of Hindooſtan; four miles from Goa.—Alſo, a town of France, in the department of the Mayne and Loire; 20 miles S.S.W. of Angers.—Alſo, a large and deep bay on the W. ſide of Newfoundland. N. lat. 48° 12'—Alſo, a river of America, or rather an arm of the ſea, in Lincoln county and ſtate of Maine, lying about two leagues S.W. of Penobſcot bay. This river is navigable for brigs and ſhips of a large burden up to the narrows; and from thence about four miles higher, to nearly the head of the tide, for ſloops and ſchooners of 80 or 90 tons. It is about half a league wide up to the narrows. The navigation is in winter. This river abounds with all kinds of fiſh.—Alſo, a river of St. Mary's county, in Maryland, which is a broad but ſhort creek, having its mouth between Piney point and St. Mary's river on the north bank of the Potowmack; oppoſite to the iſland of the ſame name.

St. GEORGE'*s Bank*, a fiſhing bank in the Atlantic ocean, in the Maſſachuſetts, E. of cape Cod. It extends from north to ſouth between 41° 15' and 42° 22' N. lat., and between 67° 50' and 68° 40' W. long.

St. GEORGE'*s Bay*, a bay of the Pacific ocean, on the S.E. coaſt of New Ireland, between cape St. George and cape Orford.

St. GEORGE'*s Channel*, that part of the Atlantic ocean which is ſituated between Ireland and Wales.—Alſo, a ſtrait of the Pacific ocean between New Britain and New Ireland, 300 miles in length.—Alſo, a ſtrait between the little Nicobar and Sambelong iſles, in the Eaſt Indian ſea.

St. GEORGE'*s Iſland*, a ſmall iſland in the mouth of the river Potowmack. N. lat. 38° 13'. W. long. 76° 34'.

St. GEORGE'*s Iſlands*, a cluſter of ſmall iſlands near the coaſt of Eaſt Florida, oppoſite to the mouth of the Apalachicola.—Alſo, ſmall iſlands in the Atlantic, near the coaſt of Maine in America. N. lat. 43° 50'. W. long. 68° 10'.

St. GEORGE'*s Key*, was one of the principal Britiſh ſettlements in the bay of Honduras, taken by the Spaniards during the American war, but retaken by the Britiſh ſoon after. The Britiſh ſettlements on the Moſquito ſhore, and in the bay of Honduras, were ſurrendered to the crown of Spain at the Spaniſh convention, ſigned at London on the 14th of July, 1786. N. lat. 17° 35'. W. long. 88° 43'.

St. GEORGE *d'Albora*, an iſland in the Grecian Archipelago, about ſeven miles in circumference. N. lat. 37° 28'. E. long. 23° 20'.

St. GEORGE *de Comiers*, a town of France, in the department of the Iſere; nine miles S. of Grenoble.

St. GEORGE *d'Elmina*. See ELMINA.

St. GEORGES-*en-Couſans*, a town of France, in the department of the Loire, and chief place of a canton in the diſtrict of Montbriſon, 9 miles N.W. of Montbriſon. The place contains 1020, and the canton 7271 inhabitants, on a territory of 207½ kiliometres, in 8 communes.

St. GEORGE *d'Eſperanche*, a town of France, in the department of the Iſere; 18 miles S.E. of Lyons.

St. GEORGES *de Lévéſac*, a town of France, in the department of the Lozére, and chief place of a canton in the diſtrict of Florac, 18 miles S.W. of Mende. The place contains 1000, and the canton 2600 inhabitants, on a territory of 137½ kiliometres, in 5 communes.

St. GEORGES *ſur Loire*, a town of France, in the department of the Mayne and Loire, and chief place of a canton in the diſtrict of Angers; 9 miles S.W. of Angers. The place contains 2,320, and the canton 9951 inhabitants, on a territory of 205 kiliometres, in 9 communes.

St. GEORGES-*les-Baillargeaux*, a town of France, in the department of the Vienne, and chief place of a canton in the diſtrict of Poitiers. The place contains 1119, and the canton 6027 inhabitants, on a territory of 190 kiliometres, in 7 communes.

St. GEORGE *d'Orque*, a town of France, in the department of the Herault; 4 miles W. of Montpellier.

St. GEORGE *de Rantambaut*, a town of France, in the department of the Ille and Vilaine; 9 miles N. of Fougeres.

St. GEORGE *in Reith*, a town of Auſtria, 6 miles S.E. of Waidhoven.

St. GEORGE *am Sec*, a town of Germany, in the principality of Culmbach, ſeated on a lake, called the pond of Brandenburg; 24 miles N.N.E. of Bayreuth.

St. GEORGES *des Sept Voies*, a town of France, in the department of the Maine and Loire; 12 miles N.W. of Saumur.

St. GEORGES-*du-Viévre*, a town of France, in the department of the Eure, and chief place of a canton in the diſtrict of Pontaudemer; 25 miles N.W. of Evreux. The place contains 830, and the canton 11,733 inhabitants, on a territory of 95½ kiliometres, in 14 communes.

GEORGENBERG, a town of Sileſia, in the principality of Oppeln; 40 miles E. of Oppeln. N. lat. 50° 30'. E. long. 18° 52'.

GEORGENFELD, ST., a town of Saxony, in the circle of Erzgebirg; 18 miles S. of Pirna. N. lat. 50° 40'. E. long. 13° 44'.

GEORGENTHAL, a town of Saxony, in the principality of Gotha; 6 miles S of Gotha.

GEORGENZELLS, a town of Germany, in the county of Henneberg; 5 miles S.S.E. of Salzungen.

GEORGE-TOWN, a town of America, being the chief and poſt-town of Suſſex county, in the ſtate of Delaware, ſituated 103 miles S. of Philadelphia, containing about 30 houſes, and lately made the ſeat of the county-courts.—Alſo, a poſt-town in Maryland, in Kent county, on the eaſt ſide of Cheſapeak bay, containing about 30 houſes; 9 miles from the mouth of the river Saſſafras, 65 miles S.W. of Philadelphia.—Alſo, a poſt-town of Beaver county, Pennſylvania, on the S.E. ſide of Monongahela river, at the mouth of George's creek; 16 miles S.W. of Union. In this place are annually built many boats, for the trade and emigration to the weſtern country.—Alſo, a poſt-town and port of entry in Montgomery county, Maryland, and in the territory of Columbia, pleaſantly ſituated on a number of ſmall hills, on the northern bank of Potowmack river, ſeparated eaſtward by Rock creek from Waſhington city, and diſtant 4 miles from the capital, and 8 N. from Alexandria. The houſes, which are about 250, are elegant and commodious. The Roman Catholics have eſtabliſhed a college in this place, which is in a flouriſhing ſtate. The town carries on a ſmall trade with Europe and the Weſt Indies; 46 miles S.W. by W. from Baltimore, and 148 S.W. from Philadelphia. N. lat. 38° 55'.—Alſo, a town and townſhip of Lincoln county, in the ſtate of Maine, ſituated on both ſides of Kennebeck river; incorporated in 1716, and containing 1534 inhabitants. It is entirely ſurrounded by navigable waters, excepting about two miles of land, which divides the waters of Winnagance creek, a part of the Kennebeck, from an arm or influx of Caſco bay, called Stephen's river. This townſhip contains about 28,000 acres of land, and ſalt-marſh. Upon this ſpot the Europeans firſt attempted in 1607 to colonize New England. It is a part of what was called "Sagadahock;" and the patentees of the Plymouth company began here to lay the foundation of a great ſtate. They ſent over for this purpoſe a number of civil and military officers, and about 100 people. Several misfortunes obliged them to give up the ſettlement, and in 1608 the whole number who ſurvived the winter returned to England. George-town is 15 miles S. of Pownalborough, and 170 N. by E. from Boſton.—Alſo, a poſt-town of Georgia, in the county of Oglethorpe, 50 miles S.W of Auguſta, in the midſt of a poor country, but indicating proſperity.—Alſo, a large maritime diſtrict in the lower country of South Carolina, ſituated in the N.E. corner of the State. Horry and Marion diſtricts have lately been taken from this territory, leaving 20,332 inhabitants, of whom 16,860 are ſlaves.—Alſo, a poſt-town, and port of entry, and capital of the laſt-mentioned diſtrict, ſituated on a ſpot near which ſeveral ſtreams unite their waters, and form a broad water called "Winyaw" bay, 13 miles from the ſea. It contains 3 or 400 dwelling-houſes, built chiefly of wood. The public buildings are a court-houſe, gaol, and academy; four churches for epiſcopalians, baptiſts, preſbyterians, and methodiſts reſpectively. The place carries on a ſmall trade with the Weſt Indies; 60 miles N.E. by N. from Charleſtown, and 681 from Philadelphia. N. lat. 33° 24'. W. long. 79° 35'.—Alſo, a town of Kentucky, on the Eikhorn; 20 miles E. of Francfort. N. lat. 38° 7'. W. long. 84° 50'.—Alſo, a town of New Brunſwick, on the river St. John. N. lat. 45° 48'. W. long. 66° 12'.—Alſo, a town on the eaſt coaſt of the iſland of St. John, on the gulf of St. Laurence.—Alſo, a town of the ſtate of Georgia; 20 miles N. of Wayneſborough.—Alſo, a town of Scotland, in Perthſhire, with ſome barracks, at the end of Loch Rannock; 31 miles N.W. of Perth. N. lat. 56° 41'. W. long. 4° 25'.

GEORGIA, in *Botany*, Ehrhart Beitr. v. 1. 176, ſo named by that author after his majeſty George III. king of Great Britain, when he eſtabliſhed, as a new genus, the moſs called by Linnæus *Mnium pellucidum*. All botaniſts, nevertheleſs, have preferred the name *Tetraphis*, given by Hedwig. See Fringe *of* Moſses, n. 1. It ſeems, however, that there ought to be a *Georgia* after Georgi the Ruſſian traveller and botaniſt. See Georgina.

Georgia, in *Geography*, a country of Aſia, between the Caſpian and Black ſeas, and particularly appropriated to the territory that lies between the Caſpian ſea and Mingrelia, anciently known by the name of "Iberia." The ancient Iberia, which lies to the weſt, is now chiefly the "Immeretia" of European Turkey, on the other ſide of a branch of the Caucaſus. Georgia, or more properly "Gurguſtan," including Dagheſtan and Schirvan, may be conſidered as conſtituting the Albania of the ancients; a name, however, that has been applied in different quarters to mountainous regions.

The whole country, which is known by the name of Georgia or Gruſinia, is divided into two conſiderable Chriſtian ſtates. One of theſe, bounded by the Black ſea, conſiſts of the kingdom of "Immeretia," and the principalities of "Mingrelia" and "Guriel," (which ſee reſpectively,) and is now governed by a common prince, who bears the title of tzar or czar. Each of theſe countries had formerly its own ruler, all acknowledging the ſupremacy of the Grand Sultan, till czar Solomon united them under his authority, and freed them from the paramount Ottomans. Solomon, having upon his acceſſion forbidden the ſcandalous traffic practiſed by the nobles of ſelling their peaſants, greatly offended the Turks, who gained by that ſpecies of commerce. Being by their intrigues driven from his throne, and compelled to find an aſylum in the woods and mountains, he lived like a wild man for ſixteen years, in caverns and holes, and frequently, by his perſonal courage, eſcaped aſſaſſination, until he was re-inſtated in his dominions by the Ruſſians. This prince, on ordinary occaſions, was diſtinguiſhed from his ſubjects by riding on an aſs, perhaps the only one in Immeretia, and by wearing boots. He had no regular troops, but collected a deſultory army of 6000 men, without artillery. Theſe troops were drawn together by the ſound of the trumpet; in other reſpects the prince's orders were iſſued at the markets, which are held every Friday. One of his ſervants aſcended a tree near the place of meeting, and proclaimed the edict with a loud voice. His ſubjects were of the Greek religion. Solomon died of the plague in 1784, and was ſucceeded by his nephew David, who threw himſelf under the protection of Ruſſia. In 1784 his embaſſadors were introduced to the empreſs at Peterſburg, and, in the eaſtern ſtyle of homage, threw themſelves on the ground at her feet.

The ſecond Georgian ſtate conſiſts of the principalities of "Karduelia" or "Carduelia," (Kartalinia) and "Kakhetty," which have been long governed by Chriſtian princes, in ſubmiſſion to the Perſian empire, but, ſince the ſhock ſuſtained by the throne of the Sophis, have rendered themſelves independent. Each of theſe two provinces formerly compoſed a diſtinct ſtate; but they have both lately been reduced under the ſole ſovereignty of prince Heraclius of the Kakhettian dynaſty. The ſtate of Karduelia and Kakhetty borders northwards on the Kabarda, eaſtwards on Dagheſtan and Schirvan, (which ſee reſpectively,) ſouthwards on the Perſian Armenia, and weſtwards on Immeretia. The capital is *Teflis* (which ſee). The czar, or prince Heraclius, who is celebrated for his bravery and other great qualities, as well as by the important part which he acted during the diſturbances that agitated Perſia after the death of Tamas Kuli-Khan, ſubmitted in the year 1783 to the Ruſſian empire, thus voluntarily ſacrificing an independence which he ſeemed to have ſecured by his exploits; but the advantages of which were richly compenſated in the protection he procured by this ſubmiſſion. However, notwithſtanding his cloſe alliance with Ruſſia, he was compelled in 1787 to renounce his connection with it, and to acknowledge himſelf tributary to the Porte; but he died ſoon afterwards. Within a few years paſt the Ruſſian intereſt revived, and prevailed; and in February 1801, Georgia was by a public ukaſe united to that empire. The Georgians or Gruſinians, as they are ſometimes called, avoided all commixture with the Tartars, and have diſtinguiſhed themſelves as the moſt numerous and powerful body of the mountaineers of Caucaſus, now for the greateſt part ſubject to the protecting authority of Ruſſia. The inhabitants of Georgia, when it was one kingdom, were Chriſtians, but ſince the year 1639, they were blended with Mahometans; the king of Perſia having conquered and divided the country into two provinces or kingdoms, and having obliged the people to embrace the Mahometan religion. But ſince they have been under the protection of Ruſſia, they have again avowed themſelves Chriſtians, following in part the rights of the Armenian, and in part thoſe of the Greek church. They are repreſented as the moſt tractable Chriſtians of the Eaſt. The Georgians excel in the uſe of the bow, and are reputed to be the beſt ſoldiers in Aſia. The women are celebrated for their beauty, but though they are very handſome they love to adorn themſelves with paint, and are not in high eſtimation for their modeſty. As the country produces ſtrong wine, the Georgians are addicted to intoxication, and the women, as well as the men, indulge freely in the uſe of brandy. The men, it is ſaid, have no virtue but courage; fathers ſell their children, and ſometimes their wives. According to the laws of war in Turkey, any province which revolts is given up to pillage, and the inhabitants are reduced to ſlavery. In conſequence of this cuſtom, which prevails throughout Aſia, Georgia and Circaſſia ſupply the market of Conſtantinople with ſlaves; though it is ſaid, that the Circaſſians alone have the honour of being admitted into the bed of the ſultan. This ſupply of female ſlaves is continually furniſhed by the Leſgues Tartars, who, ſituated between the Caſpian and Black ſeas, between Georgia and Circaſſia, are perpetually at war with theſe two provinces. They carry over to the eaſtern coaſt of the Black ſea the ſlaves they have taken, and ſell them to the Turkiſh merchants, who come thither at ſtated times for this traffic. The inhabitants of this ſame coaſt, likewiſe, ſeize on their countrymen in the neighbouring villages, and ſell them; and children have been ſometimes ſold by their parents. See Circassia.

The air of Georgia is dry, very warm in ſummer, and very cold in winter. Fine weather commences in the month of May, and continues till the end of November. The ſoil is extremely fertile, provided the ground be watered. The bread and fruits are excellent; and the paſtures feed a great number of cattle, fat and lean. The game is of excellent flavour, and the wild hogs are delicate. The inhabitants make wine, which they ſell into Armenia and Perſia, eſpecially to Iſpahan, for the king's table. Silk forms a conſiderable branch of trade to Erzerum; though the inhabitants are unacquainted with the beſt method of winding it. In this province there are only four conſiderable towns; *viz.* Tefflis, Gori, Suren and Ali. See Persia.

Georgia, one of the United States of America, ſituated between 31° and 35° N. lat. and between 5° and 16 W. long.; extending in length about 600 miles, and in breadth 250; and bounded on the eaſt by the Atlantic ocean; S. by Eaſt and Weſt Floridas; W. by the river Miſſiſippi; N.E. and N. by South Carolina, the Tenneſſee ſtate, or by lands ceded to the United States by South Carolina. Its population is eſtimated, by the cenſus of 1790, at 82,548 perſons; of whom 29,264 were ſlaves; but the number has ſince been much augmented. The ſettlement of a colony between the rivers Savannah and Alatamaha became the ſubject of contemplation in England in the year 1732, with a view to the accommodation of poor people in Great Britain and Ireland, and for the farther ſecurity of Carolina. The benevolent and humane propoſed to raiſe a fund for conveying indigent emigrants to this part of America, free of expence. Their generous project was encouraged by letters patent obtained from his majeſty George II. in June 1732; and, in honour of the king, the new province was called "Georgia." A corporation was eſtabliſhed for ſettling the colony, which was to be ſeparated from Carolina by the Savannah; and a large ſum of money was raiſed for the purpoſe of carrying the liberal and humane deſign into execution. General Oglethorpe was ſelected for conducting the emigrants, about 116 in number, to their new abode; and ſoon after their arrival, in the commencement of the year 1733, they marked the ſpot, on which Savannah now ſtands, as the moſt proper for the foundation of their ſettlement. Accordingly they proceeded to erect a fort, and a number of ſmall huts, for their defence and accommodation. A treaty of amity was concluded between the ſettlers and their neighbours, the Creek Indians; and various regulations were framed, for their future government. The number of new ſettlers from the Highlands of Scotland and from Germany gradually increaſed; ſo that in the courſe of three years, Georgia received above 400 Britiſh ſubjects, and about 170 foreigners. Afterwards ſeveral adventurers from Scotland, Germany, and Switzerland followed their countrymen, and contributed to encourage the hopes of the truſtees as to the permanence and proſperity of the colony. Several towns were built, and, in 1739, more than 600 people were employed in trading with the Indians for furs and ſkins. Nevertheleſs, in 1741, the Engliſh government received information that ſcarcely a ſixth part remained of the number of perſons who had migrated to Georgia; and thoſe that continued were ſo much diſcouraged, that they ſeemed to be deſirous of fixing in a more favourable ſituation. It was thus found that the ſyſtem of government, which had been formed for this colony, was highly injudicious and altogether inconſiſtent with its proſperity. The firſt uſe which the proprietors of Georgia made of the unlimited powers with which they were inveſted, was to eſtabliſh a ſyſtem of legiſlation that made them abſolute maſters, not only of the police, juſtice, and finances of the country, but even of the lives and eſtates of the inhabitants. As great inconveniences had been found to ariſe in other colonies from large poſſeſſions, it was thought proper in Georgia to allow each family only 50 acres of land; which they were not permitted to mortgage, or to diſpoſe of by will to their female iſſue. This laſt regulation, however, which made the males only capable of inheritance, was ſoon aboliſhed; but other reſtrictions of a diſcouraging nature ſtill remained. No man was permitted to leave the province without a licence. If any of the lands granted by the truſtees were not cultivated, cleared, and fenced round with a wooden fence, or pales ſix feet high, within 18 years from the date of the grant, ſuch part was to revert to the truſtees for the benefit of the colony. It was forbidden to uſe negroes, to import rum, and to trade with the Indians without a ſpecial licence obtained for this purpoſe. Under theſe reſtraints the province languiſhed, and the people complained; till at length the truſtees, in the year 1752, ſurrendered their charter to the king, and it was made a royal government. From this time, till the peace of Paris in 1763, the province ſtruggled under many difficulties; ariſing from the want of credit with friends, and from the frequent moleſtations of enemies. The good effects of this peace were ſenſibly felt, and its annual exports, which in 1752 amounted to no more than about 10,000*l.* ſterling, were very much augmented; and its population and agriculture proportionally increaſed; though under ſome checks and interruptions from diſputes and wars with the Creek Indians. But ſince a treaty of peace and friendſhip with the Creek nation was concluded in 1790, the ſtate of Georgia has been rapidly advancing in every kind of improvement.

Since the revolution, Georgia has been divided into counties, comprehended under two diſtricts, *viz.* the Upper and the Lower; the former includes 15 counties, *viz.* Montgomery, Waſhington, Hancock, Greene, Franklin, Oglethorpe, Elbert, Wilkes, Lincoln, Warren, Jefferſon, Jackſon, Bullock, Columbia, and Richmond; the latter contains nine counties, *viz.* Camden, Glynn, Liberty, Chatham, Bryan, M'Intoſh, Effingham, Scriven, and Burke. The principal towns are Auguſta, formerly the ſeat of government, Savannah, the former capital of the ſtate, Sunbury, Brunſwick, Frederica, Waſhington, and Louiſville, which is the metropolis of the ſtate, and where its records are depoſited. The principal rivers which water Georgia, are Savannah, which ſeparates it from South Carolina, Ogeechee, which runs parallel with the former, and Alatamaha, which runs parallel with the others. Beſides theſe and their numerous branches, we might mention Turtle river, Little Sitilla, Great Sitilla, Crooked river, and St. Mary's, which forms a part of the ſouthern boundary of the United States. The rivers in the middle and weſtern parts, belonging to the "Georgia Weſtern territory," will be noticed in another place. All theſe rivers contain a plentiful ſupply of various ſorts of fiſh, as rock, mullet, whiting, ſhad, trout, drum, baſs, cat fiſh, whiting, brim and ſturgeon; and the bays and lagoons afford oyſters, and other ſhell fiſh. The chief lake, or marſh, in this ſtate, is Ekanfanoka, called by ſome Ouaquaphenogaw, which is 300 miles in circumference. The eaſtern part of the ſtate, between the mountains and the ocean, and the rivers Savannah and St. Mary's, comprehending a tract of country more than 120 miles from N. to S., and from 50 to 80 E. and W., is level without a hill or ſtone. At the diſtance of about 40 or 50 miles from the ſea-board, or ſalt-marſh, the land gradually riſes to mountains. The vaſt chain of the Alleghany or Appalachian mountains terminates in Georgia, 60 miles S. of its northern boundary. From the baſe of this mountain ſpreads a widely extended plain, of the richeſt ſoil, and in a latitude and climate well adapted to the culture of moſt productions either of the ſouth of Europe or of the Eaſt Indies. In the low country, near the rice ſwamps, bilious complaints and fevers are very general during the months of July, Auguſt, and September; and at the approach of this ſickly ſeaſon, the rich planters, with their families, remove either to the ſea-iſlands or to a more elevated ſituation, for the benefit of the air. In the winter and ſpring, pleuriſies, peripneumonies, and other inflammatory diſorders, produced by colds, are common, and frequently fatal. The winters in Georgia, however, are mild and pleaſant; ſnow is ſeldom ſeen, nor is vegetation interrupted by ſevere froſts. In the hilly country, commencing about 50 miles in ſome parts, and in others about 100 miles from the ſea, the air is pure and ſalubrious, and the water good and abundant. From June to September the mercury in Fahrenheit's thermometer fluctuates from 76° to 90°; and in winter from 40° to 60°. The moſt prevailing winds are S.W. and E.; and in winter N.W. The E. wind is warmeſt in winter and cooleſt in ſummer; the S. wind in ſummer and autumn is damp, ſultry, and inſalubrious. In the S.E. parts of the ſtate, the trade winds impart their agitation to the atmoſphere, and ſerve to purify and meliorate it. In the lowlands rice is cultivated; and in the interior and hilly parts, wheat and Indian corn, and the other productions common to the northern ſtates, are the objects of agricultural attention. Rice is at preſent the ſtaple commodity of this ſtate; and the other chief articles of produce are tobacco, wheat and indigo. Georgia alſo yields cotton, ſilk, corn, potatoes, oranges, figs, olives, pomegranates, &c. The foreſts conſiſt of oak, hickory, mulberry, pine, cedar, &c. The whole coaſt is bordered with iſlands, of which the principal are Skidaway, Waſſaw, Oſſabaw, St. Catherines, Sapelo, Frederica, Jekyl, Cumberland, &c. Theſe iſlands are ſurrounded by navigable creeks, between which and the main land is a large extent of ſalt-marſh at a medium four or five miles broad, fronting the whole ſtate, and interſected with creeks, which admit a general inland navigation, between the iſlands and the main land, from the N.E. to the S.E. corners of the ſtate. The entrances of rivers flowing between theſe iſlands, form capacious harbours from three to eight miles broad; communicating with each other by parallel ſalt creeks. The iſlands in their natural ſtate are covered with pine, oak, hickory, live oak, and red cedar. The ſoil is grey, formed by a mixture of ſand and black mould; and a conſiderable part of it is very rich, and yields, by cultivation, good crops of indigo, corn, cotton, and potatoes. The ſoil of the main land, adjoining the marſhes and creeks, reſembles that of the iſlands; except that, which borders on the creeks and river that penetrate far into the interior of the country, and which furniſhes the valuable rice ſwamps. The ſoil between the rivers, at a greater diſtance, changes from a grey to red colour; and ſtill more remotely, into the mulatto kind, conſiſting of a black and red earth. This ſort of land is generally ſtrong, and yields large crops of wheat, tobacco, corn, &c. This ſoil is ſucceeded by another, nearly black, and very rich. This ſucceſſion of different ſoils is uniform and regular, intermixed with occaſional veins of different ſorts; and ſtretches, in the order above-mentioned, acroſs this ſtate nearly parallel with the ſea-coaſt, and extends through the ſeveral ſtates, nearly in the ſame direction, to the banks of Hudſon river. The culture of cotton is now ſo much an object of attention in this ſtate as to afford a reaſonable expectation, that the ſtates of South Carolina and Georgia may, in a few years, be able to raiſe more than 10 millions of pounds annually for exportation. With proper attention, moſt of the tropical fruits would flouriſh in this ſtate. The ſouth-weſtern part of this ſtate, and the adjoining parts of E. and W. Florida, will, it is conjectured, at ſome future period, become the vineyard of America. The chief articles of export are rice, tobacco, indigo, ſago, lumber, naval ſtores, leather, deer ſkins, ſnake root, myrtle and bees wax, corn, and live ſtock. The value, in ſterling money, of the exports of Georgia, in the year 1755, was 15,744*l.*; in 1772, 121,677*l.*; in 1791, value in dollars, 491,472; in 1792, 458,973; in 1793, 501,383; in 1794, 676,154; in 1796, 950,158; and in 1801, 1,854,951. In 1790, the tonnage employed in this ſtate was 28,540, and the number of American ſeamen was 11,225. In return for her exports, Georgia receives Weſt India goods, teas, wines, clothing, and dry goods of all kinds: from the northern ſtates, cheeſe, fiſh, potatoes, apples, cyder, and ſhoes. The imports and exports are principally to and from Savannah, which has a fine harbour, and is the chief emporium of the ſtate.

The diſpoſition and character of the inhabitants, collected from various parts of the world, are very much diverſified; they are charged with indolence, which is attributed partly to the relaxing heat of the climate, and partly to the want of motives, neceſſary for exerting induſtry; they are praiſed for their friendlineſs and hoſpitality to ſtrangers. Their diverſions are dancing, horſe-racing, cock-fighting, and chiefly hunting. They are reproached with an addictedneſs to gaming.

The different religious ſects of this ſtate are Baptiſts, Methodiſts, Preſbyterians, Epiſcopalians, Roman Catholics, Quakers, and Jews. The two firſt are the moſt numerous, and inhabit the upper part of the ſtate. The Epiſcopalians and Preſbyterians are about equal in number; and the Catholics and Jews have each of them one church. The civil conſtitution of Georgia was adopted and ratified by a convention of delegates from the people, on the 6th of May, 1789, and is formed upon a plan ſimilar to the federal conſtitution of the United States. All legiſlative power is veſted in two diſtinct branches, a ſenate and houſe of repreſentatives, both choſen by the people at large, and ſtyled the General Aſſembly. The members of the ſenate are choſen for the term of three years, and thoſe of the houſe of repreſentatives are choſen annually. The ſenate conſiſts of one member from each county, and the houſe of repreſentatives of thirty-four members. The executive power is veſted in the hands of a governor, who holds his office during two years. Freedom of the preſs and trial by jury ſhall remain inviolate, and all perſons ſhall be entitled to the writ of "habeas corpus." All perſons ſhall have the free exerciſe of their religion, without being obliged to contribute to the ſupport of any religious profeſſion but their own. In each county a ſuperior court is holden twice in every year, in which all cauſes, civil and criminal, ſhall be tried, thoſe excepted, which may be ſubject to the federal court, or ſuch as may by law be referred to inferior juriſdictions. The judges of the ſupreme court, and the attorney-general, ſhall have a ſalary eſtabliſhed by law; and hold their commiſſion for three years. In the adminiſtration of juſtice, this ſtate is divided into two diſtricts, called the upper and lower circuit; and there are only two judges appointed to ſit in the ſuperior court; each of theſe judges being appointed to try cauſes in each circuit. Beſides the ſuperior court, there is an inferior court, a court of common pleas eſtabliſhed in each county, which ſits twice in a year, with five judges, appointed by the legiſlators. The county courts have a juriſdiction of criminal cauſes, which can be tried only in the ſuperior court. Beſides theſe there are the ſheriff's court, and courts held by the juſtices of the peace, in every part of the ſtate. The literature of this ſtate, which is yet in its infancy, is gradually advancing towards higher degrees of improvement. For this purpoſe a college is inſtituted at Louiſville, with liberal endowments; and in ſubordination to this it is propopoſed to found academies in every county of the ſtate. This inſtitution is denominated the "Univerſity of Georgia." The funds for its ſupport conſiſt of about 50,000 acres of valuable land, together with nearly 6000*l.* ſterling in bonds, houſes, and town lots in Auguſta. Other property alſo, to the amount of 1000*l.*, has been ſet apart in each county for erecting and furniſhing their reſpective academies. The fund originally deſigned to ſupport the literary orphan ſchool, founded by the Rev. George Whitfield, a few miles S. of Savannah, conſiſt chiefly of rice plantations and negroes. On the death of the counteſs of Huntingdon, to whom Mr. Whitfield bequeathed this property as truſtee, the legiſlature, in the year 1792, paſſed a law, veſting it in thirteen commiſſioners, with power to carry Mr. Whitfield's original deſign into execution; and in compliment to the counteſs, the ſeminary is denominated "Huntingdon college."

The middle parts of this ſtate are inhabited by the Muſkogee or Creek Indians, the moſt numerous tribe of Indians within the United States. See Creeks.

The "Georgia Weſtern Territory" conſiſts of an extenſive tract of land, a principal part of which belongs to, and is inhabited by the Creek, Chactaw, Chickaſaw, and Cherokee nations of Indians. It is waſhed by the Miſſiſippi river on the weſt, and may be conſidered as extending eaſtward as far as the Appalachicola and Flint rivers. It is interſected by a great number of ſtreams, which run in every direction; the principal are the Yazoo, and Looſa Chitto, which diſcharge themſelves into the Miſſiſippi, Pearl, Paſcagoula, Mobille, Alibama, Tombeekkee, Eſcambia, and Chatta Hatcha, which fall into the gulf of Mexico; and the Tenneſſee Bend, with Chuccamaga river, which falls into it from the ſouth-eaſt, water its northern part. Twenty millions of acres of this territory was ſold in conſequence of an act of the legiſlature, paſſed in 1795, to certain companies; and the purchaſe money, amounting to 500,000 dollars, was paid into the ſtate treaſury. This land was afterwards ſold at an advanced price, by the original purchaſers, to various perſons, principally of the middle and eaſtern ſtates. This tranſaction produced a great degree of diſcontent; but the ferment has ſince ſubſided; and the termination of the diſpute has been a general ſatisfaction on the part of the purchaſers, that the diſcordant proceedings of the legiſlature cannot affect their title, which they conceive to be good againſt all claims on the part of Georgia. Morſe.

Georgia, *New*, or *South* Georgia, an iſland in the South Atlantic ocean, diſcovered by La Roche in 1675, ſeen by Mr. Guyot, in the ſhip Lion, in 1756, and more particularly deſcribed by captain Cook, who explored it with attention in 1775, deſcribed its extent and true poſition, and named it Georgia, in honour of his majeſty. It is ſituated between 53° 57′ and 54° 57′ S. lat., and between 38° 13′ and 35° 34′ W. long. It extends S. E. by E. and N. W. by W., and in that direction is 31 leagues long, and its greateſt breadth is about 10 leagues. It ſeems to abound with bays and harbours, eſpecially on the N.E. coaſt; but they are rendered inacceſſible for the greateſt part of the year by the vaſt quantity of ice; or, at leaſt, it muſt be dangerous lying in them, on account of the breaking up of the ice-cliffs, by which the coaſt is bounded, and which riſe up perpendicularly in maſſes of very conſiderable elevation. When theſe fall they float about in the ſea like detached iſlands, and in falling make a noiſe like that of a diſcharged cannon. The inner parts of the country exhibit an appearance no leſs ſavage and horrible than the coaſt. The rocks raiſed their lofty ſummits, till they were loſt in the clouds, and the vallies lay covered with everlaſting ſnow. The lands, or rather rocks, bordering on the ſea coaſt, were not covered with ſnow like the inland parts. The rocks ſeemed to contain iron. They are of blackiſh horizontal ſlate, probably approaching to hornblende. Not a tree was to be ſeen, nor a ſhrub even big enough to make a tooth-pick. The only vegetation that could be ſeen was that of a coarſe ſtrong-bladed graſs growing in tufts, wild burnet, and a plant like moſs, which ſprung from the rocks. Seals or ſea-bears were numerous, but ſmaller than thoſe at Staten Land. Several flocks of penguins of a large ſize were obſerved, and beſides theſe, the oceanic birds were albatroſſes, common gulls, and that ſort called by Cook Port Egmont hens, terns, ſhags, divers, the new white bird, and a ſmall bird like thoſe of the Cape of Good Hope, called yellow birds, which were found to be moſt delicious food. All the land birds that were ſeen conſiſted of a few ſmall larks; but our navigators found no quadrupeds. The dung of one was ſeen, ſuppoſed to have belonged to a fox or an animal of that kind. On the whole coaſt our voyagers obſerved neither a river nor a ſtream of freſh water. They thought it highly probable, that the country has no perennial ſprings; and that the interior parts, as being much elevated, never enjoy heat enough to melt the ſnow in ſuch quantities as to produce a river or ſtream of water. The coaſt alone receives warmth ſufficient to melt the ſnow, and this only on the N. E. ſide; for the other, beſides being expoſed to the cold ſouth winds, is in a great degree deprived of the ſun's rays by the uncommon height of the mountains. On the approach of our navigators to Georgia, they firſt diſcovered an iſland in S. lat. 54° and W. long. 38° 23′, which was called "Willis's iſland," which was a high rock of no great extent: eaſt of this, between it and the main, they obſerved another iſland, to which, on account of the number of birds they ſaw upon it, they gave the name of "Bird Iſland." This iſland is of larger extent than the former, lies cloſe to the N. E. point of the main land, which was called "Cape North." After having cleared the paſſage between theſe two iſlands, they purſued their coaſting voyage to "Cape Buller," and at length arrived at a bay, which they denominated "Poſſeſſion bay," ſituated in S. lat. 54° 5′. W. long. 37° 18′, 11 leagues E. of Cape North. The land in which this bay lies, was at firſt judged to be part of a great continent; but upon coaſting round the whole country, it was found to be an iſland, about 70 leagues in circuit. Between this bay and Cape Buller lies the "Bay of Iſles," ſo named on account of ſeveral ſmall iſles lying in and before it. The next projecting point was called "Cape Saunders," and beyond this is a large bay, which was named "Cumberland Bay." The next projecting land, which was an iſland appearing to be the extremity of the coaſt to the eaſt, was called "Cape Charlotte," and on the weſt ſide of it lay a bay, which was named the "Royal Bay," the W. point of it being called "Cape George." Theſe two capes are diſtant from each other ſix leagues. The iſland above mentioned, diſtant in the direction of S. by E. eight leagues from Cape Charlotte, was denominated "Cooper's Iſle," which is a rock of conſiderable height, about five miles in circuit, and one mile from the main. The coaſt between them forms a large bay, named "Sandwich Bay." At Cooper's Iſle the main coaſt takes a S. W. direction for the ſpace of four or five leagues to a point which Capt. Cook called Cape Diſappointment. Off this are three ſmall iſles, the ſouthernmoſt of which is green, low, and flat, and lying one league from the Cape. Advancing towards the S. W., land opened beyond the Cape, which proved to be an iſland, and was called "Pickerſgill iſland." In ſailing round this iſland, our navigators were almoſt continually involved in a thick miſt, which led them to apprehend that they might be ſurrounded with dangerous rocks.—Cook's Second Voyage, vol. ii.

Georgia, a townſhip of America, in the ſtate of Vermont and county of Franklin, containing 1068 inhabitants. It is ſituated on lake Champlain, oppoſite to the north end of South Hero iſland, and joins Milton on the ſouth and St. Albán's on the north. The river La Moille traverſes the S. E. corner of this townſhip.

Georgia, *Gulf of*, a large gulf of the North Pacific ocean, between the continent of North America and Quadra and Vancouver's iſland; about 120 miles in length from north to ſouth; the breadth varying from 6 to 20 miles. It contains ſeveral cluſters of iſlands, and branches off into a great number of canals, moſt or all which were examined by Capt. Vancouver and his officers.

GEORGIAN Planet, or Georgium *Sidus*, in *Aſtronomy*, the name given by Dr. Herſchel, the diſcoverer, to the ſeventh primary planet of the ſolar ſyſtem. It is now generally known, particularly on the continent, by the name of Uranus.

This planet was diſcovered by Dr. Herſchel on the 13th March, 1781. It is ſuppoſed that other aſtronomers have obſerved it, and inſerted it in their catalogues as a fixed ſtar. But Dr. Herſchel, when he firſt ſaw it, was ſtruck with its appearance, which ſeemed to differ from that of the neighbouring ſmall ſtars. He happened to be accidentally engaged in examining the ſmall ſtars near the feet of Gemini, and he obſerved one conſiderably larger than the reſt, but it not being quite ſo brilliant, he ſuſpected that it might be a comet; in conſequence of which he obſerved it with different magnifying powers, from 227, with which he diſcovered it, to 2010, and found that its apparent magnitude increaſed in proportion, contrary to what takes place in the fixed ſtars. He therefore meaſured its diſtance from ſome of the neighbouring fixed ſtars, and comparing its diſtance for ſeveral nights he found that it moved at the rate of about $2\frac{1}{4}''$ in an hour. Dr. Herſchel wrote immediately to the Royal Society, that other aſtronomers might join in obſerving it; upon which it was found and obſerved by Dr. Maſkelyne, who almoſt immediately declared that he ſuſpected it to be a planet; and on April 1, he wrote an account of this diſcovery to the aſtronomers at Paris, ſo that it was ſoon obſerved by all the aſtronomers in Europe. Mr. Lexell was then in England, and applied himſelf to compute the orbit upon the ſuppoſition that it was a comet; he therefore, according to the uſual manner in ſuch a caſe, ſuppoſed the orbit to be a parabola, and aſſumed ſeveral perihelion diſtances, 6, 8, 10, 11, 12, 14, 16, and 18 times the earth's diſtance from the ſun, and found that any perihelion diſtance between 14 and 18, would anſwer very well to the obſervations. Boſcovich printed a memoir on the ſubject, in which he ſhewed that there were four different parabolas in which a body might move, and yet the computed places would agree with the obſervations which had then been made. Other aſtronomers, however, found that a circular orbit, whoſe radius was about 18 times the diſtance of the ſun from the earth, would agree better with the obſervations; and confirmed Dr. Maſkelyne's opinion that it was a planet. Upon the ſuppoſition, therefore, of a circular orbit, M. de la Lande proceeded to inveſtigate its magnitude from the following obſervations. Mem. de l'Acad. Roy. des Sci. 1779.

Time of obſervation	April 25, 1781, at $9^h\ 47'$	July 31, 1781, at $15^h\ 33'$	Dec. 12, 1781, at $10^h\ 10'$
Right aſcenſion obſerved	$2^s\ 25^\circ\ 15'\ 27''$	$3^s\ 1^\circ\ 7'\ 49'$	$3^s\ 1^\circ\ 23'\ 31''$
North declination obſerved	23 35 34	23 40 25	23 42 47
Longitude	2 25 39 17	3 1 2 7	3 1 16 28
Latitude, north	11 36	12 24	14 54
Nutation in longitude	+ 10	+ 8	+ 7
Aberration in longitude	+ 19	+ 21	− 18
Sun's longitude from the mean equinox	1 5 58 53	4 9 7 13	8 21 21 50
Log. of the ſun's diſtance	0.003196	0.006272	9.992993

From theſe data, M. de la Lande calculated the elements of a circular orbit; but it having been found that the motion did not agree with any poſſible circle, it became neceſſary to calculate the elements of an elliptic orbit. When a ſufficient number of oppoſitions had been obſerved for this purpoſe, profeſſor Robiſon of Edinburgh undertook this inveſtigation, a full account of which is given in Edinb. Tranſ. vol. i. 1788. The obſervations on which this inveſtigation is founded are as follows:

True Time at Edinburgh.		Longitude.	N. lat.
Dec. 21, 1781,	17′ 44′ 33′	3ˢ 0° 52′ 11″	15′ 7″
26, 1782,	8 56 56	3 5 20 29	18 56
31, 1783,	0 46 24	3 9 50 52	22 10
Jan. 3, 1785,	17 28 56	3 14 23 2	25 40
8, 1786,	10 39 31	3 18 57 5	28 52

From which the following elements were obtained:

Mean diſtance		19.08247
Eccentricity		0.9006
Periodic time		83.359 years
Mean anomaly at the 5th oppoſition		4ˢ 0° 32′ 51″
Long. of aphelion	for epoch Dec. 31, 1783.	11 23 9 51
Long. of the node		2 12 46 14
Inclination of the orbit		0 46 25
Equation of the centre		5 26 56 6

The elements, as given by La Place, are as follows:

	Years.	Days.	Hours.	Min.	Seconds.
Sidereal revol.	84	29	0	0	0.0

Semi maj. axis or mean diſtance	19.183620
Proportion of eccentricity of ſemi maj. axis for beginning of 1750	0.046683
Secular variation (—indicates diminution)	—0.000026228

	Deg.	Min.	Sec.
Mean longitude at beginning of 1750	228	33	53.6
Long. of perihelion 1750	166	36	48.8
Sidereal and ſecular motion of perihelion	0	4	6.1
Inclination of orbit to ecliptic 1750	0	46	26.0
Secular variation of inclination of orbit to true ecliptic	0	0	3.0
Long. of aſcending node on ecliptic 1750	72	37	52.8
Sidereal and ſecular motion of node on true ecliptic	0	57	16.2

The diameter of this planet is about 4½ times that of the earth, or 35,112 Engliſh miles nearly. When ſeen from the earth, its apparent diameter, or the angle which it ſubtends at the eye, is 3″.5, and its mean diameter, as ſeen from the ſun, is 4″. As the diſtance of the Georgian from the ſun is twice as great as that of Saturn, it can ſcarcely be diſtinguiſhed by the naked eye. When the ſky however is ſerene, it appears like a fixed ſtar of the ſixth magnitude with a blueiſh white light, and a brilliancy between that of Venus and the Moon; but with a power of 200 or 300, its diſc is viſible and well defined. Its arc of retrogradation is 3° 36′, and the duration of its retrograde motion 151 days.

This planet is accompanied by ſix ſatellites, all of them diſcovered likewiſe by Dr. Herſchel. The two firſt, which he ſaw for the firſt time in the month of Jan. 1787, proved afterwards to be the ſecond and fourth, the others were diſcovered ſome few years later.

The moſt remarkable circumſtance attending theſe ſatellites is, that they move in a retrograde direction, and revolve in orbits nearly perpendicular to the ecliptic, contrary to the analogy of the other ſatellites, which phenomenon is extremely diſcouraging when we attempt to form any hypotheſes relative to the original cauſe of the planetary motions.

According to La Place, if we take for unity the ſemidiameter of the planet, equal to 1″.9, ſuppoſed ſeen at the mean diſtance of the planet from the ſun, the diſtance of its ſatellites will be as follows:

I.	13.120
II.	17.022
III.	19.845
IV.	22.752
V.	45.507
VI.	91.008

And the duration of their ſidereal revolutions

	D.	Days.	hrs.	min.	ſec.
I.	5.8926	5	21	25	20
II.	8.7068	8	16	57	47
III.	10.9611	10	23	2	47
IV.	13.4559	13	10	56	29
V.	38.0750	38	1	48	0
VI.	107.6944	107	16	39	56

La Place conceives that the firſt five ſatellites of the Georgian may be retained in their orbits by the action of its equator, and the ſixth by the action of the interior ſatellites; hence he concludes that the planet revolves about an axis very little inclined to the ecliptic, and that the time of its diurnal rotation cannot be much leſs than that of Jupiter and Saturn.

Uſe of the Tables.—The general conſtruction of this kind of tables will be explained under Planet. The manner of calculating the mean longitude of the planet is as follows. Vince's Aſtronomy, vol. iii.

From Table I. take out the mean longitude, the aphelion, and node, together with the arguments II., III., IV., V., VI., VII., VIII., and place them in an horizontal line. But if the given year be not found in that table, take the neareſt year preceding the given year as an epoch, and take out as before.

Under which, from Table II. place the mean motion in longitude of the aphelion and node, with the arguments anſwering to the number of years elapſed ſince the epoch, to the given year.

Under theſe write down (Table III.) the mean motions of the ſame, for the given month.

Under theſe write down (Table IV.) the mean motions of the ſame, for the given day of the month.

Under theſe write down (Table V.) the mean motions of the ſame, for hours and minutes.

Add together the numbers in the ſeveral columns, rejecting twelve ſigns, or any multiples thereof, if they occur; and in the arguments, rejecting 10,000 in the arguments IV., VI., and 1000 in the arguments II., III., V., VII., VIII., or any multiples thereof, and you get the mean longitude, the aphelion, and node, and the arguments for the given time.

From the mean longitude of the Georgian ſubtract the longitude of the aphelion, and you have argument I., or mean anomaly.

With argument I. take out the equation of the orbit in Table VI., together with the ſecular variation, with their proper ſigns, except the time be *before* 1780, in which caſe the ſecular variation is to be taken out with a contrary ſign, making a proportion for the minutes and ſeconds of the argument, and you firſt get the equation; and doing the ſame for the ſecular variation, you get the ſecular variation; then ſay, 100 : the number of years from 1780 to the given time

: : ſecular variation above found : ſecular variation required. *Before* 1780 the ſecular variation muſt be taken with a ſign contrary to that found in the table. With argument II. take out the equation in Table VII., making a proportion in this and in the following equations, for the intermediate numbers of the arguments. With argument III., take out the equation in Table VIII. With argument IV. take out the equation in Table IX. With argument V. take out the equation in Table X. With argument VI. take out the equation in Table XI. With argument VII. take out the equation in Table XII. With argument VIII. take out the equation in Table XIII. Take the ſum of all theſe equations, regard being had to the ſigns of the firſt equation, and of the ſecular variation, the ſigns of the others being poſitive; and from it ſubtract 7′ 20″, and you get the value of theſe eight equations; and this applied with its proper ſign to the mean longitude already found gives the longitude of the Georgian in his orbit.

From the longitude thus found, ſubtract the longitude of the node, and you have argument IX.

With argument IX. enter Table XVII. and take out the reduction to the ecliptic, with its proper ſign, making a proportion for the minutes and ſeconds of the argument: and this applied to the longitude of the Georgian in his orbit, gives his true heliocentric longitude on the ecliptic, reckoned from the mean equinox.

With argument IX. enter Table XVI., and take out the latitude, making a proportion for the minutes and ſeconds of the argument, and you have the true heliocentric latitude of the planet.

With the mean anomaly enter Table XIV., and take out the radius vector, and correct it by the following Table XV. and you have the true diſtance of the planet from the ſun, that of the earth being unity.

Example.—To find the heliocentric Latitude and Longitude of the Georgian, on Nov. 26, 1789, at 16^h 14′, mean Time at Greenwich.

	Longitude.				Aphelion.				Node.				Arguments.						
	S.	D.	M.	S.	S.	D.	M.	S.	S.	D.	M.	S.	II.	III.	IV.	V.	VI.	VII.	VIII
Epoch for 1789	4	6	12	41.4	11	17	11	8	2	12	48	5	618	232	0139	885	0825	949	563
November		3	34	39.8				44				13	18	8	85	27	15	60	50
26^d			18	21.6				4				1	2	1	7	2	1	5	4
16^h				28.2															
14′				.4															
Sum - - -	4	10	6	11.4	11	17	11	56	2	12	48	19	638	241	0231	914	0841	14	617
Sum of eight equations	—	3	21	45.5	4	10	6	11	4	6	44	26							
Longitude in orbit	4	6	44	25.9	4	22	54	15	1	23	56	7							
Reduction - -			—	8.9	Arg. I.				Arg. IX.										
Heliocentric longitude	4	6	44	17															
Heliocentric latitude - - - -											37′	2″.9							

		D.	M.	S.
Arg. I.	—	3	22	54.5
	—		7	20
	—	3	30	14.5
Secular variation	+	0	0	0.7
Arg. II.				4.1
Arg. III.				5.9
Arg. IV.			2	51.7
Arg. V.				2.3
Arg. VI.			4	12.2
Arg. VII.			1	4.6
Arg. VIII.				7.5
	+	0	8	29.0
Sum of equations	—	3	21	45.5

This is the true heliocentric longitude from the *mean* equinox; and if we want it from the *true* equinox, we muſt apply the equation of the equinoxes.

In this operation the firſt five lines are taken out immediately from the tables, and the ſums of all the columns give the mean longitude of the aphelion, the node, and the arguments for the given time. Argument I. is immediately found according to the rule, the equation to which is thus found. The equation (Table VI.) for $4^s 22°$ is $-3° 26' 59''.6$, and the variation or 60′ is 4′ 31″.1; hence 60′ : 54′ 15″ : : 4′ 31″.1 : 4′ 5″.1, which (as the equation is decreaſing) ſubtracted from $-3° 26' 59''.6$ gives $-3° 22' 54''.5$, the equation required. And to find the ſecular variation, that variation is + 7″.44 for 4^s 22°, and it decreaſes 0″.16 for 60′; hence 60′ : 54′ 15″ : : 0″.16 : 0″.15, which taken from + 7″.44 leaves + 7″.29, the ſecular variation correſponding to the given argument. Now this ſecular variation is reckoned from 1780, and from thence to November 26, 1789, there has elapſed 9.9 years; hence, 100 : 9.9 : : + 7″.29 : + 0″.7 the ſecular variation for 9.9 years. With argument II, 638, take the equation from Table VII. Now the equation for 630 is 4″.7, and it changes 0″.7 for 10; hence 10 : 8 : : 0″.7 : 0″.6, which as the equation

tion decreaſes, ſubtracted from $4''.7$ leaves $4''.1$, the equation required. By proceeding thus to argument VIII. we get all the equations, and by taking the difference of the poſitive and negative parts, we get $3^\circ\,21'\,45''.5$ for the value of the firſt eight equations; which applied to $4^s\,10^\circ\,6'\,11''.4$ gives $4^s\,6^\circ\,47'\,25''.9$ the longitude of the Georgian in his orbit. From this longitude ſubtract $2^s\,12'\,48'\,19''$ the longitude of the node, and we get $1^s\,23^\circ\,56'\,7''$, which is argument IX.; with which enter Table XVII. and take out the reduction, which is $-\,8''.9$, and this applied to $4^s\,6^\circ\,44'\,25''.9$ gives $4^s\,6^\circ\,44'\,17''$, the heliocentric longitude of the Georgian on the ecliptic from the mean equinox. Alſo with argument IX. enter Table XVI. and take out the latitude. Now for $1^s\,23^\circ$ the latitude is $36'\,57''$, and it increaſes $28''.8$ for $60'$; hence $60' : 56''.7 :: 28''.8 : 26''.9$, which added to $36'\,57''$ gives $37'\,23''.9$, the heliocentric latitude of the Georgian.

TABLE I.

Epochs of the mean Longitude of the Planet, with the Arguments of the Equations.

Years.	Mean Longitnde of the Georgian.	Aphelion.	Node.	Years.	Arg. II.	Arg. III.	Arg. IV.	Arg. V.	Arg. VI.	Arg. VII.	Arg. VIII.
	S. D. M. S.	S. D. M. S.	S. D. M. S.								
B. 1680	0 17 41 1.4	11 15 35 13	2 12 19 34	B. 1680	215	126	9068	376	8907	057	969
1690	2 0 39 48.2	11 15 44 1	2 12 22 11	1690	435	228	0085	698	9084	781	574
C. 1700	3 13 38 34.9	11 15 52 49	2 12 24 48	C. 1700	656	329	1100	020	9200	505	179
1720	6 9 36 50.9	11 16 10 25	2 12 30 2	B. 1720	096	532	3132	664	9612	953	389
1740	9 5 35 6.8	11 16 28 1	2 12 35 10	B. 1740	537	735	5162	308	9963	401	597
1756	11 14 21 43.5	11 16 42 6	2 12 39 27	B. 1756	890	898	6788	823	0245	560	567
B. 1760	0 1 33 22.7	11 16 45 37	2 12 40 30	B. 1760	978	938	7194	951	0315	849	809
1769	1 10 14 24.2	11 16 53 32	2 12 42 51	1769	177	029	8108	241	0473	501	353
B. 1780	2 27 31 38.6	11 17 3 13	2 12 45 44	B. 1780	419	141	9225	595	0666	297	019
1790	4 10 30 25.3	11 17 12 1	2 12 48 21	1790	640	242	0241	917	0842	021	624
C. 1800	5 23 29 12.1	11 17 20 49	2 12 50 58	1800	860	344	1256	239	1018	745	229
1810	7 6 27 58.7	11 17 29 37	2 12 53 35	1810	080	445	2272	561	1194	468	834
1811	7 10 45 42.9	11 17 30 30	2 12 53 31	1811	103	456	2373	593	1211	541	894
B. 1812	7 15 4 9.5	11 17 31 23	2 12 54 6	B. 1812	125	466	2475	625	1229	614	955
1813	7 19 21 53.7	11 17 32 16	2 12 54 22	1813	347	476	2577	657	1247	686	1015
1814	7 23 39 37.9	11 17 33 9	2 12 54 37	1814	169	486	2678	689	1264	759	1076
1815	7 27 57 22.1	11 17 34 1	2 12 54 53	1815	191	496	2780	721	1272	831	1136
B. 1816	7 32 15 48.7	11 17 34 54	2 12 55 9	B. 1816	213	507	2881	754	1299	904	1197
1817	7 36 33 32.9	11 17 35 47	2 12 55 14	1817	235	517	2983	786	1317	976	1257
1818	7 40 51 17.0	11 17 36 40	2 12 55 40	1818	257	527	3084	718	1334	1048	1318
1819	8 15 9 1.3	11 17 37 33	2 12 55 56	1819	279	537	3186	750	1352	1121	1378
B. 1820	8 19 27 27.6	11 17 38 25	2 12 56 12	B. 1820	301	547	3287	783	1370	1193	1439

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TABLE II.—Mean Motion of the Planet for complete Julian Years.

Years.	Mean Longitude.	Aphelion.	Node.	Years.	Arg II.	Arg. III.	Arg. IV.	Arg. V.	Arg. VI.	Arg. VII.	Arg. VIII.
	S. D. M. S.	S. D. M. S.	S. D. M. S.								
1	0 4 17 44.2	0 0 0 53	0 0 0 16	1	022	010	0102	032	0018	072	060
2	0 8 35 28.4	0 0 1 46	0 0 0 31	2	044	020	0203	064	0035	145	121
3	0 12 53 12.6	0 0 2 38	0 0 0 47	3	066	030	0305	097	0053	217	181
B. 4.	0 17 11 39.2	0 0 3 31	0 0 1 3	B. 4	088	041	0406	129	0070	290	242
5	0 21 29 23.4	0 0 4 24	0 0 1 18	5	110	051	0508	161	0088	362	302
6	0 25 47 7.5	0 0 5 17	0 0 1 34	6	132	061	0609	193	0105	434	363
7	1 0 4 51.8	0 0 6 10	0 0 1 50	7	154	071	0711	225	0123	507	423
B. 8	1 4 23 18.1	0 0 7 2	0 0 2 6	B. 8	176	081	0812	258	0141	579	484
9	1 8 41 2.6	0 0 7 55	0 0 2 21	9	198	091	0914	290	0158	652	544
10	1 12 58 46.8	0 0 8 48	0 0 2 37	10	220	101	1016	322	0176	724	605
11	1 17 16 31.0	0 0 9 41	0 0 2 53	11	243	112	1117	354	0193	796	665
B. 12	1 21 34 57.5	0 0 10 34	0 0 3 8	B. 12	265	122	1219	386	0211	869	726
13	1 25 52 41.7	0 0 11 26	0 0 3 24	13	287	132	1320	418	0229	941	786
14	2 0 10 26.0	0 0 12 19	0 0 3 40	14	309	142	1422	451	0246	014	847
15	2 4 28 10.2	0 0 13 12	0 0 3 55	15	331	152	1523	483	0264	086	907
B. 16	2 8 46 36.7	0 0 14 5	0 0 4 11	B. 16	353	162	1625	515	0281	158	968
17	2 13 4 20.9	0 0 14 58	0 0 4 27	17	375	172	1727	547	0299	231	028
18	2 17 22 5.1	0 0 15 50	0 0 4 43	18	397	183	1828	579	0316	303	089
19	2 21 39 49.3	0 0 16 43	0 0 4 58	19	419	193	1930	612	0334	376	150
B. 20	2 25 58 15.9	0 0 17 36	0 0 5 14	B. 20	441	203	2031	644	0352	448	210
B. 40	5 21 56 31.8	0 0 35 12	0 0 10 28	B. 40	882	406	4062	288	0703	896	420
B. 60	8 17 54 47.7	0 0 52 48	0 0 15 42	B. 60	323	609	6094	931	1055	344	630
B. 80	11 13 53 3.6	0 1 10 24	0 0 20 56	B. 80	764	812	8125	575	1406	792	840
B. 100	2 9 51 19.5	0 1 28 0	0 0 26 10	B. 100	205	015	0156	219	1758	240	050
B. 200	4 19 42 39.1	0 2 56 0	0 0 52 20	B. 200	410	030	0312	438	3516	480	100
B. 300	6 29 33 58.6	0 4 24 0	0 1 18 30	B. 300	615	045	0468	657	5274	720	150
B. 400	9 9 25 18.1	0 5 52 0	0 1 44 40	B. 400	820	060	0624	876	7032	960	200
B. 500	11 19 16 37.7	0 7 20 0	0 2 10 50	B. 500	025	075	0780	095	8790	200	250
B. 600	1 29 7 57.2	0 8 48 0	0 2 37 0	B. 600	230	090	0936	314	0548	440	300
B. 700	4 8 59 16.7	0 10 16 0	0 3 3 10	B. 700	435	105	1092	533	2306	680	350
B. 800	6 18 50 36.3	0 11 44 0	0 3 29 20	B. 800	640	120	1248	752	4064	920	400
B. 900	8 28 41 55.8	0 13 12 0	0 3 55 30	B. 900	845	135	1404	971	5822	160	450
B. 1000	11 8 33 15.4	0 14 40 0	0 4 21 40	B. 1000	050	150	1560	190	7580	400	500

TABLE III.—Mean Motion for Months.

Months.	Mean Longitude.			Aphel.	Node.	Arg. II.	Arg. III.	Arg. IV.	Arg. V.	Arg. VI.	Arg. VII.	Arg. VIII.
	D.	M.	S.	S.	S.							
January.	0	0	0.0	0	0	0	0	0	0	0	0	0
February.		21	53.4	4	1	2	1	9	3	1	6	5
March.		41	39.7	9	2	4	2	17	5	3	12	10
April.	1	3	33.1	13	4	6	2	25	8	4	18	15
May.	1	24	44.2	17	5	7	3	33	11	6	24	20
June.	1	46	37.5	22	6	9	4	42	13	7	30	25
July.	2	7	48.6	26	8	11	5	50	16	9	36	30
Auguſt.	2	29	42.0	31	9	13	6	59	19	10	42	35
September.	2	51	35.4	35	10	15	7	68	22	12	48	40
October.	3	12	46.4	39	12	17	8	76	24	13	54	45
November.	3	34	39.8	44	13	18	8	85	27	15	60	50
December.	3	55	50.8	48	15	20	9	93	30	16	66	55

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Table IV.—Mean motion for Hours and Minutes.

Hours.	Long.	Hours.	Long.	Minutes.	Long.	Minutes.	Long.
	S.		S.		S.		S.
1	1.8	13	22.9	1	0.0	27	0.8
2	3.5	14	24.7	2	0.0	30	0.9
3	5.3	15	26.5	3	0.1	33	1.0
4	7.1	16	28.2	4	0.1	36	1.1
5	8.8	17	30.0	5	0.1	39	1.1
6	10.6	18	31.8	6	0.2	42	1.2
7	12.4	19	33.5	9	0.3	45	1.3
8	14.1	20	35.3	12	0.4	48	1.4
9	15.9	21	37.1	15	0.4	51	1.5
10	17.7	22	38.8	18	0.5	54	1.6
11	19.4	23	40.6	21	0.6	57	1.7
12	21.2	24	42.4	24	0.7	60	1.8

Table V.—Mean motion for the Days of the Month.

Days.	Long.			Aphel.	Node.	Arg. II.	Arg. III.	Arg. IV.	Arg. V.	Arg. VI.	Arg. VII.	Arg. VIII.
	D.	M.	S.	S.	S.							
1	0	0	42.4	0	0	0	0	0	0	0	0	0
2	0	1	24.7	0	0	0	0	0	0	0	0	0
3	0	2	7.1	0	0	0	0	1	0	0	1	0
4	0	2	49.5	1	0	0	0	1	0	0	1	1
5	0	3	31.8	1	0	0	0	1	0	0	1	1
6	0	4	14.2	1	0	0	0	2	1	0	1	1
7	0	4	56.6	1	0	0	0	2	1	0	1	1
8	0	5	38.9	1	0	0	0	2	1	0	1	1
9	0	6	21.3	1	0	0	0	2	1	0	2	1
10	0	7	3.7	1	0	0	0	3	1	0	2	2
11	0	7	46.0	2	0	1	0	3	1	1	2	2
12	0	8	28.4	2	1	1	0	3	1	1	2	2
13	0	9	10.8	2	1	1	0	4	1	1	2	2
14	0	9	53.1	2	1	1	0	4	1	1	3	2
15	0	10	35.5	2	1	1	0	4	1	1	3	2
16	0	11	17.9	2	1	1	0	4	1	1	3	3
17	0	12	0.2	2	1	1	0	5	1	1	3	3
18	0	12	42.6	3	1	1	0	5	2	1	3	3
19	0	13	25.0	3	1	1	1	5	2	1	4	3
20	0	14	7.4	3	1	1	1	5	2	1	4	3
21	0	14	49.7	3	1	1	1	6	2	1	4	3
22	0	15	32.1	3	1	1	1	6	2	1	4	4
23	0	16	14.5	3	1	1	1	6	2	1	4	4
24	0	16	56.8	3	1	1	1	6	2	1	5	4
25	0	17	39.2	4	1	2	1	7	2	1	5	4
26	0	18	21.6	4	1	2	1	7	2	1	5	4
27	0	19	3.9	4	1	2	1	7	2	1	5	4
28	0	19	46.3	4	1	2	1	8	2	1	5	5
29	0	20	28.7	4	1	2	1	8	3	1	6	5
30	0	21	11.0	4	1	2	1	8	3	1	6	5
31	0	21	53.4	4	1	2	1	9	3	1	6	5

In the Biſſextiles a day muſt be ſubtracted for the months of January and February.

TABLE VI.

Equation of the Orbit for 1780, with the ſecular variation to be applied to the longitude.—Before 1780, this ſecular variation muſt be applied with a contrary ſign.

ARG. I = (Mean long. — aphelion) or mean anomaly.

	0^{s}.						I^{s}.						
Degr.	Equation.			Difference.		Sec. Var.	Equation.			Difference.		Sec. Var.	Degr.
	−					+	−					+	
	D.	M.	S.	M.	S.	S.	D.	M.	S.	M.	S.	S.	
0	0	0	0.0	5	17.5	0.00	2	32	42.3	4	40.0	4.97	30
1	0	5	17.5	5	17.4	0.17	2	37	22.3	4	37.5	5.13	29
2	0	10	34.9	5	17.4	0.34	2	41	59.8	4	35.0	5.28	28
3	0	15	52.3	5	17.1	0,51	2	46	34.8	4	32.4	5.43	27
4	0	21	9.4	5	16.7	0.68	2	51	7.2	4	28.7	5.58	26
5	0	26	26.1	5	16.3	0.85	2	55	36.9	4	27.0	5.73	25
6	0	31	42.4	5	15.8	1.02	3	0	3.9	4	24.0	5.88	24
7	0	36	58.2	5	15.3	1.19	3	4	27.9	4	21.1	6.02	23
8	0	42	13.5	5	14.6	1.36	3	8	49.0	4	18.1	6.17	22
9	0	47	28.1	5	13.9	1.53	3	13	7.1	4	15.1	6.31	21
10	0	52	42.0	5	13.0	1.70	3	17	22.2	4	11.8	6.46	20
11	0	57	55.0	5	12.2	1.87	3	21	34.0	4	8.7	6.60	19
12	1	3	7.2	5	11.2	2.04	3	25	42.7	4	5.4	6.74	18
13	1	8	18.4	5	10.2	2.21	3	29	48.1	4	2.0	6.87	17
14	1	13	28.6	5	9.0	2.38	3	33	50.1	3	58.7	7.01	16
15	1	18	37.6	5	7.8	2.55	3	37	48.8	3	55.0	7.15	15
16	1	23	45.4	5	6.5	2.71	3	41	43.8	3	51.5	7.28	14
17	1	28	51.9	5	5.1	2.88	3	45	35.3	3	47.9	7.41	13
18	1	33	57.0	5	3.7	3.05	3	49	23.2	3	44.1	7.54	12
19	1	39	0.7	5	2.1	3.21	3	53	7.3	3	40.3	7.67	11
20	1	44	2.8	5	0.5	3.38	3	56	47.6	3	36.5	7.79	10
21	1	49	3.3	4	58.8	3.54	4	0	24.1	3	32.6	7.92	9
22	1	54	2.1	4	57.1	3.70	4	3	56.7	3	28.6	8.04	8
23	1	58	59.2	4	55.2	3.86	4	7	25.3	3	24.6	8.16	7
24	2	3	54.4	4	53.3	4.02	4	10	49.9	3	20.4	8.28	6
25	2	8	47.7	4	51.2	4.18	4	14	10.3	3	16.3	8.40	5
26	2	13	38.9	4	49.1	4.34	4	17	26.6	3	12.0	8.51	4
27	2	18	28.0	4	47.0	4.50	4	20	38.6	3	7.7	8.63	3
28	2	23	15.0	4	44.8	4.66	4	23	46.3	3	3.3	8.74	2
29	2	27	59.8	4	52.5	4.81	4	26	49.6	2	58.9	8.84	1
30	2	32	42.3			4 97	4	29	48.5			8.95	0
	+					−	+					−	
	XI^{s}.						X^{s}.						

TABLE VI.—*Continued.*

Arg. I = Mean Anomaly													
	IIˢ.						IIIˢ.						
Degr.	Equation.			Difference.		Sec. Var.	Equation.			Difference.		Sec. Var.	Degr.
	–					+	–					+	
	D.	M.	S.	M.	S.	S.	D.	M.	S.	M.	S.	S.	
0	4	29	48.5	2	54.4	8.95	5	20	30.6	0	16.3	10.95	30
1	4	32	49.9	2	49.9	9.06	5	20	46.9	0	11.0	10.97	29
2	4	35	32.8	2	45.2	9.16	5	20	57.9	0	4.8	10.99	28
3	4	38	18.0	2	40.6	9.26	5	21	2.7	0	1.0	11.00	27
4	4	40	58.6	2	35.9	9.35	5	21	1.7	0	6.7	11.02	26
5	4	43	34.5	2	31.1	9.45	5	20	55.0	0	12.7	11.02	25
6	4	46	5.6	2	26.2	9.54	5	20	42.3	0	18.7	11.03	24
7	4	48	31.8	2	21.3	9.63	5	20	23.6	0	24.5	11.03	23
8	4	50	53.1	2	16.4	9.72	5	19	59.1	0	30.5	11.03	22
9	4	53	9.5	2	11.5	9.81	5	19	28.6	0	36.6	11.02	21
10	4	55	21.0	2	6.4	9.89	5	18	52.0	0	42.0	11.01	20
11	4	57	27.4	2	1.2	9.97	5	18	10.0	0	48.5	11.00	19
12	4	59	28.6	1	56.2	10.04	5	17	21.5	0	54.3	10.98	18
13	5	1	24.8	1	50.8	10.11	5	16	27.2	1	0.2	10.96	17
14	5	3	15.6	1	45.8	10.19	5	15	27.0	1	6.2	10.94	16
15	5	5	1.4	1	40.4	10.26	5	14	20.8	1	12.2	10.91	15
16	5	6	41.8	1	35.1	10.33	5	13	8.6	1	18.2	10.88	14
17	5	8	16.9	1	29.8	10.39	5	11	50.4	1	24.0	10.85	13
18	5	9	46.7	1	24.2	10.45	5	10	26.4	1	30.0	10.81	12
19	5	11	10.9	1	18.9	10.51	5	8	56.4	1	36.0	10.77	11
20	5	12	29.8	1	13.4	10.56	5	7	20.4	1	41.8	10.73	10
21	5	13	43.2	1	7.8	10.61	5	5	38.6	1	47.8	10.68	9
22	5	14	51.0	1	2.3	10.66	5	3	50.8	1	53.6	10.63	8
23	5	15	53.3	0	56.6	10.71	5	1	57.2	1	59.5	10.57	7
24	5	16	49.9	0	51.1	10.76	4	59	57.7	2	5.3	10.51	6
25	5	17	41.0	0	45.3	10.80	4	57	52.4	2	11.2	10.45	5
26	5	18	26.3	0	39.7	10.83	4	55	41.2	2	16.9	10.38	4
27	5	19	6.0	0	34.0	10.87	4	53	24.3	2	22.7	10.31	3
28	5	19	40.0	0	28.2	10.90	4	51	1.6	2	28.5	10.24	2
29	5	20	8.2	0	22.4	10.93	4	48	33.1	2	34.1	10.16	1
30	5	20	30.6			10.95	4	45	59.0			10.08	0
	+					–	+					–	
	IXˢ.						VIIIˢ.						

TABLE VI.—*Continued.*

Arg. I = Mean Anomaly.													
	IVs.						Vs.						
Degr.	Equation.			Difference.		Sec. Var.	Equation.			Difference.		Sec. Var.	Degr.
	−					+	−					+	
	D.	M.	S.	M.	S.	S.	D.	M.	S.	M.	S.	S	
0	4	45	59.6	2	39.8	10.08	2	48	56.7	5	2.5	6.10	30
1	4	43	19.1	2	45.5	10.00	2	43	54.2	5	6.1	5.92	29
2	4	40	33.0	2	51.4	9.91	2	38	48.1	5	9.5	5.74	28
3	4	37	42.6	2	56.5	9.82	2	33	38.6	5	12.7	5.56	27
4	4	34	46.1	3	2.1	9.72	2	28	25.9	5	15.9	5.37	26
5	4	31	44.0	3	7.6	9.63	2	23	10.0	5	18.9	5.19	25
6	4	28	36.5	3	13.0	9.53	2	17	51.1	5	21.9	4.99	24
7	4	25	23.5	3	18.3	9.42	2	12	29.2	5	24.9	4.80	23
8	4	22	5.2	3	23.6	9.31	2	7	4.3	5	27.5	4.61	22
9	4	18	41.6	3	28.9	9.20	2	2	36.8	5	30.0	4.41	21
10	4	15	12.7	3	34.1	9.08	1	56	6.8	5	32.6	4.21	20
11	4	11	38.6	3	39.1	8.96	1	50	34.2	5	34.9	4.01	19
12	4	7	59.5	3	44.3	8.84	1	44	59.3	5	37.4	3.81	18
13	4	4	15.2	3	49.3	8.72	1	39	21.9	5	39.4	3.61	17
14	4	0	25.9	3	54.3	8.58	1	33	42.5	5	41.5	3.40	16
15	3	56	31.6	3	59.0	8.45	1	28	1.0	5	43.4	3.20	15
16	3	52	32.6	4	4.0	8.32	1	22	17.6	5	45.1	2.99	14
17	3	48	28.6	4	8.6	8.18	1	16	32.5	5	46.8	2.78	13
18	3	44	20.0	4	13.3	8.03	1	10	45.7	5	48.4	2.57	12
19	3	40	6.7	4	17.9	7.89	1	4	57.3	5	49.8	2.36	11
20	3	35	48.8	4	22.4	7.74	0	59	7.5	5	51.1	2.15	10
21	3	31	26.4	4	26.8	7.59	0	53	16.4	5	52.2	1.94	9
22	3	26	59.6	4	31.1	7.44	0	47	24.2	5	53.2	1.73	8
23	3	22	28.5	4	35.4	7.28	0	41	31.0	5	54.3	1.51	7
24	3	17	53.1	4	39.5	7.12	0	35	36.7	5	54.9	1.30	6
25	3	13	13.6	4	43.6	6.96	0	29	41.8	5	55.6	1.08	5
26	3	8	30.0	4	47.6	6.79	0	23	46.2	5	56.1	0.86	4
27	3	3	42.4	4	51.5	6.62	0	17	50.1	5	56.5	0.65	3
28	2	58	50.9	4	55.3	6.45	0	11	53.6	5	56.7	0.43	2
29	2	53	55.6	4	58.9	6.27	0	5	56.9	5	56.9	0.21	1
30	2	48	56.7			6.10	0	0	0.0			0.00	0
	+	VIIs.				−	+	VIs.				−	

TABLE VII. Equation II.

Argument II.					
Arg. II	Equation II.	Arg. II.	Equation II.	Arg. II.	Equation II.
	S.		S.		S.
0	38.4	340	47.7	670	3.3
10	39.0	350	46.5	680	3.4
20	39.6	360	45.2	690	3.5
30	40.1	370	43.9	700	3.8
40	40.7	380	42.5	710	4.2
50	41.3	390	41.0	720	4.8
60	41.9	400	39.4	730	5.5
70	42.5	410	37.8	740	6.3
80	43.2	420	36.1	750	7.2
90	43.9	430	34.4	760	8.3
100	44.7	440	32.7	770	9.4
110	45.4	450	30.8	780	10.7
120	46.2	460	29.0	790	12.1
130	47.0	470	27.1	800	13.5
140	47.8	480	25.2	810	15.0
150	48.5	490	23.4	820	16.6
160	49.2	500	21.6	830	18.1
170	49.9	510	19.8	840	19.7
180	50.5	520	18.1	850	21.3
190	51.1	530	16.3	860	22.9
200	51.7	540	14.8	870	24.5
210	52.1	550	13.3	880	26.0
220	52.4	560	11.7	890	27.5
230	52.7	570	10.4	900	28.9
240	52.8	580	9.2	910	30.1
250	52.8	590	8.0	920	31.4
260	52.7	600	7.0	930	32.6
270	52.4	610	6.1	940	33.6
280	52.1	620	5.3	950	34.6
290	51.6	630	4.7	960	35.4
300	51.0	640	4.0	970	36.3
310	50.3	650	3.5	980	37.0
320	49.5	660	3.4	990	37.7
330	48.6	670	3.3	1000	38.4
340	47.7				

TABLE VIII. Equation III.

Argument III.					
Arg. III.	Equation III.	Arg. III.	Equation III.	Arg. III.	Equation III.
	S.		S.		S.
0	50.0	340	12.7	670	88.7
10	47.3	350	14.3	680	90.0
20	44.5	360	16.0	690	91.1
30	41.7	370	17.8	700	92.0
40	39.0	380	29.8	710	92.8
50	36.4	390	21.8	720	93.4
60	33.7	400	24.0	730	93.8
70	31.2	410	26.3	740	94.1
80	28.7	420	28.7	750	94.2
90	26.3	430	31.2	760	94.1
100	24.0	440	33.7	770	93.8
110	21.7	450	36.4	780	93.4
120	19.8	460	39.0	790	92.8
130	17.8	470	41.7	800	92.0
140	16.0	480	44.5	810	91.1
150	14.3	490	47.3	820	90.0
160	12.7	500	50.0	830	88.7
170	11.3	510	52.7	840	87.3
180	10.0	520	55.5	850	85.7
190	8.9	530	58.3	860	84.0
200	8.0	540	61.0	870	82.2
210	7.2	550	63.6	880	80.2
220	6.6	560	66.3	890	78.2
230	6.2	570	68.8	900	76.0
240	5.9	580	71.3	910	73.7
250	5.8	590	73.7	920	71.3
260	5.9	600	76.0	930	68.8
270	6.2	610	78.2	940	66.3
280	6.6	620	80.2	950	63.6
290	7.2	630	82.2	960	61.0
300	8.0	640	84.0	970	58.3
310	8.9	650	85.7	980	55.5
320	10.0	660	87.3	990	52.7
330	11.3	670	88.7	1000	50.0
340	12.7				

TABLE IX. Equation IV.

Argument IV.				
Arg. IV.	Arg. IV.	Equation IV.		
		M.	S.	Diff.
2500	2500	5	0.0	0.3
2600	2400	4	59.7	0.9
2700	2300	4	58.8	1.5
2800	2200	4	57.3	2.0
2900	2100	4	55.3	2.7
3000	2000	4	52.6	3.2
3100	1900	4	49.4	3.7
3200	1800	4	45.7	4.3
3300	1700	4	41.4	4.8
3400	1600	4	36.6	5.2
3500	1500	4	31.4	5.9
3600	1400	4	25.5	6.2
3700	1300	4	19.3	6.6
3800	1200	4	12.7	7.1
3900	1100	4	5.6	7.4
4000	1000	3	58.2	7.8
4100	900	3	50.4	8.1
4200	800	3	42.3	8.4
4300	700	3	33.9	8.7
4400	600	3	25.2	8.8
4500	500	3	16.4	9.1
4600	400	3	7.3	9.2
4700	300	2	58.1	9.3
4800	200	2	48.8	9.4
4900	100	2	39.4	9.4
5000	0	2	30.0	9.4
5100	9900	2	20.6	9.4
5200	9800	2	11.2	9.3
5300	9700	2	1.9	9.2
5400	9600	1	52.7	9.1
5500	9500	1	43.6	8.8
5600	9400	1	34.8	8.7
5700	9300	1	26.1	8.4
5800	9200	1	17.7	8.1
5900	9100	1	9.6	7.8
6000	9000	1	1.8	7.4
6100	8900	0	54.4	7.1
6200	8800	0	47.3	6.6
6300	8700	0	40.7	6.2
6400	8600	0	34.5	5.9
6500	8500	0	28.6	5.2
6600	8400	0	23.4	4.8
6700	8300	0	18.6	4.3
6800	8200	0	14.3	3.7
6900	8100	0	10.6	3.2
7000	8000	0	7.4	2.7
7100	7900	0	4.7	2.0
7200	7800	0	2.7	1.5
7300	7700	0	1.2	0.9
7400	7600	0	0.3	0.3
7500	7500	0	0.0	

TABLE X. Equation V.

Argument V.			
Arg. V.	Equ. V.	Arg. V.	Equ. V.
	S.		S.
0	3.5	510	6.4
10	3.6	520	6.2
20	3.8	530	6.0
30	4.0	540	5.8
40	4.2	550	5.6
50	4.4	560	5.5
60	4.5	570	5.3
70	4.7	580	5.1
80	4.9	590	4.9
90	5.1	600	4.7
100	5.3	610	4.5
110	5.5	620	4.3
120	5.7	630	4.1
130	5.9	640	3.9
140	6.1	650	3.7
150	6.3	660	3.6
160	6.4	670	3.4
170	6.6	680	3.2
180	6.8	690	2.9
190	7.1	700	2.5
200	7.5	710	2.4
210	7.6	720	2.4
220	7.6	730	2.3
230	7.6	740	2.3
240	7.7	750	2.3
250	7.7	760	2.3
260	7.7	770	2.2
270	7.8	780	2.1
280	7.9	790	2.1
290	7.9	800	2.0
300	8.0	810	2.0
310	8.0	820	2.0
320	8.1	830	1.9
330	8.1	840	1.9
340	8.1	850	1.9
350	8.1	860	2.0
360	8.0	870	2.1
370	8.0	880	2.1
380	7.9	890	2.1
390	7.9	900	2.2
400	7.8	910	2.3
410	7.7	920	2.4
420	7.7	930	2.5
430	7.5	940	2.6
440	7.4	950	2.7
450	7.3	960	2.8
460	7.2	970	3.0
470	7.0	980	3.1
480	6.9	990	3.2
490	6.7	1000	3.5
500	6.5		

TABLE XI. Equation VI.

Argument VI.							
Arg. VI.	Equation VI.		Diff.	Arg. VI.	Equation VI.		Diff.
	M.	S.	S.		M.	S.	S.
0	4	33.1	0.6				
100	4	32.5	1.1	5100	0	7.5	0.6
200	4	31.4	1.7	5200	0	8.6	1.1
300	4	29.7	2.1	5300	0	10.3	1.7
400	4	27.6	2.7	5400	0	12.4	2.1
500	4	24.9	3.1	5500	0	15.1	2.7
600	4	21.8	3.6	5600	0	18.2	3.1
700	4	18.2	4.2	5700	0	21.8	3.6
800	4	14.0	4.5	5800	0	26.0	4.2
900	4	09.5	5.0	5900	0	30.5	4.5
1000	4	04.5	5.4	6000	0	35.5	5.0
1100	3	59.1	5.8	6100	0	40.9	5.4
1200	3	53.3	6.1	6200	0	46.7	5.8
1300	3	47.2	6.5	6300	0	52.8	6.1
1400	3	40.7	6.8	6400	0	59.3	6.5
1500	3	33.9	7.1	6500	1	6.1	6.8
1600	3	26.8	7.4	6600	1	13.2	7.1
1700	3	19.4	7.6	6700	1	20.6	7.4
1800	3	11.8	7.8	6800	1	28.2	7.6
1900	3	4.0	8.0	6900	1	36.0	7.8
2000	2	56.0	8.1	7000	1	44.0	8.0
2100	2	47.9	8.3	7100	1	52.1	8.1
2200	2	39.6	8.3	7200	2	0.4	8.3
2300	2	31.3	8.4	7300	2	8.7	8.3
2400	2	22.9	8.3	7400	2	17.1	8.4
2500	2	14.6	8.4	7500	2	25.4	8.3
2600	2	6.2	8.3	7600	2	33.8	8.4
2700	1	57.9	8.2	7700	2	42.1	8.3
2800	1	49.7	8.1	7800	2	50.3	8.2
2900	1	41.6	7.9	7900	2	58.4	8.1
3000	1	33.7	7.7	8000	3	6.3	7.9
3100	1	26.0	7.6	8100	3	14.0	7.7
3200	1	18.4	7.3	8200	3	21.6	7.6
3300	1	11.1	7.0	8300	3	28.9	7.3
3400	1	4.1	6.7	8400	3	35.9	7.0
3500	0	57.4	6.4	8500	3	42.6	6.7
3600	0	51.0	6.1	8600	3	49.0	6.4
3700	0	44.9	5.7	8700	3	55.1	6.1
3800	9	39.2	5.2	8800	4	0.8	5.7
3900	0	34.0	4.9	8900	4	6.0	5.2
4000	0	29.1	4.4	9000	4	10.9	4.9
4100	0	24.7	4.0	9100	4	15.3	4.4
4200	0	20.7	3.5	9200	4	19.3	4.0
4300	0	17.2	3.0	9300	4	22.8	3.5
4400	0	14.2	2.5	9400	4	25.8	3.0
4500	0	11.7	2.0	9500	4	28.3	2.5
4600	0	9.7	1.5	9600	4	30.3	2.0
4700	0	8.2	1.0	9700	4	31.8	1.5
4800	0	7.2	0.4	9800	4	32.8	1.0
4900	0	6.8	0.1	9900	4	33.2	0.4
5000	0	6.9		10000	4	33.1	0.1

Table XII.

Argument VII.								
Arg. VII.	Equation VII.		Arg. VII.	Equation VII.		Arg. VII.	Equation VII.	
	M.	S.		M.	S.		M.	S.
0	1	0.0	340	1	44.5	670	0	13.8
10	1	3.3	350	1	42.7	680	0	12.4
20	1	6.6	360	1	40.7	690	0	11.1
30	1	9.7	370	1	38.5	700	0	10.0
40	1	12.9	380	1	36.1	710	0	9.0
50	1	16.1	390	1	33.6	720	0	8.3
60	1	19.2	400	1	31.0	730	0	7.9
70	1	22.3	410	1	28.3	740	0	7.6
80	1	25.1	420	1	25.5	750	0	7.5
90	1	27.9	430	1	22.5	760	0	7.6
100	1	30.6	440	1	19.4	770	0	7.9
110	1	33.2	450	1	16.3	780	0	8.5
120	1	35.7	460	1	13.2	790	0	9.2
130	1	38.1	470	1	9 9	800	0	10.2
140	1	40 2	480	1	6.6	810	0	11.3
150	1	42.3	490	1	3.3	820	0	12.6
160	1	44.1	500	1	0.0	830	0	14.2
170	1	45.8	510	0	56.7	840	0	15.9
180	1	47.4	520	0	53.4	850	0	17.7
190	1	48.7	530	0	50.1	860	0	29.7
200	1	49 8	540	0	46 8	870	0	21.9
210	1	50 8	550	0	43.7	880	0	24.3
220	1	51.5	560	0	40.6	890	0	26.8
230	1	52.1	570	0	37.5	900	0	29.4
240	1	52.4	580	0	34.5	910	0	32.1
250	1	52.5	590	0	31.7	920	0	34.9
260	1	52.4	600	0	29.0	930	0	37.7
270	1	52.1	610	0	26.4	940	0	40.8
280	1	51 7	620	0	23.9	950	0	43.9
290	1	51.0	630	0	21.5	960	0	47.0
300	1	51.0	640	0	19.4	970	0	50.3
310	1	48 9	650	0	17.3	980	0	53.4
320	1	47.6	660	0	15.5	990	0	56.7
330	1	46.2	670	0	13.8	1000	1	0.0
340	1	44.5						

Table XIII.

Argument VIII.				
Arg. VIII.	Arg. VIII.	Eq. VIII.	Arg. VIII.	Eq. VIII.
		S.		S.
250	250	1.3	590	7.0
260	240	1.3	600	7.2
270	230	1.3	610	7.4
280	220	1.4	620	7.5
290	210	1.4	630	7.7
300	200	1.5	640	7.8
310	190	1.6	650	8.0
320	180	1.7	660	8.1
330	170	1.8	670	8.2
340	160	1.9	680	8.3
350	150	2.0	690	8.4
360	140	2.2	700	8.5
370	130	2.3	710	8.6
380	120	2.5	720	8.6
390	110	2.6	730	8.7
400	100	2.8	740	8.7
410	90	3.0	750	8.7
420	80	3.2	760	8.7
430	70	3.4	770	8.7
440	60	3.6	780	8.6
450	50	3.9	790	8.6
460	40	4.1	800	8.5
470	30	4.3	810	8.4
480	20	4.5	820	8.3
490	10	4.8	830	8.2
500	0	5.0	840	8.1
510	990	5.2	850	8.0
520	980	5.5	860	7.8
530	970	5.7	870	7.7
540	960	5.9	880	7.5
550	950	6.1	890	7.4
560	940	6.4	900	7.2
570	930	6.6	910	7.0
580	920	6.8		
590	910	7.0		

TABLE XIV.—Radius Vector for 1780, with the Secular Variation.

Argument I. Mean Anomaly.										
Degrees.	0^{s}.			I^{s}.			II^{s}.			Degrees.
	Rad. Vect.	Diff.	Sec. Var. — 0.0	Rad. Vect.	Diff.	Sec. Var. — 0.0	Rad. Vect.	Diff.	Sec. Var. — 0.0	
0	20.0722		005.2	19.9620		004.5	19.6547		002.9	30
1	20.0721	1	005.2	19.9547	73	004.5	19.6417	130	002.9	29
2	20.0717	4	005.2	19.9472	75	004.5	19.6286	131	002.8	28
3	20.0711	6	005.2	19.9394	78	004.4	19.6153	133	002.7	27
4	20.0702	9	005.2	19.9314	80	004.4	19.6019	134	002.6	26
5	20.0691	11	005.1	19.9232	82	004.3	19.5884	135	002.5	25
6	20.0677	14	005.1	19.9148	84	004.3	19.5748	136	002.5	24
7	20.0661	16	005.1	19.9062	86	004.3	19.5610	138	002.4	23
8	20.0643	18	005.1	19.8973	89	004.2	19.5470	140	002.4	22
9	20.0622	21	005.1	19.8882	91	004.2	19.5330	140	002.3	21
10	20.0598	24	005.0	19.8790	92	004.1	19.5189	141	002.2	20
11	20.0572	26	005.0	19.8696	94	004.1	19.5047	142	002.2	19
12	20.0543	29	005.0	19.8599	97	004.0	19.4904	143	002.1	18
13	20.0512	31	005.0	19.8501	98	004.0	19.4759	145	002.0	17
14	20.0479	33	005.0	19.8400	101	003.9	19.4613	146	001.9	16
15	20.0443	36	005.0	19.8298	102	003.8	19.4467	146	001.8	15
16	20.0404	39	005.0	19.8193	105	003.8	19.4319	148	001.7	14
17	20.0364	40	005.0	19.8087	106	003.8	19.4171	148	001.6	13
18	20.0321	43	005.0	19.7979	108	003.7	19.4022	149	001.5	12
19	20.0276	45	005.0	19.7869	110	003.6	19.3872	150	001.4	11
20	20.0228	48	004.9	19.7757	112	003.5	19.3722	150	001.3	10
21	20.0178	50	004.9	19.7643	114	003.5	19.3570	152	001.3	9
22	20.0125	53	004.8	19.7528	115	003.4	19.3418	152	001.2	8
23	20.0069	56	004.8	19.7411	117	003.3	19.3266	152	001.1	7
24	20.0012	57	004.8	19.7293	118	003.2	19.3113	153	001.0	6
25	19.9953	59	004.7	19.7172	121	003.1	19.2959	154	000.9	5
26	19.9891	62	004.7	19.7050	122	003.1	19.2804	155	000.9	4
27	19.9827	64	004.6	19.6926	124	003.1	19.2650	154	000.8	3
28	19.9760	67	004.6	19.6801	125	003.0	19.2495	155	000.7	2
29	19.9691	69	004.6	19.6675	126	003.0	19.2340	155	000.6	1
30	19.9620	71	004.5	19.6547	128	002.9	19.2184	156	000.5	0
	XI^{s}.		—	X^{s}.		—	IX^{s}.		—	

TABLE XIV.—*Continued.*

Argument I. Mean Anomaly.

Degrees.	IIIˢ.			IVˢ.			Vˢ.			Degrees.
	Rad. Vect.	Diff.	Sec. Var. ∓ 0.0	Rad. Vect.	Diff.	Sec. Var. + 0.0	Rad. Vect.	Diff.	Sec. Var. + 0.0	
0	19.2184	156	000.5	18.7613	141	002.2	18.4121	83	004 3	30
1	19.2028	156	000.3	18.7472	140	002.2	18.4038	81	004 3	29
2	19.1872	156	000.1	18.7332	138	002.3	18.3957	78	004 4	28
3	19.1716	157	000.0	18.7194	137	002.4	18.3879	76	004 4	27
4	19.1559	156	000 0	18.7057	136	002.5	18.3803	74	004 4	26
5	19.1403	157	000.1	18.6921	134	002.6	18.3729	70	004 5	25
6	19.1246	156	000 2	18.6787	132	002.6	18.3659	68	004 5	24
7	19.1090	156	000 2	18.6655	131	002.7	18.3591	65	004 5	23
8	19.0934	157	000.3	18.6524	130	002 8	18.3526	63	004 6	22
9	19.0777	156	000.3	18.6394	128	002 9	18.3463	60	004.6	21
10	19.0621	155	000 4	18.6266	126	003.0	18.3403	57	004 7	20
11	19.0466	156	000 5	18.6140	124	003 0	18.3346	54	004.7	19
12	19.0310	155	000.6	18.6016	123	003.1	18.3292	52	004 7	18
13	19.0155	155	000.7	18.5893	121	003.2	18.3240	48	004 8	17
14	19.0000	154	000.8	18.5772	119	003.3	18.3192	45	004 8	16
15	18.9846	155	000.9	18.5653	117	003.4	18.3147	44	004 9	15
16	18.9691	153	000.9	18.5536	115	003.5	18.3103	40	004 9	14
17	18.9538	153	001.0	18.5421	113	003.5	18.3063	37	004 9	13
18	18.9385	152	001.1	18.5308	111	003.6	18.3026	34	004 9	12
19	18.9233	151	001.2	18.5197	109	003.6	18.2992	31	004 9	11
20	18.9082	152	001.3	18.5088	107	003.7	18.2961	29	005 0	10
21	18.8930	150	001.4	18.4981	104	003.7	18.2932	25	005 0	9
22	18.8780	149	001.5	18.4877	103	003.8	18.2907	23	005 0	8
23	18.8631	148	001.6	18.4774	100	003.9	18 2884	19	005 0	7
24	18.8483	148	001.7	18.4674	98	003.9	18 2865	16	005 0	6
25	18.8335	147	001.7	18.4576	96	004 0	18.2849	14	005 1	5
26	18.8188	146	001.8	18.4480	93	004.0	18.2835	11	005 1	4
27	18.8042	144	001.9	18.4387	91	004 1	18.2824	7	005 1	3
28	18.7898	143	002.0	18.4296	88	004.1	18.2817	4	005 1	2
29	18.7755	142	002.1	18.4208	86	004.2	18.2813	2	005 1	1
30	18.7613		002.2	18.4122		004.3	18.2811		005 1	0
	VIIIˢ.		0 0 ±	VIIˢ.		0 0 +	VIˢ.		0 0 +	

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TABLE XV. Equations of the Radius Vector.

Argument.

Argument.	Equation II.	Equation III.	Equation IV.	Equation VII.	Argument.
0	0.0070	0.0032	0.0000	0.0098	1000
10	0.0070	0.0032	0.0000	0.0098	990
20	0.0070	0.0032	0.0000	0.0098	980
30	0.0069	0.0032	0.0001	0.0097	970
40	0.0069	0.0032	0.0002	0.0096	960
50	0.0068	0.0032	0.0003	0.0096	950
60	0.0067	0.0031	0.0004	0.0095	940
70	0.0066	0.0031	0.0006	0.0093	930
80	0.0065	0.0031	0.0007	0.0092	920
90	0.0063	0.0030	0.0009	0.0090	910
100	0.0061	0.0030	0.0011	0.0089	900
110	0.0060	0.0029	0.0014	0.0087	890
120	0.0058	0.0029	0.0017	0.0085	880
130	0.0056	0.0028	0.0019	0.0082	870
140	0.0053	0.0027	0.0022	0.0080	860
150	0.0051	0.0027	0.0025	0.0078	850
160	0.0049	0.0026	0.0028	0.0075	840
170	0.0046	0.0025	0.0032	0.0073	830
180	0.0044	0.0024	0.0035	0.0070	820
190	0.0042	0.0023	0.0039	0.0067	810
200	0.0039	0.0022	0.0043	0.0064	800
210	0.0037	0.0021	0.0046	0.0061	790
220	0.0034	0.0020	0.0050	0.0058	780
230	0.0030	0.0019	0.0054	0.0054	770
240	0.0028	0.0018	0.0058	0.0052	760
250	0.0026	0.0016	0.0062	0.0049	750
260	0.0024	0.0014	0.0058	0.0046	740
270	0.0022	0.0013	0.0054	0.0043	730
280	0.0020	0.0012	0.0050	0.0040	720
290	0.0018	0.0011	0.0046	0.0037	710
300	0.0016	0.0010	0.0043	0.0034	700
310	0.0015	0.0009	0.0039	0.0031	690
320	0.0013	0.0008	0.0035	0.0028	680
330	0.0012	0.0007	0.0032	0.0025	670
340	0.0010	0.0006	0.0028	0.0023	660

Argument.	Equation II.	Equation. III.	Argument.
350	0.0009	0.0005	650
360	0.0007	0.0005	640
370	0.0006	0.0004	630
380	0.0005	0.0003	620
390	0.0004	0.0003	610
400	0.0003	0.0002	600
410	9.0002	0.0002	590
420	0.0001	0.0001	580
430	0.0001	0.0001	570
440	0.0001	0.0001	560
450	0.0000	0.0000	550
460	0.0000	0.0000	540
470	0.0000	0.0000	530
480	0.0000	0.0000	520
490	0.0000	0.0000	510
500	0.0000	0.0000	500

Argument.	Equation. IV.	Equation. VII.	Argument.
350	0.0025	0.0020	650
360	0.0022	0.0018	640
370	0.0019	0.0016	630
380	0.0017	0.0013	620
390	0.0014	0.0011	610
400	0.0011	0.0009	600
410	0.0009	0.0008	590
420	0.0007	0.0006	580
430	0.0006	0.0005	570
440	0.0004	0.0004	560
450	0.0003	0.0003	550
460	0.0002	0.0002	540
470	0.0001	0.0001	530
480	0.0000	0.0000	520
490	0.0000	0.0000	510
500	0.0000	0.0000	500

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TABLE XVI. Heliocentric Latitude for 1780, with the Secular Variation.

Argument IX. Long. of the Planet — long. of Node.

Degrees.	Latitude. 0^s. N.		Difference.	Variat. for 10''.	Latitude. I. N.		Difference.	Variat. for 10''	Latitude. II. N.		Difference.	Variat. for 10''	Degrees.
	VI^s. S.				VII^s. S.				$VIII^s$. S.				
	M.	S.	''	''	M.	S.	''	''	M.	S.	''	''	
0	0	0.0		0.0	23	8.0		5.0	40	4.1		8.7	30
1	0	48.4	48.4	0.2	23	49.7	41.7	5.2	40	27.9	23.8	8.7	29
2	1	36.9	48.5	0.3	24	31.1	41.4	5.3	40	51.1	23.2	8.8	28
3	2	25.3	48.4	0.5	25	11.9	40.8	5.4	41	3.4	22.3	8.9	27
4	3	13.7	48.4	0.7	25	52.3	40.4	5.6	41	5.0	21.6	9.0	26
5	4	1.9	48.2	0.9	26	32.3	40.0	5.7	41	55.9	20.9	9.1	25
6	4	50.1	48.2	1.0	27	11.7	39.4	5.9	42	16.0	20.1	9.1	24
7	5	38.3	48.2	1.2	27	50.6	38.9	6.0	42	35.3	19.3	9.2	23
8	6	26.3	48.0	1.4	28	19.1	38.5	6.2	42	53.9	18.6	9.3	22
9	7	14.2	47.9	1.6	29	7.0	37.9	6.3	43	11.6	17.7	9.3	21
10	8	2.0	47.8	1.7	29	44.4	37.4	6.4	43	28.6	17.0	9.4	20
11	8	49.7	47.7	1.9	30	21.2	36.8	6.6	43	44.8	16.2	9.5	19
12	9	37.2	47.5	2.1	30	57.5	36.3	6.7	44	0.1	15.3	9.5	18
13	10	24.5	47.3	2.2	31	33.2	35.7	6.8	44	14.7	14.6	9.6	17
14	11	11.6	47.1	2.4	32	8.4	35.2	6.9	44	28.5	13.8	9.6	16
15	11	58.4	46.8	2.6	32	42.9	34.5	7.1	44	41.4	12.9	9.7	15
16	12	45.1	46.7	2.8	33	16.9	34.0	7.2	44	53.5	12.1	9.7	14
17	13	31.6	46.5	2.9	33	50.2	33.3	7.3	45	4.8	11.3	9.7	13
18	14	17.8	46.2	3.1	34	23.0	32.8	7.4	45	15.3	10.8	9.8	12
19	15	3.8	46.0	3.3	34	55.1	32.1	7.5	45	25.0	9.7	9.8	11
20	15	49.4	45.6	3.4	35	26.5	31.4	7.7	45	33.8	8.8	9.8	10
21	16	34.8	45.4	3.6	35	57.3	30.8	7.8	45	41.8	8.0	9.9	9
22	17	19.9	45.1	3.7	36	27.5	30.2	7.9	45	49.0	7.2	9.9	8
23	18	4.7	44.8	3.9	36	57.0	29.5	8.0	45	55.3	6.3	9.9	7
24	18	49.1	44.4	4.1	37	25.8	28.8	8.1	46	0.8	5.5	9.9	6
25	19	33.2	44.1	4.2	37	54.0	28.2	8.2	46	5.4	4.6	10.0	5
26	20	16.9	43.7	4.4	38	21.4	27.4	8.3	46	9.2	3.8	10.0	4
27	21	0.3	43.4	4.5	38	48.1	26.7	8.4	46	12.2	3.0	10.0	3
28	21	43.3	43.0	4.7	39	14.2	26.1	8.5	46	14.3	2.1	10.0	2
29	22	25.9	42.6	4.8	39	39.5	25.3	8.6	46	15.6	1.3	10.0	1
30	23	8.0	42.1	5.0	40	4.1	24.6	8.7	46	16.0	0.4	10.0	0
	XI. S.				X^s. S.				IX^s. S.				
	V. N.				IV^s. N.				III^s N.				

GEORGIUM SIDUS.

Table XVII.

Reduction to the Ecliptic and Logarithm of the Coſine of the heliocentric Latitude.

Arg. IX., or Argument of Latitude.							
Deg.	Reduct. to the Ecliptic. 0ˢ. — VIˢ. — S.	Log. coſin. of Heilocen. lat.	Reduct. to the Ecliptic. Iˢ. — VIIˢ. — S.	Log. coſin. of Heliocen. lat.	Reduct. to the Ecliptic. IIˢ. — VIII. — S.	Log. coſin. of Heliocentric lat.	Deg.
0	0.0	10.000000	8.1	9.999990	8.1	9.999971	30
1	0.4	10.000000	8.3	9.999990	8.0	9.999970	29
2	0.7	10.000000	8.4	9.999989	7.8	9.999969	28
3	1.0	10.000000	8.6	9.999988	7.6	9.999969	27
4	1.3	10.000000	8.7	9.999988	7.4	9.999969	26
5	1.6	10.000000	8.8	9.999987	7.2	9.999968	25
6	1.9	9.999999	8.9	9.999986	6.9	9.999967	24
7	2.3	9.999999	9.0	9.999985	6.7	9.999967	23
8	2.6	9.999999	9.1	9.999984	6.5	9.999966	22
9	2.9	9.999999	9.2	9.999984	6.3	9.999966	21
10	3.2	9.999999	9.2	9.999983	6.0	9.999965	20
11	3.5	9.999999	9.3	9.999982	5.8	9.999965	19
12	3.8	9.999998	9.3	9.999982	5.5	9.999965	18
13	4.1	9.999998	9.3	9.999981	5.2	9.999964	17
14	4.4	9.999998	9.3	9.999980	4.9	9.999964	16
15	4.7	9.999998	9.3	9.999980	4.7	9.999963	15
16	4.9	9.999997	9.3	9.999979	4.4	9.999963	14
17	5.2	9.999997	9.3	9.999978	4.1	9.999963	13
18	5.5	9.999997	9.3	9.999978	3.8	9.999962	12
19	5.8	9.999996	9.3	9.999977	3.5	9.999962	11
20	6.0	9.999996	9.2	9.999976	3.2	9.999962	10
21	6.3	9.999995	9.2	9.999976	2.9	9.999962	9
22	6.5	9.999995	9.1	9.999975	2.6	9.999961	8
23	6.7	9.999964	9.0	9.999974	2.3	9.999961	7
24	6.9	9.999993	8.9	9.999974	1.9	9.999961	6
25	7.2	9.999993	8.8	9.999973	1.6	9.999961	5
26	7.4	9.999992	8.7	9.999972	1.3	9.999961	4
27	7.6	9.999992	8.6	9.999972	1.0	9.999961	3
28	7.8	9.999991	8.4	9.999972	0.5	9.999961	2
29	8.0	9.999991	8.3	9.999971	0.4	9.999961	1
30	8.1	9.999990	8.1	9.999971	0.0	9.999961	0
	+	XIˢ.	+	Xˢ.	+	IXˢ.	
	+	Vˢ.	+	IV.	+	IIIˢ.	

Georgian *Bible*. See Bible.

Georgian *Monks* and *Nuns*, are religious of Georgia, in Aſia, who follow the rule of St. Baſil.

GEORGIANA, in *Geography*, a name originally given to a tract of country in the province of Maine, in North America.

GEORGIC, ſomething that relates to the culture or tilling of the ground.

The word is borrowed from the Latin *georgicus*; and that of the Greek γεωργικος, of γη, *terra*, *earth*; and εργαζομαι, *opero*, *I work*, *labour*, of εργον, *opus*, *work*.

The Georgics of Virgil are four books compoſed by that poet on the ſubject of agriculture.

GEORGIEV, in *Geography*, a town of Ruſſia, in the government of Caucaſus; 32 miles W.N.W. of Ekaterinograd.

GEORGINA, in *Botany*, ſo named by Willdenow in honour of Profeſſor Georgi; ſee Georgia and Dahlia. We have retained the latter name, given by Cavanilles, for this fine genus, becauſe it has been univerſally adopted in this country, where the various ſpecies ſeem likely to come into general cultivation. A change in ſuch a caſe not only ſhocks vulgar prejudices and illiterate indolence, but is materially inconvenient.

GEORGITZ, in *Geography*, a town of Walachia; 18 miles N.N.E. of Buchareſt.

GEOSCOPY, a kind of knowledge of the nature and qualities of the ground or ſoil, gained by viewing and conſidering it.

The word is formed of the Greek γη, *earth*, and σκοπεω, *I ſee*, *view*.

Geoſcopy is only conjectural; but its conjectures are very well grounded.

GEOSTATICS. See Statics.

GEPHRUS, in *Ancient Geography*, a town of Syria, according to Polybius, which ſurrendered to Antiochus.

GEPHYRA, a town of Syria, in the Seleucide territory, according to Ptolemy; 22 miles from Antioch.—Alſo, a town of Africa, according to Polybius, in the vicinity of Carthage, ſituated on the bank of the river Macros.

GEPHYRÆI, a people mentioned by Herodotus, who were probably natives of Gephyra in Syria; they migrated with Cadmus into Bœotia, where they occupied the territory of Tanagra; but on being driven from thence by the Bœotians, they took refuge in Attica.

GEPIDÆ, a people of Scandinavian origin, of whoſe Gothic extraction Jornandes gives the following account: the Goths, leaving Scandinavia under the conduct of king Barith, put to ſea with only three ſhips. One of theſe, ſailing ſlower than the other two, was thence called "Gepanta," ſignifying in the Gothic tongue ſlow: and hence the name of Gepantæ and Gepidæ, which was at firſt given them as an appellation of reproach. Procopius likewiſe expreſsly affirms, that the Goths, the Vandals, the Viſigoths, and the Gepidæ, were originally the ſame nation; that they had the ſame cuſtoms, manners, religion, and language; and that they only differed in names, borrowed, perhaps, he ſays, from their different leaders. They entered Scythia with the other Goths, and ſettled in the neighbourhood of the Tanais and Palus Mæotis. There they continued till the reign of Arcadius and Honorius, when, their number being greatly increaſed, they approached the Danube, and having afterwards croſſed that river, dwelt in the neighbourhood of Singidunum and Sirmium, about the year 400, where they ſtill were when Procopius wrote his hiſtory. They had kings of their own, and formed a diſtinct nation, ſeparate from both the Oſtrogoths and Viſigoths; but perhaps not one from the Lombards, who were afterwards maſters of Italy. Under their king Faſtida, they gained a complete victory over the Burgundians about the year 245; and Faſtida, elated with this victory, laid waſte the territories of the Goths, whoſe ſovereign Oſtrogotha refuſed to grant them land for their accommodation. Being defeated by the Goths, they afterwards joined them, and other northern nations, in the irruption which they made with their united forces into the empire in the ſecond year of the reign of Claudius; but they were defeated by that prince with great ſlaughter. In the year 279 Probus granted them lands in Thrace, upon promiſe of their quiet ſubmiſſion; but whilſt the emperor was engaged in war in the Eaſt, they ſeized the neighbouring provinces, and were cut off in great numbers by Probus after his return. St. Jerom mentions the Gepidæ among the other nations of Barbarians, who, in 407, invaded Gaul, and overran its provinces. Attila afterwards ſubdued them, and in 451 they ſerved under him in his famous expedition into Gaul. Upon the death of Attila, the Gepidæ ſhook off the yoke under the conduct of their king Ardaric, who obtained a complete victory over the Hunns; in conſequence of which the Gepidæ not only recovered their ancient liberty, but gained poſſeſſion of ancient Dacia, N. of the Danube, from which they had been driven by Attila. They then entered into an alliance with the Romans, who agreed to pay them an annual penſion. Having obtained poſſeſſion of part of Illyricum, with the city of Sirmium, they continued quiet till the year 537, when, on account of their joining the Heruli, and plundering the neighbouring provinces, they were compelled by Juſtinian, after ſeveral encounters, to abandon Illyricum, and to content themſelves with Dacia beyond the Danube. In the year 550, a quarrel aroſe between the Gepidæ and the Lombards; but the latter, having obtained a reinforcement from Juſtinian, attacked the former, and gave them a total overthrow. This defeat was followed by a peace between the two nations, which was brought about by the mediation of Juſtinian. The peace, however, was of ſhort duration. Under their reſpective ſovereigns, *viz.* Cunimandus, king of the Gepidæ, and Alboinus, king of the Lombards, they commenced mutual hoſtilities; and determined to abide by the iſſue of a ſingle battle. The conteſt was very ſevere, and remained for ſome time very doubtful; but at laſt, the Gepidæ were put to flight, and purſued by the victorious Lombards with ſuch ſlaughter, that ſcarcely one was left alive of the numerous multitude that had engaged. After this victory the Lombards ſeized the whole of Dacia, and obliged the Gepidæ either to ſubmit, or to retire. Henceforth they had no king of their own, but lived in ſubjection either to the Lombards, who were maſters of their country, or to the princes of the neighbouring nations, eſpecially the Hunns, ſettled in Pannonia. Thus their kingdom terminated in the year 572, Juſtin, the ſucceſſor of Juſtinian, being then emperor.

GEPPE, in *Geography*, a river of Germany, which riſes near Neuſtat in the county of Mark, and runs into the Bigge, two miles N. of Olpe, in Weſtphalia.

GER, Cape. See Aguer.

GERA, a town of Saxony, in the Vogtland, on the Elſter; 30 miles S.S.W. of Leipſic. N. lat. 50° 49′. E. long. 12° 6′.—Alſo, a town of Italy, in the department of the Upper Po.—Alſo, a river of Germany, which runs into the Unſtrull, ſix miles N. of Erfurt.

Gera, in *Ancient Geography*, a town of Arabia. Ptolemy.

GERÆA, a town of Luſitania. Ptolemy.

GERÆSTIUM, a country of the Peloponneſus, in Arcadia.

GERÆSTUS, a town and port of the iſland of Eubœa, upon the S.W. coaſt, about 15 miles from Caryſtus; now Gereſto.

GERALFINGEN, in *Geography*, a town of Switzerland; four miles S.E. of Soleure.

GERANDRUM, in *Ancient Geography*, a town of the iſland of Cyprus.

GERANGER, in *Geography*, a town of Norway, in the dioceſe of Drontheim; 22 miles S.S.W. of Romſdal.

GERANIA, in *Botany*, the 73d natural order in Juſſieu's ſyſtem, or the 13th of his 13th claſs. The following is his definition of this, one of his moſt important and extenſive claſſes. Cotyledons two. Petals many. Stamens inſerted below the germen.—The Calyx is of one or many leaves, very rarely deficient. Petals hypogynous, or inſerted below the piſtil, definite in number, very rarely indefinite, for the moſt part diſtinct, but ſometimes connected at the baſe, into a ſort of falſe monopetalous corolla; they are rarely wanting. Stamens inſerted below the piſtil, definite or indefinite, the filaments often diſtinct, ſometimes united all together into one tube, more rarely collected into ſeveral bundles; anthers diſtinct, or united only in *Viola* and *Impatiens* (called *Balſamina* by Juſſieu). Germen ſuperior, in many ſimple, in ſome multiplied; ſtyle ſingle, or multiplied, or deficient; ſtigma one, or ſeveral. Fruit ſuperior, ſometimes ſimple, of one or many cells; ſometimes, but more rarely, multiplied, each pericarp of one cell.

The order of *Gerania* is thus defined by Juſſieu. *Calyx* ſimple, either of five leaves, or of one deeply five-cleft, permanent. *Petals* five. *Stamens* definite, their filaments united at the baſe, ſometimes all fertile, ſometimes part of them abortive. *Germen* ſimple; ſtyle one; ſtigmas five, oblong. *Fruit* either of five cells, or of five capſules, each cell or capſule containing one or two ſeeds. *Corculum* without a periſperm, (or albumen). *Stem* either ſomewhat ſhrubby, or herbaceous. *Leaves* with ſtipulas, oppoſite or alternate. *Flowers*, in the former caſe, oppoſite to each leaf; in the latter, axillary.

Juſſieu enumerates only two genera as properly belonging to this order, *Geranium*, which includes *Erodium* and *Pelargonium* juſtly ſeparated from that genus by the late M. L'Heritier; ſee Erodium: and *Monſonia*, which is but too nearly akin to *Geranium*. He ſubjoins three genera as related to this order; *Tropæolum*, whoſe affinity is very obſcure; *Impatiens* (his *Balſamina*), which is perhaps ſtill leſs akin to it; and *Oxalis*, which laſt we would rather refer to the *Rutaceæ*, an order which Juſſieu ſeems but imperfectly to have ſtudied. He indeed, like Linnæus, hints ſome relationſhip between *Oxalis* and *Tribulus* or *Zygophyllum*, both which laſt he ſtations in the firſt ſection of his *Rutaceæ*; but we preſume to think they are there miſplaced, and that *Oxalis* is not ſo much allied to them as to the real *Rutaceæ*, ſo many of which are found in New Holland. In all ſuch doubtful caſes however, which form the difficulty and the pedantry of the ſtudy of natural orders, and in which our chief guide being conjecture, humility and candour are moſt becoming, we merely aim at collecting obſervations. The unnatural combinations complained of in a ſyſtem profeſſedly artificial, cannot be half ſo hurtful as error maſked in authority in the details of a pretended natural one. The doubts and hints of the excellent Juſſieu are in themſelves inſtructive, but how few are content like him to confeſs their doubts! He has at length acquired a pupil worthy of himſelf in this country, Mr. R. Brown, whoſe opportunities of obſervation, among the paradoxical novelties of New Holland, have given ample ſcope to his intelligence and aſſiduity.

Gerania, in *Ancient Geography*, a town of Thrace.—Alſo, a town of Phrygia.—Alſo, an ancient town of the Peloponneſus, in Laconia, on the confines of Meſſenia.—Alſo, a mountain of Greece, in the territory of Megaris, towards the iſthmus of the Peloponneſus.

GERA'NIS, or Geranium, in *Surgery*, a bandage formerly applied to fractured collar-bones, and diſlocated ſhoulders. The word is derived from γερανος, a *crane*, becauſe the ſhape of the bandage was thought to reſemble an extended crane.

GERANITES, γερανος, *a crane*, in *Natural Hiſtory*, a name given by ſome authors to ſuch pieces of agate, or any other of the ſemi-pellucid gems, as have round ſpots in them, reſembling in colour the eye of a crane.

GERANIUM, in *Botany*, γερανιον of the ancient Greeks, admirably named from γερανος, a *crane*, the germen and ſtyle reſembling the head and beak of that bird. Crane's-bill.—Linn. Gen. 350. Schreb. 458. Willd. Sp. Pl. v. 3. 696. L'Herit. in Ait. Hort. Kew. v. 2. 432. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 729. Juſſ. 268. Lamarck Illuſtr. t. 573. f. 1. Gærtn. t. 79, pratenſe. Claſs and order, *Monadelphia Decandria*. Nat. Ord. *Gruinales*, Linn. *Gerania*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of five ovate, acute, concave, permanent leaves. *Cor.* regular, of five large, obovate or obcordate, equal, ſpreading petals. Nectary five glands at the baſe of the germen, alternate with the petals. *Stam.* Filaments 10, awl-ſhaped, recurved, united at the baſe into a ſmall cup, five alternate ones longeſt, all ſhorter than the petals; anthers oblong, verſatile, five of them occaſionally abortive. *Piſt.* Germen ſuperior, with five furrows, beaked; ſtyle central, awl-ſhaped, longer than the ſtamens, permanent; ſtigmas five, oblong, reflexed. *Peric.* Capſules five, aggregate, membranous, globoſe, lateral, ſeparating at their inſide, each attached upwards to a long, linear, flat, pointed, rigid, ſmooth awn, at length elaſtically recurved, adhering by its point to the ſummit of the ſtyle. *Seeds* ſolitary, lateral, roundiſh, their ſurface ſmooth or dotted.

Eſſ. Ch. Calyx of five leaves. Petals five. Nectariferous glands five. Fruit beaked, of five aggregate capſules, each tipped with a long, recurved, naked awn.

Obſ. This genus, as above defined, contains only the *Gerania columbina* of Linnæus, or what are commonly called European Geraniums, or Crane's-bills, bearing but one or two flowers on a ſtalk. (See Erodium.) Thus it is adopted by Willdenow, who has 39 ſpecies, 13 of which are natives of Britain. They are tolerably naturally diſtributed into three ſections.

* Flower-ſtalks ſingle-flowered; 4 ſpecies.

G. *ſanguineum*, Engl. Bot. t. 272, a handſome inhabitant of rocky woods and abrupt gravelly ground, is an example of this ſection, though the late Mr. Davall once found in Switzerland an occaſionally two-flowered variety. See Fl. Brit. 739. A variety found on the Lancaſhire coaſt, of humble depreſſed growth, with white red-veined petals, is frequent in gardens.

G. *ſibiricum*, Jacq. Hort. Vind. v. 1. t. 19, an inconſpicuous ſpecies, is, we believe, conſtantly ſingle-flowered.

** Flower-ſtalks two-flowered. Root perennial, 24 ſpecies. Moſt of the Crane's-bills uſually cultivated for ornament are of this diviſion, as

G. *anemonifolium* of L'Heritier. Curt. Mag. t. 206. This ſhowy ſpecies, diſcovered by Mr. Maſſon in Madeira, was, as Mr. Curtis records, long known in our gardens by the name *lævigatum*, admirably expreſſive of its ſmoothneſs, and the French botaniſt changed it for the worſe. We could have no redreſs, as the original name had not been printed. It is a hardy greenhouſe plant, throwing out, from its ſhort knotty *ſtem*, a profuſion of ſpreading, long-ſtalked, ſhining, palmate, prinnatifid *leaves*, and many ſpreading, leafy *branches*, forked upwards. The *flowers* are large, of a fine crimſon, broader than a half-crown.

G. *macrorrhizum*, Linn. Sp. Pl. 953. Jacq. Ic. Rar. t. 134, native of Italy, is a very common hardy perennial in our gardens, remarkable for the roundneſs of its red petals, and the ſtrong, but aromatic, cedar-like, ſcent of its herbage. The plant is of humble growth, with a ſhort knotty *ſtem*, like the laſt. *Leaves* ſoft and downy.

G. *phæum*, Linn. Sp. Pl. 953. Engl. Bot. t. 322; and

G. *fuſcum*, Linn. Mant. 97, two ſpecies very nearly akin, are remarkable for the dark brown colour of their *flowers*; as G. *reflexum*, ibid. 257. Cavan Diſſ. t. 81. f. 1, is for its reflexed *petals*, and G. *lividum*, L'Herit. Geran. t. 39, firſt well determined by Haller at his No. 935, though he was not for ſome time attended to, for its flat, round, ſerrated *petals*, of a pale livid dove-colour. Theſe four laſt are often ſeen in gardens about London.

G. *nodoſum*, Linn. Sp. Pl. 953. Engl. Bot. t. 1091, is the moſt rare Britiſh ſpecies, and ſcarcely found elſewhere but on the mountains of Provence and Dauphiny, in ſhady places.

G. *ſtriatum*, Linn. Sp. Pl. 953. Curt. Mag. t. 55, a native of Italy, very hardy with us, is generally admired for its delicately pencilled bloſſoms.

G. *angulatum*, Curt. Mag. t. 203, now frequent in gardens about London, but from what country imported is not known, was firſt aſcertained as a diſtinct ſpecies by the late Mr. Curtis. Its *flowers* are prettily veined with reddiſh purple on a pale ground.

G. *pratenſe*, Linn. Sp. Pl. 954. Engl. Bot. t. 404, a very handſome blue-flowered ſpecies, common in paſtures in the north, is extremely remarkable, and almoſt ſingular in this natural order, for having ſometimes double flowers, in which ſtate it was found near Athol houſe, Scotland, by lady Charlotte Murray in 1793. It is often ſeen with white petals.

G. *argenteum*, Linn. Sp. Pl. 954. Curt. Mag. t. 504, a native of Mount Baldus, was introduced into England by the indefatigable and intelligent Mr. Lodlige, whoſe zeal and liberality as a cultivator are above all praiſe. Its *leaves* are beautifully ſilvery, the plant dwarf, but the *flowers* peculiarly large, bluſh-coloured, veined with red.

G. *pyrenaicum*, Linn. Mant. 97. Sm. Fl. Brit. 735. Engl. Bot. t. 405. Curt. Lond. faſc. 3. t. 42, common about London and Edinburgh, has not been well underſtood, even by Mr. Curtis, who undertook to illuſtrate it. Linnæus originally confounded it with *molle* hereafter mentioned, from which its even capſules, perennial root, and greater magnitude, keep it very diſtinct.

*** Flower-ſtalks two-flowered. Root annual; 11 ſpecies.

G. *bohemicum*, Linn. Sp. Pl. 955, placed firſt in this ſection, well drawn in Dillenius's Hort. Elth. t. 133. f. 160, is remarkable for its very black hairy ſeed-veſſels, and viſcid herbage.

G. *molle*, Engl. Bot. t. 778, ought to follow immediately; with *diſſectum*, t. 753; *rotundifolium*, t. 157; and *puſillum*, t. 385. Theſe four, long confounded, and ſcarcely underſtood by any botaniſt, are beautifully diſtinguiſhed, in every degree of luxuriance, by their *capſules*, which are corrugated and naked in the firſt; more ſlightly corrugated, but hairy, with reticulated ſeeds, in the ſecond; carinated, even and hairy, with reticulated ſeeds in the third, with much more entire leaves; even and hairy, with ſmooth ſeeds, in the laſt, whoſe hairs on the part in queſtion are, moreover, cloſe-preſſed, not ſpreading as in the preceding. We were obliged to the late Mr. Davall for firſt calling our attention to this part, and thus leading to one of the moſt ſatisfactory diſcoveries in European botany.

G. *carolinianum*, Linn. Sp. Pl. 956. Jacq. Hort. Schonbr. v. 2. t. 140, where it is miſtaken for a new plant, and called *lanuginoſum*! follows theſe; with *columbinum*, Engl. Bot. t. 259. To which ſhould ſucceed *lucidum*, t. 75; then, if it be a diſtinct ſpecies, which we much doubt, *purpureum* of Willdenow, n. 39, and Villars Dauph. t. 40; and finally *robertianum*, Engl. Bot. t. 1486. Curt. Lond. faſc. 1. t. 52. This *purpureum* has been a weed in Chelſea garden ever ſince the time of Miller, but though Ray mentions it as a native, ſee Fl. Brit. 732, G. *robertianum* β, we never gathered it elſewhere.

Geranium, in *Gardening*, comprehends plants of the herbaceous perennial kind, of which the ſpecies cultivated are, the dark flowered crane's-bill (G. phœum); the knotty crane's-bill (G. nodoſum); the ſtreaked crane's-bill (G. ſtriatum); the Siberian crane's-bill (G. ſibiricum); the bloody crane's-bill (G. ſanguineum); and the long-rooted crane's-bill (G. macrorhizum); but there are other ſorts that may be cultivated with propriety.

The fifth ſpecies has ſeveral varieties, as with ſhort ſpreading ſtems and ſmall leaves and flowers; with large leaves deeply divided, and with variegated or ſtriped flowers.

Method of Culture.—Each of theſe ſpecies of plants is capable of being increaſed in two ways, either by ſowing the ſeeds or parting the roots. Where the firſt method is adopted, the ſeeds ſhould be ſown in the autumn as ſoon as they have become perfectly ripened, either in pots or a ſhady border in the garden ground where the mould is light and fine. As ſoon as the plants have acquired a few inches in growth, they ſhould be pricked out into other pots, or beds of ſimilar earth, at the diſtance of five or ſix inches in the latter caſe; but where this cannot be done, they may be permitted to remain until the following autumn or ſpring, and be then put out into other pots or borders, where they are to continue, being occaſionally watered in a moderate manner.

In caſes where the parting of the roots is practiſed, care ſhould be taken not to divide them too much; planting them out in the early part of the autumn, either in pots or where they are to continue.

Moſt of theſe ſorts of plants are of rather hardy growth, and ſucceed in moſt kinds of ground, demanding but little attention in their cultivation, beſide that of their being kept clear from all ſorts of weeds and rubbiſh.

All of them are capable of affording variety in the borders, clumps, and other parts of pleaſure gardens, and the potted kinds produce a fine effect in ſituations about the houſes in mixture with thoſe of other ſorts.

GERANOS, Γερανος, in *Antiquity*, a remarkable dance performed in the feſtival called *Delia*.

GERANZAGO, in *Geography*, a town of Italy; nine miles E.N.E. of Pavia.

GERAR, or Gerasar, or *Gezarah*, in *Scripture Geography*, a city of the Philiſtines, S. of Judah. The Abimelechs were kings of this city in the time of Abraham and Iſaac. At this time it was the boundary of the Canaanites, ſituated on the river Bezor, about ſeven miles S.W. of Debir, and ſix E. of Beerſheba. It afterwards belonged to the tribe of Simeon. Gerar extended far into Arabia Petræa, being 25 miles from Eleutheropolis, beyond Daroma, the ſouth of Gudah. Moſes ſays, that it lay between Kadeſh and Shur; and he mentions the brook or valley of Gerar. (Gen. xxvi. 26.) Sozomen ſpeaks of a little town, called *Gera*, 50 furlongs from Peluſium.

Gerar is confounded with Beerſheba, Aſhkelon, Alluſh, and Arad.

GERARD, Herb. in *Botany*. See Ægopodium.

Gerard, in *Biography*, who flouriſhed about the end of the eleventh, and commencement of the twelfth centuries, founder and firſt grand-maſter of the order of St. John of Jeruſalem, was a native of the iſle of Martigues, on the coaſt of Provence. While Jeruſalem was in the hands of the Saracens, ſome Neapolitan merchants obtained permiſſion from the ſultan of Egypt and Syria, in the year 1050, to erect a Benedictine monaſtery, near the holy ſepulchre, for the convenience of the pilgrims who came to viſit it. Among others Gerard came to pay his devotions at the holy city, where he obtained a high character for piety and prudence. The monaſtery ſoon became rich, and in conformity with the ſpirit of the times the abbot built, with the wealth poured in by the rich devotees, an hoſpital for the reception of the poorer claſs, and with proper accommodation for the aged and the ſick. The management of this he gave to Gerard. A part of the building was ſeparated for a chapel dedicated to St. John, becauſe it was ſaid that Zacharias, the father of St. John, had lived on the ſpot where it was built. Gerard, after the conqueſt of Jeruſalem, by Godfrey of Bouillon, projected the foundation of a new religious order, in which the eccleſiaſtical and military character ſhould be blended. He began, about the year 1100, to carry his deſign into execution, when numbers of perſons aſſociated with him under the denomination of the "Hoſpitalers of St. John of Jeruſalem," who, beſides the three uſual vows of chaſtity, poverty, and obedience, took a particular vow to devote themſelves to the relief of all Chriſtians in diſtreſs. The order was recognized, and privileges granted to it by pope Paſcal II. Gerard was the firſt grand-maſter, and ſuch was the commencement of that order which has been ſo frequently and ſo long celebrated in hiſtory: the members of it were firſt denominated knights of Rhodes, and afterwards knights of Malta. Moreri.

Gerard, John, a learned German Lutheran divine, was born at Jena in the year 1621, where he was educated, but at the age of nineteen he went to Altdorf for the ſake of greater progreſs in the oriental languages, and in 1643 the univerſity conferred on him the degree of M.A. He was appointed profeſſor of philoſophy at Wittemberg in 1646, and in 1652 he was nominated profeſſor of hiſtory at Jena. After this he was created doctor of divinity, and made profeſſor in that faculty, having devoted much of his time to biblical and theological learning. He was likewiſe appointed rector of the univerſity of Jena. He died in the year 1688, and left behind him, as memorials of his great learning, many works of very deep erudition: among theſe were "Harmonia Linguarum Orientalium;" "Diſputationum theologicarum Faſciculus;" "De Eccleſiæ Copticæ Ortu, Progreſſu, et Doctrina."

Gerard, Alexander, was born at Garioch, in the county of Aberdeen, in the year 1728: he was educated at the grammar-ſchool at Aberdeen, and ſo great was his progreſs, that he was entered a ſtudent in Mariſchal college when he was but twelve years of age. Here he devoted his firſt four years to the ſtudy of Greek, Latin, the mathematics, and philoſophy, and was, at the cloſe of the courſe, admitted to the degree of M.A. He now commenced his theological ſtudies, which he proſecuted at the univerſities of Aberdeen and Edinburgh. Immediately on the completion of his twentieth year, he was licenſed to preach in the church of Scotland, and in the year 1750 was choſen aſſiſtant to Mr. David Fordyce, profeſſor of philoſophy in the Mariſchal college at Aberdeen, and in two years afterwards, upon the death of the profeſſor, Gerard was appointed to ſucceed him. Here, after a ſhort time, the department aſſigned to Mr. Gerard was confined to moral philoſophy and logic, the duties of which he diſcharged with conſcientious and unwearied diligence, and with equal ſucceſs and reputation. He was a member of a literary ſociety at Aberdeen, which met very regularly every fortnight during the winter, when the members communicated their ſentiments with the utmoſt freedom, and received mutual improvement from their literary diſcuſſions. In 1759 Mr. Gerard was ordained a miniſter of the church of Scotland, and in the following year he was appointed profeſſor of divinity in the Mariſchal college, and about the ſame period he took his degree of doctor of divinity. He continued to perform the ſeveral duties attached to his offices till 1771, when he reſigned the profeſſorſhip, together with the church living, and was preferred to the theological chair in the univerſity of King's college, a ſituation which he held till his death in 1795. Dr. Gerard's attainments were ſolid rather than brilliant, the effect of cloſe and almoſt inceſſant ſtudy, and a fine judgment. He had improved his memory to ſuch a degree, that he could, in little more than an hour, get by heart a ſermon of ordinary length. He was author of "An Eſſay on Taſte," which was publiſhed in 1759, and which obtained for him the prize of a gold medal, from the Society of Edinburgh. This work was afterwards much enlarged and reprinted in 1780. His "Diſſertations on the Genius and evidences of Chriſtianity," publiſhed in 1766, are well known and highly appreciated: ſo alſo are his "Eſſay on Genius," and his ſermons in two volumes. In the year 1799 his ſons gave the world a poſthumous work of much merit, which had been left among the papers of his father, entitled "The Paſtor's Care," which made a part of his theological courſe of lectures. As a clergyman the conduct of Dr. Gerard was marked with prudence, exemplary manners, and the moſt punctual and diligent diſcharge of his miniſterial duties: his ſermons were ſimple and plain, adapted to the common claſs of hearers, but ſo accurate as to ſecure the approbation of the ableſt judges. As a profeſſor of divinity, his great aim was not to impoſe by his authority upon his pupils any favourite ſyſtem of opinions; but to impreſs them with a ſenſe of the importance of the miniſterial office; to teach them the proper manner of diſcharging all its duties; and to enable them, by the knowledge of the ſcriptures, to form a juſt and impartial judgment on controverted ſubjects. Poſſeſſing large ſtores of theological knowledge, he was judicious in ſelecting his ſubjects, happy and ſucceſsful in his manner of communicating inſtruction. He had the merit of introducing a new, and in many reſpects a better, plan of theological education, than thoſe on which it had formerly been conducted. Having a conſtant regard to whatever was practically uſeful, rather than to unedifying ſpeculations, he enjoined no duty which he was unwilling to exemplify in his own conduct. In domeſtic life he was amiable and exemplary: in his friendſhips ſteady and diſintereſted, and in his intercourſe with ſociety hoſpitable, benevolent, and unaſſuming; uniting to the decorum of the Chriſtian paſtor, the good breeding of a gentleman, and the cheerfulneſs, affability, and eaſe of an agreeable companion.

GERARDE, John, a ſurgeon and famous herbaliſt of the time of queen Elizabeth, was born at Namptwich, Cheſhire, in 1545. He practiſed ſurgery in London, and roſe to eminence in that profeſſion. Mr. Granger ſays "he was many years retained as chief gardener to lord Burleigh, who was himſelf a great lover of plants, and had the beſt collection of any nobleman in the kingdom: among theſe were many exotics, introduced by Gerarde." This is confirmed by the dedication of the firſt edition of his Herbal, in 1597, to that illuſtrious nobleman, in which he ſays he had "that way employed his principal ſtudy, and almoſt all his time" then for 20 years. It appears therefore that he had given up his original profeſſion. Johnſon, the editor of his ſecond edition, ſays "he lived ſome ten years after the publiſhing of this work, and died about 1607;" ſo that he ſurvived his noble patron nine years. See CECIL, WILLIAM.

Gerarde lived in Holborn, and had there a large botanic garden of his own, of which he publiſhed a catalogue in 1596 and again in 1599. Of this work ſcarcely an impreſſion is known to exiſt, except one in the Britiſh Muſeum, which proved of great uſe in preparing the *Hortus Kewenſis* of Mr. Aiton, as ſerving to aſcertain the time when many old plants were firſt cultivated. Holborn was then in the outſkirts of the town on that ſide. The reader of Engliſh hiſtory will recollect that the hypocritical Richard III. aſked the biſhop of Ely to ſend for "ſome of the good ſtrawberries which he heard the biſhop had in his garden in Holbourn," by way of ſhewing himſelf in good humour at the council, while he was in fact meditating the ſeizure of lord Haſtings. The catalogue of Gerarde's garden contains, according to Dr. Pulteney, 1033 ſpecies, or at leaſt ſuppoſed ſuch, though many doubtleſs were varieties, and there is an atteſtation of Lobel ſubjoined, aſſerting his having ſeen nearly all of them growing and flowering. This was one of the earlieſt botanic gardens in Europe.

The great work of our author is his Herbal, or General Hiſtory of Plants, printed in folio in 1597, by John Norton, who procured the wooden cuts from Frankfort, originally done for the German herbal of Tabernæmontanus. The baſis of the text was the work of Dodonæus entitled *Pemptades*, for which alſo we believe the ſame cuts had been uſed; ſee DODONÆUS. Lobel aſſerts that a tranſlation of the Pemptades had been made by a Dr. Prieſt, at the expence of Mr. Norton, but the tranſlator dying ſoon after, the manuſcript was uſed by Gerarde, indeed without acknowledgment. The intelligent reader of the Herbal will obſerve that moſt of the remarks relative to the places in which certain plants are found, their common uſes, &c., belong to the original work, and refer to the country in which Dodonæus wrote, not to England. Gerarde is alſo accuſed of having been no Latin ſcholar, and of having made many miſtakes in the additional matter which he tranſlated from the works of Cluſius, Lobel, &c. He alſo certainly miſapplied many of the cuts. Notwithſtanding ſuch faults, Gerarde had the great merit of a practical knowledge of plants, with unbounded zeal, and indefatigable perſeverance. Dr. Pulteney juſtly obſerves that notwithſtanding his manifeſt inferiority to Lobel in point of learning, it muſt yet be owned that Gerarde contributed greatly to bring forward the knowledge of plants in England. His connection with the great, and his ſituation in London, favoured an extenſive correſpondence, both with foreigners and his own countrymen; and his ſucceſs in procuring new exotics, as well as ſcarce indigenous plants, was equal to his diligence and aſſiduity. In fact, we owe to Gerarde and his friends the diſcovery of many new Engliſh plants; and his name will be remembered by botaniſts with eſteem, when the utility of his Herbal is ſuperſeded." Among the perſons to whom he was indebted for the communication of exotic plants and ſeeds, are recorded ſir Walter Raleigh, Edward lord Zouch, and lord Hunſdon, with many of leſs elevated rank.

A ſecond edition of Gerarde's Herbal was publiſhed by Dr. Thomas Johnſon in 1636, which has ever ſince been a very popular book, and indeed, as Haller remarks, Gerarde was the claſſical author of the Engliſh, almoſt to the time of Ray. Johnſon, like many other editors, cenſured his author with great freedom, and undoubtedly made many eſſential corrections. He has prefixed a liſt of his additions, which are very numerous, and a learned hiſtorical preface. He was a man of far more learning than Gerarde, but by no means ſo good a botaniſt. Among the moſt valuable of his additions are the communications of Mr. John Goodyer of Maple-Durham, Hampſhire, a man of ſingular penetration and accuracy in practical botany. Johnſon added many excellent figures, either of new plants, or in the place of ſuch as were badly executed in the firſt edition. Among the latter is *Gratiola latifolia*, which Haller complains he could make nothing of. It proves to be *Scutellaria minor*, and is well repreſented in Johnſon's edition, p. 581.

Mr. Granger, in his Biographical Hiſtory of England, ed. 4. v. 1. 275, mentions only two engraved portraits of Gerarde.

"JOHN GERARDE; engraved by William Rogers, for the firſt edition of his Herbal.

Ditto engraved by Paine, for Johnſon's edition of the ſame book."

The latter, dated 1636, is a ſmall copy of the former. There is a ſprig of the potatoe plant in the left hand.

The writer of the preſent article is poſſeſſed of the copper-plate itſelf, very much worn, of an octavo portrait of Gerarde, without age or date, holding a ſprig of *Ciſtus*, with his arms and the Italian motto, *D'aſſenti, buone.* In one corner below is a branch of Jaſmine, in the other the Bugloſs. The name of the engraver ſeems to be Hall. Pulteney's Sketches of the Progreſs of Botany in England. Granger's Biographical Hiſtory of England. Haller's Bibl. Bot. S.

GERARDIA, in *Botany*, named by Plumier in memory of the Engliſh herbaliſt John Gerarde; ſee that article. (It may alſo ſerve to commemorate a botaniſt of our own time, Louis Gerard, M. D. author of the excellent Flora Galloprovincialis, publiſhed in 1761, with a few exquiſitely engraved plates, and who, we believe, is ſtill living, at a very advanced age, at Cottignac in Provence, where the writer of this viſited him in 1786. (See Tour on the Continent, ed. 2. v. 1. 204.) – Plum. Nov. Gen. 30. t. 12. Linn. Gen. 307. Schreb. 403. Willd. Sp. Pl. v. 3. 221. Mart. Mill. Dict. v. 2. Juſſ. 119. Lamarck. Illuſtr. t. 529. (Nigrina; Linn. Mant. 42 and 512. Melaſma; Berg. Cap. 162. Gærtn. t. 55.)—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Scrophulariæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, permanent, with five upright, ſharp ſegments. *Cor.* of one petal, ringent, tube round, longer than the calyx; upper lip erect, obtuſe, flat, broadeſt, emarginate; lower reflexed, deeply three-cleft, its lateral ſegments emarginate, the middle one ſhorter, deeply divided. *Stam.* Filaments four, ſcarcely ſo long as the tube, two of them rather ſhorter than the reſt; anthers ſmall. *Piſt.* Germen ſuperior, ovate, ſmall; ſtyle ſimple, ſhort; ſtigma obtuſe. *Peric.* Capſule ovate, of two cells and two valves, opening at the baſe, the partition contrary to the valves. *Seeds* ovate; according to Linnæus ſolitary, which does not appear from Plumier's works.

Eſſ. Ch. Calyx five-cleft. Corolla two-lipped; the lower lip in three deep emarginate lobes, the middlemoſt deeply divided. Capſule of two cells, opening at the baſe.

This genus, as founded by Plumier and adopted by Linnæus, entirely depends on the firſt ſpecies.

1. G *tuberoſa*. Linn. Sp. Pl. 848. (G. humilis, bugulæ foliis, aſphodeli radice; Plum. Ic. 64. t. 75. f. 2.), found by Plumier in South America, and never ſeen by Linnæus. We have a very bad ſpecimen from that country, which agrees with Plumier's figure, as to the leaves and habit, but nothing can be made out of the fructification. The above characters are taken from Plumier's works. Willdenow, by miſtake, we preſume, ſays the capſule is of three cells. Dr. Swartz appears not to have found this, or any other ſuppoſed *Gerardia*, in the Weſt Indies. Linnæus, well aware that the various plants he ſubſequently referred hither might probably not well accord with the above, has given a hint that "the fructification requires examination." Whatever might be the reſult of ſuch examination, this plant muſt be the true, though it were the only *Gerardia*, and the reſt in that caſe muſt have a new generic appellation and character.

2. G. *delphinifolia*. Linn Sp. Pl. 848. Roxb. Coromand. v. 1 .t. 40. is totally diſtinct in habit and character. Its anthers have a remarkable creſt, indicated but miſrepreſented in Roxburgh's figure, for what there appears the anther is the creſt, and the apparent point of the filament is the true anther, at leaſt in our ſpecimen.

3. G. *purpurea*, a North American ſpecies, cloſely agreeing with the laſt in habit, has no ſuch creſt or appendage, but their flowers are otherwiſe very ſimilar. G. *flava* and *pedicularia* are undoubtedly of the ſame genus with theſe; but *glutinoſa*, figured in Lamarck t. 529. f. 1, has a very different appearance. It was gathered in China by Oſbeck, who likewiſe has given a plate of this ſpecies in his Travels, t. 9. Lamarck's f. 2. is G. *pedicularia*.

Willdenow has 12 ſpecies in all. None of them ſeem now to be known in the Engliſh gardens, though highly deſerving of culture for the beauty and ſize of their flowers. G. *purpurea* indeed is mentioned in the *Hortus Kewenſis*, as a hardy annual, introduced in 1772, by Samuel Martin, M. D., but it probably did not long remain, or at leaſt has not been diſperſed among collectors in general.

GERARDMER, in *Geography*, a town of France, in the department of the Voſges, and chief place of a canton, in the diſtrict of St. Dié, 10 miles E. of Remiremont. The place contains 4,285, and the canton 4,285 inhabitants, on a territory of 122½ kiliometres, in one commune.

GERARDS, Mark, in *Biography*, a painter, born at Bruges in 1561; who came into England not long after the year 1580, and remained till his death in 1635. He was made painter to queen Elizabeth, as he was alſo to Anne of Denmark. His works are very numerous here, though, as he uſed no mark, they are not eaſily known. He painted very thin and neat; ornamenting the dreſſes of his figures with jewels and pearls in a profuſe manner. The fleſh he generally painted of a greyiſh teint, and theſe are the beſt tokens of his hands by which his pictures may be diſcovered.

He painted a proceſſion of queen Elizabeth to Hunſdown houſe, which is engraved by Vertue; and he drew the queen and the knights of the garter in proceſſion; from which deſign Aſhmole's print is engraved in his hiſtory of that order. He alſo wrote an introduction to the art of drawing, which was tranſlated and publiſhed in Engliſh in 1674.

GERARDSTOWN, in *Geography*, a ſmall town of America, in Berkeley county, Virginia, containing about 30 or 40 houſes; 10 miles from Martinſburg.

GERASA, or Gergésa, in *Scripture Geography*, a city beyond and eaſt of the Dead ſea, included by ſome in Cœleſyria, by others in Arabia; placed among the cities of the Decapolis, Matt. vii. 28. The Greek editions of Matthew, for Gereſenians, read Gergeſenes, and ſome, Gadarens. Luke and Mark have the ſame reading. Origen thinks that the true reading is neither Geraſa nor Gadara; but that the city of Gergeſa is meant, which lies on the lake of Tiberias, where, in his time, the people ſhewed the rocks and precipices from which the ſwine ran down. It is alſo called Giraſa and Girgeſha, and was one of the cities that belonged to the half-tribe of Manaſſeh.

GERASDORFF, in *Geography*, a town of Auſtria; 7 miles E. of Korn Neuburg.

GERAU, a ſmall country of Germany, ſituated near the conflux of the Maine and the Rhine, in the circle of the Upper Rhine: its capital is Darmſtadt.

Gerau, *Groſs*, a town of Germany, in the principality of Heſſe-Darmſtadt; 8 miles W. N. W. of Darmſtadt.

GERBA, or Jerba, a ſmall iſland in the Mediterranean, near the coaſt of Tripoli. Its principal produce is barley and fruit. Its ancient name was "Lotophagitis." N. lat. 33° 56′. E. long. 11° 20′.

GERBEL, Nicholas, in *Biography*, a native of Pfortzheim, was known and highly celebrated in the fifteenth century as a moſt learned juriſt. He was profeſſor of the law at Vienna, and afterwards at Straſburg. He attained likewiſe to a high reputation for his deep knowledge in hiſtory and antiquities. He is characterized by De Thou as one equally eſtimable for his erudition and humanity. His works are "Iſagoge in Tabulam Graciæ Nicolai Sophiani;" "De Anabaptiſtarum ortu et progreſſu;" "Vita Joannis Caſpiniani." The firſt of theſe was publiſhed in 1545, and afterwards augmented into ſeven books, comprehending a complete deſcription of all Greece, and printed at Baſil in 1550. Gerbel corrected Caſpinian's "Chronicle of the Cæſars," and Arrian's "Hiſt. of Alexander."

GERBERA, in *Botany*. See Arnica.

GERBERAY, in *Geography*, a town of France, in the department of the Oiſe, fortified in the 9th century, to ſtop the incurſion of the Normans; 12 miles N. W. of Beauvais. N. lat. 49° 32′. E. long. 1° 57′.

GERBERT, or Girbert, *Pope*, in *Biography*, was a native of Auvergne, and born of obſcure parents in the neighbourhood of Aurillac, where he was a monk; and may be juſtly conſidered as one of the principal ornaments of the tenth century. His talents were ſo various, and his aſſiduity in acquiring knowledge ſo great, that it is difficult to ſay what were thoſe branches of literature and ſcience in which he chiefly excelled. He was a divine, a mathematician, and a philoſopher, and he wrote upon geometry, particularly the quadrature of the circle, aſtronomy, logic and rhetoric. He was eminently diſtinguiſhed by his knowledge of muſic, on which he compoſed, in Latin monkiſh rhyme, a didactic poem, entitled "Ars Muſica," preſerved in the Rawlinſon collection of MSS. at Oxford; and in this little work is a ſeparate treatiſe, under the title of "Rhythmomachia," or the battle of numbers or figures, which Gerbert compoſed as a kind of game, ſoon after the arrival of the Arabian figures or cyphers in Europe, for which the author gives rules reſembling thoſe for cheſs. Having cultivated muſic very aſſiduouſly, regarding it as the ſecond in rank among the liberal arts, he muſt have acquired a conſiderable reputation in it, as the authors of the twelfth century gave him the title of Gerbert the "Muſician." He is ſaid to have been as well ſkilled in the conſtruction of muſical inſtruments as in the uſe of them, particularly the hydraulic organ. William of Malmeſbury ſpeaks with wonder of the perfection to which he had brought this inſtrument by means of blowing it with warm water. His extraordinary talents and attainments eſtabliſhed his claim on thoſe high eccleſiaſtical preferments to which he was advanced. Before his exaltation to the papal chair as the ſucceſſor of Gregory V., in the year 999, he was, firſt, archbiſhop of Rheims, and afterwards of Ravenna. As pope, he aſſumed the name of Silveſter II.; but he died in 1003, after having filled the papal throne four years. The day of his death is marked in his epitaph, which was compoſed by pope Sergius IV., who ſucceeded him in 1009, and is ſtill to be ſeen in the Lateran church. This pope contributed very much to the reſtoration of letters in Europe. His genius, ſays Moſheim, (E.H. vol. ii.) was extenſive and ſublime, embracing all the different branches of literature; but its more particular bent was towards mathematical ſtudies. Mechanics, geometry, aſtronomy, arithmetic, and every kind of knowledge that had the leaſt affinity to theſe important ſciences, were cultivated by Gerbert with the moſt ardent zeal, as his various writings teſtify; and he had the merit of employing every method that was proper to animate others in the culture of the liberal arts and ſciences. The effects of this noble zeal were viſible in Germany, France, and Italy, both in the tenth and following century. Gerbert was, in a great meaſure, indebted for his extraordinary acquirements, more eſpecially in phyſics, mathematics and philoſophy, to the writings and inſtructions of the Arabians, who were ſettled in Spain. It was in this century that the plan of the holy war was formed; and towards the concluſion of it, the bloody ſignal was given by our learned pontiff, in the firſt year of his pontificate. This ſignal was an epiſtle, written in the name of the church of Jeruſalem, to the church univerſal throughout the world, in which the European powers are ſolemnly exhorted and intreated to ſuccour and deliver the Chriſtians in Paleſtine. The pontiff's exhortations, however, were only regarded by the inhabitants of Piſa. We ſhall here add that Gerbert's great learning induced the vulgar to ſuſpect that he was addicted to magic, and Platina has adopted this abſurd notion; for he ſays that he obtained the papacy by ill arts, and that he left his monaſtery to follow the devil. He allows him, indeed, the merit of a ſincere repentance; but mentions ſome prodigies at his death, which will claim little regard on the teſtimony of ſuch a writer. The moſt complete collection of Gerbert's letters is that of Ducheſne.

GERBERT, *Father Martin*, a German muſical writer, who belonged to the congregation of Benedictines, at the abbey of St. Blaiſe, in the Black Foreſt, near Friburg, in Briſgaw, about 30 miles from Straſburg, and has been elevated to the head of his ſociety under the denomination of "Prince-Abbot" of St. Blaiſe. In 1763 the learned abbot publiſhed the plan of a "Hiſtory of Church Muſic," from the firſt century to the preſent time, under the title of "De Cantu et Muſica Eccleſiaſtica à prima eccleſiæ Ætate, uſque ad præſens tempus." After this publication he travelled through Germany, and a great part of France and Italy, in order to collect materials in the ſeveral convents and public libraries of thoſe countries, and in 1765 he publiſhed his "Itinerary," informing the public of the ſucceſs of his reſearches. A great part of the author's materials for the hiſtory of ſacred muſic were unfortunately deſtroyed by fire; but availing himſelf of his remaining ſtock, he reſumed the work.

Though the indefatigable and pious abbot was in ſearch of the muſic uſed in the Romiſh maſs and liturgy, he candidly mentions the muſic of the Proteſtant churches. He had procured from England Dr. Boyce's magnificent publication of our cathedral muſic from the time of the reformation till the middle of the laſt century, and allows the compoſition to be excellent; but wiſhes for more plainneſs and ſimplicity in favour of the words; and thinks that fugues and learned counterpoint, though ingenious productions, render the words unintelligible. The author has inſerted at the end of the ſecond vol. the whole maſs, "In cœna Domini," in eight parts, in ſcore, to be ſung antiphonally as in our choirs, from ſide to ſide.

The harmony is very pure; but we have been ſo long accuſtomed to more varied, expreſſive, and elaborate compoſitions in our cathedral ſervice, that ſuch muſic would be thought very inſipid and unintereſting, if adopted in our choirs. After this, the "Gloria in excelſis" is given in the ſame ſimple counterpoint; where nothing is varied. Theſe two choirs are accompanied by two organs on a ground. Then the *gradual*, the *credo*, the *offertorium*, the *ſanctus*, and the *benedictus*, all in plain counterpoint.

The communion ſervice is in figurate harmony, but very dry, ancient, and common.

The plates given of the primitive notation of the chants and hymns, before the invention of lines and ſpaces, or a time-table; and indeed, even before counterpoint was attempted, in dots over the words are innumerable, from the Lexicon Diplomaticum of Walther, and from ancient miſſals. But theſe ever remain more curious than uſeful. For to acquire a clear conception of their import would lead to no uſeful or amuſing knowledge; as the chant or plainſong is generally ſo rude, uncouth, and unamuſing, that it would furniſh a very inadequate reward for the labour of deciphering it.

GERBEVILLER, in *Geography*, a town of France, in the department of the Meurthe, and chief place of a canton, in the diſtrict of Luneville; 5 miles S. of Luneville. The place contains 2,070, and the canton 9,169 inhabitants; on a territory of 232½ kiliometres, in 23 communes.

GERBIER, *Sir* BALTHASAR, in *Biography*, a painter in miniature, born at Antwerp in 1592. He was employed by Charles I. but is far more conſpicuous as having been engaged, in conjunction with Rubens, to negociate a treaty with Spain; and for having been for a time Britiſh reſident at Bruſſels. His being in the ſuite of Buckingham in Spain was the means of this elevation; for which he does not appear to have been duly qualified. He was ſomewhat acquainted with architecture, and was employed by lord Craven to give deſigns for Hempſted-hall, which has ſince been burnt.

Being neglected by the court, he, in 1648, appears as an author, and founder of an academy at Bethnal Green; and, in 1649, publiſhed his firſt lecture on geography. He afterwards went to Cayenne, and ſettled with his family at Surinam; where, by order of the Dutch, he was ſeized and ſent back to Holland, from the jealouſy of that government, which regarded him ſince his naturalization in England as an agent of the king. On the reſtoration of Charles II. he returned to England, and prepared triumphal arches for his honour. Here he practiſed various means of living for ſome years, with no great reſpect or profit, and at laſt died in 1667, having paſſed his latter days in all the expedients of quackery.

GERBILLON, JOHN FRANCIS, a diſtinguiſhed Jeſuit miſſionary, was born at Verdun in 1654. He entered into the ſociety of Jeſuits when he was ſixteen years of age, and having conſtantly the miſſion to China in view, he qualified himſelf for it by the ſtudy of the mathematics, and thoſe ſciences that might be moſt uſeful to him in his great work. He had the good fortune to ſee his wiſhes accompliſhed in 1685, when he was allowed to embark for China, in company with ſix other perſons, members of the ſame ſociety. On his arrival he remained at Pekin, ſtudying the language, and during this period, being admitted frequently into the preſence of the emperor, he ſo ingratiated himſelf with him, as to obtain an appointment to join an embaſſy ſent to regulate the boundaries with the court of Muſcovy. He contributed much to the ſucceſs of this buſineſs, and on his return to China was treated with great honour by the emperor, who choſe him his inſtructor in mathematics and philoſophy. Gerbillon is ſuppoſed to have enjoyed more advantages than almoſt any other perſon, for ſtudying the manners of the Chineſe court, and for making obſervations on the neighbouring country. He obtained permiſſion to preach the Chriſtian religion in China, and had the direction of the French college in Pekin, and was in the end made ſuperior-general of all the miſſionaries ſent from France. He died at Pekin in the year 1707, leaving behind him curious accounts of his eight journeys into Tartary, which have been printed in Du Halde's Deſcription de la Chine. He was the author of the "Elements of Geometry," and of a work on Perſpective, both printed in a very handſome manner at Pekin. Moreri.

GERBOA, in *Zoology*. See Dipus.

GERBSTADT, in *Geography*, a town of Germany, in the county of Mansfeld; 30 miles S.W. of Deſſau. N. lat. 51° 40'. E. long. 11° 47'.

GERDAU, a river of Luneberg, which runs into the Ilmenau, at Oldenſtadt.

GERDAVEN, a town of Pruſſia, in the province of Natangen, ſituated on the Omet, near a conſiderable lake, which is called the "Calendar of Gerdaven," from its prognoſticating the weather; 30 miles S.E. of Konigſberg. N. lat. 54° 16'. E. long. 21° 27'.

GERDEN, a town of Germany, in the biſhopric of Paderborn; 14 miles E. of Paderborn.

GERDES, Daniel, in *Biography*, was born at Bremen in 1698, where his father was engaged in a commercial life. Great care was taken of the education of Daniel, who made a rapid progreſs in the claſſics. At firſt it was intended he ſhould purſue the law as a profeſſion, but the plan was changed, and he devoted himſelf to the ſtudy of theology. In 1722 he was admitted into holy orders, and immediately afterwards made a tour on the continent, and formed an acquaintance with the moſt learned men of that period. In 1726 he was admitted to the degree of doctor, and in 1735 he was choſen profeſſor of theology at Groningen, and upon his entrance on the office he delivered an oration "De unctione quæ Fideles omnia docet." The ſame year he was elected a member of the royal academy of ſciences at Berlin. He died in the year 1765, leaving behind him many works that bear ample teſtimony to his learning and zeal in the cauſe of literature. His writings are moſtly theological, and tend to the elucidation of the difficult parts of the Old and New Teſtament. Gen. Biog.

GERDIN, in *Geography*, a town of Ruſſia, in the government of Perm, ſituated on the Colva; 152 miles N. of Perm. N. lat. 59 40'. E. long. 56° 14'.

GERDOBA, a mountain of Africa; 80 miles E. of Angela.

GEREEK, a town of Hindooſtan, in Bahar; 12 miles S. of Bahar.

GEREM, a town of Grand Bucharia; 15 miles S.S.W. of Badakſhan.

GEREMSCHANGKAIA, a town of Ruſſia, in the government of Upha; 36 miles W.N.W. of Bugulma.

GEREN, a town of Pruſſia, in Pomerelia, on the Viſtula; 9 miles W.S.W. of Marienburg.

GERENIA, or Gerunium, in *Ancient Geography*, a town of Italy.—Alſo, a town of the Peloponneſus, in Laconia. Ptolemy.—Alſo, a town of Meſſenia, on an eminence, S.W. of Alagonia. Pauſanias ſays that this town was the ſame with the "Enope" of Homer. It was conſecrated to Machaon, an ingenious phyſician, ſlain by Eryphilus, whoſe bones were collected by Neſtor, and depoſited at Rhodon, near this town. It had a temple dedicated to Machaon. Eaſt of it was a mountain called "Calathéon," on which was a temple conſecrated to Calathea, with a grotto, having a ſtrait entrance, and containing in its interior many curioſities.

GERENNA, or Jerenna, in *Geography*, a town of Spain, in the province of Seville, ſurrounded by large ſtones, ſuppoſed to have been the effect of an earthquake; 12 miles N.N.W. of Seville.

GERENSCHANSKOI, a fortreſs of Ruſſian Siberia, in the government of Kolivan; 240 miles S.S.W. of Kolivan. N. lat. 50° 45'. E. long. 79° 14'.

GERESHEIM, a town of the duchy of Berg; 5 miles E. of Duſſeldorf.

GE RE SOL, in *Muſic*, one of the clefs.

GERESPA, in *Ancient Geography*, a town of Aſia, in the interior of Media, ſometimes called *Gerepa*, and *Geresa*.

GERESTADT, in *Geography*, a town of Norway, in the biſhopric of Aggerhuus; 32 miles S.W. of Tonſberg.

GERESTO, a town of the iſland of Negropont; 15 miles S. of Cariſto.

GEREUTH, a town of the principality of Wurzburg; 5 miles N. of Ebern.

GERFALCON, Gyrfalcon, or *Jerfalcon*, (ſee **Falco**). This is naturally a very bold, wild and fierce bird, and is therefore very difficult to be reclaimed; but when that is done it proves one of the very beſt kinds, and will fly at almoſt any thing. The beak of the gerfalcon is always blue, and the claws are remarkably long and ſtrong.

In going up to the gate, as the ſportſmen expreſs it, theſe birds do not hold the ſame ſort of courſe that others do, but immediately climb up upon the train on ſight of the bird, and as ſoon as they have reached her, they immediately make the attack, and generally pull her down at the firſt encounter; but if not, always at the ſecond or third.

This ſort of hawk is to be fed and rewarded like the others. It is of a very ſly and crafty nature, and is ſo ſlothful, that it loves to keep the caſting a long time; therefore, inſtead of cotton, it is proper to give them ſometimes a caſting of tow, and to keep them ſharp ſet. As to the reclaiming this ſort of hawk, it is only to be done by gentleneſs and kindneſs; and when ſhe has been taught to be turned looſe, ſhe is not to be taught to come to the pelts of hens or other fowl. But ſhe muſt never be ſuffered to taſte any living fleſh, for that will be apt to draw away her love from the hand and voice. Whenever ſhe eats, the falconer muſt be cloſe to her, and muſt make her eat the choiceſt pieces out of his hand. There is great care to be taken in the making of theſe birds, for as they are made at firſt, ſo they are for ever; and it is a neceſſary caution, with birds of this bold and fierce nature, not to hurry over the buſineſs, but to repeat the ſame thing very often till it is perfectly fixed. See Falconry.

GERGAR, in *Geography*, a town of Spain, in the province of Grenada; 10 miles S.W. of Purchena.

GERGEFALVA, a town of Tranſilvania; 16 miles W.N.W. of Hermenſtadt.

GERGESA. See Gerasa.

GERGESENES, or Girgashites, in *Ancient Geography*, an ancient people, who inhabited the land of Canaan, before the Iſraelites took poſſeſſion of it. Their territory lay next above that of the Amorites, on the eaſt ſide of the ſea of Tiberias; and it was afterwards poſſeſſed by the half-tribe of Manaſſeh. See Geresa.

GERGETHA, or Gergitha, a town ſituated in the Troade, E. of Rhætium, Ophrynium, and Dardanus, in the vicinity of the ſcite of Troy or Ilium, near mount Ida. This town appears to have been inland at ſome diſtance from the ſea.

GERGINA, a town of Aſia, in Phrygia, at the foot of mount Ida, ſeeming to be the ſame with Gergetha.

GERGIS, the name given by Steph. Byz. to the *Gergetha* of Strabo.

Gergis, in *Geography*, a town of Africa; 80 miles W. of Tripoli.

GERGOVIA, in *Ancient Geography*, a ſtrongly fortified place of Gaul, belonging to the Arverni. According to Cæſar (l. vii. 36.) it was ſituated on a very high mountain, and every acceſs to it was extremely difficult. At length it was obliged to ſubmit to the victorious arms of Rome, and it was probably ſo completely deſtroyed, that no trace remains from which we may aſcertain its ſituation. It has been conjectured, however, that its ſituation was in the vicinity of Clermont.

GERHARDSBRON, in *Geography*, a town of Germany, in the principality of Anſpach; 28 miles W. of Anſpach. N. lat. 49°. 17'. E. long. 10°.—Alſo, a town of Wurtemberg; 28 miles E. of Hailbron.

GERINES, a ſea-port of the iſland of Cyprus, anciently called "Cerynia." The walls, which are about half a mile in circumference, appear to be erected on the foundation of the ancient walls. This place has one entire church, and two or three in ruins. Its chief trade is with Caramania, whither it exports rice and coffee brought from Egypt, and whence it brings back ſtorax, and a great number of paſſengers. Gerines is the reſidence of an Aga and Cadi: 16 miles N.N.W. of Nicoſia.

GERINGSWALDA, a town of Saxony, in the circle of Leipſic; 20 miles S.S.E. of Leipſic. N. lat. 51° 5'. E. long. 12° 46'.

GERIS, a town of Egypt, on the left bank of the Nile; 8 miles N. of Aſhmunein.

GERISA, in *Ancient Geography*, a town of Africa Propria, ſituated between the two Syrtes. Ptolemy.

GERISAU. See Gersau.

GERKOW, Jorkow, or *Borek*, a town of Bohemia, in the circle of Saatz; 22 miles N. E. of Saatz.

GERLACH, Stephen, in *Biography*, was born at a village in Swabia in the year 1546. He laid the foundation of a learned education at Stutgard, and became diſtinguiſhed for his diligence at the univerſity of Tubingen, where, in 1566, he took his degree of B. A. with great applauſe. Shortly after this he withdrew from the univerſity on account of the plague. He was admitted to the degree of doctor in philoſophy in 1567 at Eſlingen, and in 1573 he accompanied an embaſſy from the emperor Maximilian II. to the Turkiſh court. He continued at Conſtantinople about five years, acquainting himſelf with the manners and religion of the Turks and Greeks, and cultivating an acquaintance with the moſt eminent men in the latter communion. Upon his return to Tubingen he obtained other preferment, and engaged in the duties of his profeſſion with ſo much zeal and aſſiduity, as to injure his health. He died in 1612 in the 66th year of his age. He was author of "An Epitome of Eccleſiaſtical Hiſtory;" of "A Journal of the embaſſy ſent to the Porte by the emperors Maximilian II. and Rodolf II." abounding in curious and intereſting particulars, hiſtorical, eccleſiaſtical, and theological: and numerous theological "Diſſertations," &c. Moreri.

GERLATZKOI, in *Geography*, a fortreſs of Ruſſia, on the E. ſide of the Irtiſch, in the government of Kolyvan; 212 miles W. of Kolyvan. N. lat. 54°. 20'. E. long. 75° 24'.

GERM, in *Vegetable Philoſophy*. See Embryo.

Germ, in *Navigation and Commerce*, the name given in Egypt to ſmall veſſels which ſerve to carry European merchandiſe from Alexandria to Roſetta, and to bring back to Alexandria the commodities of Egypt and Arabia. Theſe veſſels are a kind of ſtrong barks, tolerably conſtructed; without decks, drawing little water; and, according to their ſize, having two or three maſts with very large latine ſails, the yards of which are fixed to the heads of the maſts, and cannot be lowered, ſo that, however bad the weather may be, the ſailors are obliged to climb up the whole length of them, in order to furl the ſails. They are, in general, of about five or ſix tons burden. Goods are often damaged in theſe uncovered veſſels, and the navigation of them is dangerous in a rough ſea. Although the diſtance which they have to ſail is ſcarcely more than 12 leagues, and though the bay of Aboukir, which is in the middle of their paſſage, affords them ſafe ſhelter, this coaſting trade is not free from danger, eſpecially at the mouth of the weſtern branch of the Nile, formerly called the "Bolbitic," now "the branch of Roſetta;" where is a bar formed by the ſand, upon which the waves, driven by the wind from the offing, and oppoſed by the ſtream of the river, break with great fury. A ſmall iſland, dividing the entrance of this branch, leaves on each hand a narrow paſſage, called in the language of the country "Boghaſs," a canal or ſtrait. But there is only a narrow channel of this paſſage which is ſecurely navigable; for it is continually ſhifting, on account of the inſtability of the bottom and the agitation of the ſea. A pilot, "Reis," or maſter of the "Boghaſs," is continually employed in ſounding this changeable paſſage, and indicating it to the "germs." In ſpite of all theſe precautions, they often get on ſhore; and, being ſoon overwhelmed with water and ſand, periſh with their crews and cargoes.

GERMA, or Germe, in *Ancient Geography*, a town of Aſia, upon the Helleſpont; which, according to Ptolemy, was a colony founded by the Gauls, named Toliſtoboians, in Galatia.

GERMAIN, Count St., in *Biography*, a conſpicuous perſon of a myſterious character, who reſided in England a conſiderable time, and of whom nothing was certainly known, but that he was a fine performer on the violin, and an elegant, though not a learned or original, compoſer. Being here at the ſame time as prince Lobkowitz, they were inſeparable. He printed a book of violin ſolos to preſent to his friends and admirers, which he called "La Muſique raiſonnée," in which there were elegant paſſages, ſingular movements, and amuſing *concetti*. In his ſongs, the melody was Italian, and in good taſte; but the accompaniments were thin, and without carrying on any ingenious deſign. It was reported, that when examined before the privy council, during the rebellion, he was obliged to diſcloſe, "ſub ſigillo confeſſionis," that he was originally a muſician by profeſſion; but that by play, and his *bonnes fortunes*, he had realized an independent fortune; but this, like newſpaper reports, *merits confirmation*.

Germain, *St.* in *Geography*. See *St.* Germans.

Germain, *St.* a town of France, in the department of the Creuſe, 15 miles N. W. of Gueret.—Alſo, a town of France, in the department of the Aube; three miles S. W. of Troyes.

—Alſo, a town of France, in the department of the Orne; ſix miles S. of Belleſme.—Alſo, a river of America, which runs into the Wabaſh, N. lat. 39° 20'. W. long. 87° 58'.

Germain *d'Arce, St.* a town of France, in the department of the Sarthe; ſix miles S. E. of Le Lude.

Germain *de Belair, St.* a town of France, in the department of the Lot, and chief place of a canton, in the diſtrict of Gourdon; ſix miles S. of Gourdon. The place contains 1711, and the canton 7478 inhabitants, on a territory of 155 kiliometres, in 12 communes.

Germain-*les-Belles-Filles, St.* a town of France, in the department of the Upper Vienne, and chief place of a canton, in the diſtrict of St. Yriuix; 16 miles S. S. E. of Limoges. The place contains 2015, and the canton 12,541 inhabitants, on a territory of 312½ kiliometres, in 8 communes.

Germain-*du-Bois, St.* a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diſtrict of Louhans. The place contains 1684, and the canton 11,316 inhabitants, on a territory of 227½ kiliometres, in 13 communes.

Germain-*de-Calberte, St* a town of France, in the department of the Lozére, and chief place of a canton, in the diſtrict of Florac; 12 miles S.E. of Florac. The place contains 1720, and the canton 12,273, inhabitants, on a territory of 332½ kiliometres, in 14 communes.

Germain *des Foſſes, St.* a town of France, in the department of the Allier; 12 miles N. E. of Gannat.

Germain-*l'Herm, St.* a town of France, in the department of the Puy-de-Dôme, and chief place of a canton, in the diſtrict of Ambert; 10 miles S.W. of Ambert. The place contains 1725, and the canton 10,510 inhabitants, on a territory of 232½ kiliometres, in 10 communes.

Germain-*Lambron, St.* a town of France, in the department of the Puy-de-Dôme, and chief place of a canton, in the diſtrict of Iſſoire; ſix miles S. of Iſſoire. The place contains 1706, and the canton 8348 inhabitants, on a territory of 130 kiliometres, in 16 communes.

Germain-*Laval, St.* a town of France, in the department of the Loire, and chief place of a canton, in the diſtrict of Roanne; 12 miles S. of Roanne. The place contains 1125, and the canton 8443 inhabitants, on a territory of 220 kiliometres, in 16 communes.

Germain-*en-Laye, St.* a town of France, in the department of the Seine and Oiſe, and chief place of a canton, in the diſtrict of Verſailles, ſeated on the Seine. A palace was built here by Robert, king of France, which was deſtroyed by the Engliſh in the year 1346; and another palace was erected by Francis I., which has been enlarged by ſeveral ſucceeding kings, and particularly by Louis XIV.; 2½ poſts W. of Paris. The place contains 9000, and the canton 14,355 inhabitants, on a territory of 107½ kiliometres, in 11 communes. N. lat. 48° 54'. E. long. 2° 10'.

Germain-*du-Plain, St.* a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diſtrict of Chalons-ſur-Saone; ſix miles S. E. of it. The place contains 1229, and the canton 6676 inhabitants, on a territory of 130 kiliometres, in 7 communes.

Germain-*de-Pringay, St.* a town of France, in the department of the Vendée, 18 miles S.S.W. of Mortagne.

Germain-*de-Tail, St.* a town of France, in the department of the Lozère; 13 miles W. of Mende.

Germain-*en-Very, St.* a town of France, in the department of the Niévre; 15 miles S. S. E. of Nevers.

Germain-*ſur-Vienne, St.* a town of France, in the department of the Charente; four miles N. of Confolens.

GERMAINMONT, St., a town of France, in the department of the Ardennes; five miles S. W. of Rethel.

GERMAN, in *Matters of Genealogy*, ſignifies whole, entire, or own.

"Germani, quaſi eadem ſtirpe geniti." Feſt. Hence,

German, *Brother*, denotes a brother both by the father's and mother's ſide, in contradiſtinction to uterine brothers, &c. who are only ſo by the mother's ſide.

German, *Couſins*, are thoſe in the firſt or neareſt degree, being the children of brothers or ſiſters.

Among the Romans we have no inſtance of marriage between couſins german before the time of the emperor Claudius, when they were very frequent.

Theodoſius prohibited them under very ſevere penalties, even fine and proſcription. See Consanguinity.

German *acacia, bezoar, bible, black, coins, compaſſes, emperor, empire, flute, language, meaſures, monies.* See the ſeveral ſubſtantives.

German *School of Engraving.* Germany was probably the birth-place, and Italy the cradle, of that art of engraving which is performed with a view to its being afterward printed on paper. Engraving itſelf, as performed on metals, and with the inſtrument which is ſtill in uſe for that purpoſe, which in the Engliſh language is termed a graver, and in French la burin, is of very remote antiquity; the Greeks of the early ages having employed it in the decorations of their ſhields, pateras, and other implements of war and ſacrifice; and the Hebrews, and perhaps the Chaldeans and Egyptians, at a ſtill earlier period; but unleſs we ſuppoſe (which is by no means improbable) that the art of engraving and printing from tablets of wood travelled from China to Europe, it was reſerved for the artiſts of Germany or Italy, and moſt probably the former, firſt to perceive that ink might be delivered, and impreſſions thus multiplied to an undefineable amount, both from the inciſions and ſurfaces, of engraved plates of metal, and blocks of wood.

The preciſe time of the diſcovery has not been aſcertained. The baron Heinnekin, who had excellent opportunities of acquiring information, and purſued his enquiries with zeal and accuracy, has clearly ſhewn that the fabrication of cards for games of chance was firſt practiſed in Germany, by means of the art of engraving, and was in uſe ſo early as the year 1376. Not long afterward, the ſame art that had been ſubſervient to amuſement, was employed to gratify and diſſeminate ſuperſtition, and extremely rude outlines of ſaints and legendary tales, which were cut on tablets of wood, and were printed in the cities of Mentz, Straſbourg, and Haerlem, toward the cloſe of the fourteenth, and beginning of the fifteenth, centuries, are not uncommon in the port-folios and bibliographical collections of the curious.

Of theſe engravings, the earlieſt that is known, whoſe inſcription contains a *date*, and which may therefore be eſteemed a great curioſity, is now in the library of earl Spencer. It was diſcovered by Heinnekin in the library of a convent at Buxheim, near Memmingen: its ſubject is the legendary tale of St. Chriſtopher carrying the infant Jeſus acroſs the ſea; it bears the date of 1423, and is inſcribed "Chriſtoferi faciam, die quacunque tueris. Illa nempe die morte mala non morieris." This rude but curious engraving is of the folio ſize, and was found carefully paſted withinſide the cover of an old book, with a view, no doubt, to its preſervation.

The ſame magnificent collection of earl Spencer contains alſo one of the original engraved blocks which were uſed in the very infancy of printing, before moveable types were invented. It appears to be of the wood of the pear tree, and in the courſe of the three centuries and a half ſince it was engraven, is here and there perforated by worms. It may be neceſſary to obſerve, that the earlieſt printed books were impreſſed from engraved blocks or tablets of this kind. To the rude repreſentations of ſaints and miracles, their names and legends, cut in the Gothic character, or German text, on a ſcroll or label, were added, for the better information of the unlearned ſpectator, and in aid of the labours of the artiſt, if ſuch he might be termed; and from theſe explanatory ſcrolls, the idea was firſt caught of printing books, to which the works of imitative art became in their turn merely illuſtrative. Some of theſe prints are ſimply outlines, and in others, which were produced ſomewhat later, ſhadowing, with a ſingle courſe of lines, is feebly attempted. The tablet in the collection of earl Spencer, is of the former kind, and originally conſtituted the ſecond leaf of the ſecond edition (of which there is a complete copy in his majeſty's library) of the hiſtory and viſions of St. John the Divine. It is, probably, therefore, one of the earlieſt engravings on wood that was ever performed, excepting the prototypes for the playing cards, which have been before-mentioned, and perhaps the oldeſt of which the original tablet itſelf is ſtill extant. Hence it appears that the art of engraving is the parent of that of printing, and that at leaſt that branch of printing which delivers the ink from the ſurface of the engraving, and which is now termed letter-preſs printing, originated in Germany.

The preſent writer conceives that a great deal too much of ſpurious importance has been attached to the invention, as it has been termed, of printing; that the traffickers in its productions, by diverting the attention of thoſe who might elſe have become men of taſte, from its true mark, have ſtifled or intercepted much of the pleaſure which the engravers' art is capable of imparting; and that the philoſophy of engraving lies buried alive under a heap of rarity and early rubbiſh which has been piled, and is ſtill piling, on it without mercy, from the ſhovels of dealers, collectors, and thoſe who have, unfortunately for ſociety, nothing better to do than to labour under them.

A knowledge of the era, and of the author of a *great* work, or an uſeful invention, is certainly deſirable. Beſide that it is neceſſary to the truth of hiſtory, it ſeems to aſſiſt us in indulging the amiable ſentiment of gratitude. It would call forth our ſincere regret, if the name of the author of Paradiſe Loſt, or the Cartoons, or Principia, had ſunk in oblivion. But at the time which we are conſidering, paper and ink were in conſtant and daily uſe; and impreſſions from dies and from ſeals had for ages been taken, and were under hourly obſervation; it therefore required no protracted train of thought; no long connected chain of cauſes and effects; no mighty genius, like that of Homer, Michael Angelo, or Newton, to perceive that impreſſions might alſo be taken either from the ſurfaces or inciſions of engraved blocks or plates. The art of printing, as I conceive, originated in a concurrence of circumſtances entirely independent of the minds or ſtudies of its reputed inventors. We have ſeen that at firſt, when it was coarſely performed, and (like the tops of ballads, and the dying ſpeeches of criminals at preſent) groſsly addreſſed itſelf to the lower claſſes of the community, it was regarded as of very little conſequence; and though Koſter, Guttemburg, and Fauſt, cannot be ranked in the claſs of inventors, the inferior merit of perceiving that the arts of engraving and printing might be applied to purpoſes of greater magnitude and importance than had hitherto been obſerved, may be juſtly claimed for them. It is the important conſequences gradually reſulting from the diſcovery, that have made us attach a degree of credit to the name, and entertain an unmerited reſpect for the ſuppoſed reſearches, of the diſcoverer, to which, in point of real ingenuity, the maker of the firſt pair of ſpectacles or ſtockings, or the firſt ſheet of paper, would be far more juſtly entitled.

In tracing effects to their true cauſes, it ought not to be forgotten that the great benefits we have derived, and continue to derive, from engraving and printing, ought, in fairneſs, to be partly aſcribed to the diſcovery of the means of converting rags into paper: this probably helped to ſuggeſt the idea of printing, and perhaps two centuries and a half had ſcarcely more than brought this invention to the degree of perfection neceſſary for the reception of impreſſions from printing types and engravings. Had the modern art of making paper been known to the ancients, we had probably never heard the names of Fauſt and Finiguerra, for with the ſame kind of ſtamps which the Roman tradeſmen uſed for their pottery and packages, books might alſo have been printed; and the ſame engraving which adorned the ſhields and pateras of the remote ages, with the addition of paper, might have ſpread the rays of Greek and Etrurian intelligence over the world of antiquity. The proceſs of printing is indeed ſo ſimple in itſelf, and was ſo nearly obvious in the ſtate of things we have juſt attended to, that a child at play, who wanted to multiply a given form, might almoſt be aſhamed not to have perceived it: and we ought rather to wonder it was not diſcovered ſooner, than that it was diſcovered ſo ſoon.

The art of engraving and printing from tablets of wood, then, may be ſaid to have been rather diſcovered than invented in Germany, and rather ſeen than diſcovered. That it was little thought of at the time, may be inferred from the number of wood cuts, the production of this period, which appear without either dates or the names of their authors, who were at once the deſigners, engravers, and printers of their own works, but who deemed thoſe works of too little importance to claim for themſelves diſtinction on account of having performed them.

For the accommodation of thoſe perſons who could not afford to purchaſe manuſcript copies of the Old and New Teſtaments, beſide the apocalyptical viſions of St. John the Divine, which has been already mentioned, a ſmall folio volume, entitled "Hiſtoriæ Veteris et Novi Teſtamenti," (commonly known by the name of "The Poor Man's Bible,") was publiſhed about this time, or ſoon after. In the ſame manner as the former, each leaf, printed from a ſingle engraved block of wood, conſiſted of a mixture of reading with pictorial repreſentation, ſuch as it was; to which colour was in ſome inſtances afterwards added with the hair pencil, or ſome ſuch implement. The printing was performed only on one ſide the paper, and two of theſe leaves being paſted together have the appearance of a ſingle leaf printed on both ſides. Copies of theſe early wood cuts, ſufficiently faithful, may be ſeen in Strutt's Biographical Dictionary of Engravers. As the title of this anonymous and undated book (the *Poor* Man's Bible) imports, its publication was regarded merely as a cheap contrivance for diſſeminating the knowledge of holy ſcripture. Other books of engravings, printed in the ſame manner, were ſoon afterward produced, among which are "Hiſtoria beatæ Mariæ Virginis," "Ars Memorandi," "Ars Moriendi," and "Speculum Humanæ Salvationis;" but we paſs over, as of minor importance, all particular mention of theſe and various other engravings on wood by unknown workmen, which were apparently executed in Germany, about the time now under our obſervation. The next work which bears a date after the print of St. Chriſtopher and the infant Jeſus, and the firſt engraved book which bears date at all, is called "the Chiromancy of Doctor Hartlieb." It conſiſts of twenty-four ſmall folio leaves, printed on *both* ſides. "At the beginning of this curious book," ſays Strutt, "is a large vignette, repreſenting Dr. Hartleib kneeling and preſenting it to the princeſs Anne, who is ſeated upon her throne; and the names of theſe two perſonages are engraven at the bottom of their portraits. The prints in this book are exceedingly rude; but have not, as far as one can judge from the copy of one of them, given in the "Ideé generale d'une Collection complete d'eſtampes," the appearance of being ſo ancient as thoſe in the Apocalypſe, or Poor Man's Bible. This curious compilation is dated 1448, and the name of Jorg Schapff, the artiſt, who is ſuppoſed to have performed the engravings, appears upon the fourth page."

Of Hans Sporer and Johan von Paderborn, who are mentioned among the earlieſt German engravers on wood, we know nothing more than their names. They may perhaps be the authors of ſome of the works we have enumerated.

Johan Schnitzer executed the geographical charts for the edition of Ptolemy, printed at Ulm in 1486. His map of the world is ornamented with *ten* rude heads, which are intended to repreſent the winds, and is inſcribed, "Inſculptum eſt per Johannem Schnitzer de Arnſheim."

Sandrart indeed mentions and copies a print, which he believes to bear the date of 1455, and which is marked with a cypher, ſuch as the reader will find in our firſt plate of the monograms, &c. of the German ſchool of engravers. As this cypher is compoſed of the initials of Hans Sporer, it may poſſibly be from his graver; yet neither Sandrart, nor the author of "The little chronological Series of Engravers," which was printed at Cambridge, aſcribe it to him; the latter aſſerts in his preface, that the two fives in the date, or what Sandrart ſuppoſes to be ſuch, are intended for ſevens; which makes a difference of twenty-two years in the age of the print, and brings it down to the time when the elder Schauflein is believed to have flouriſhed.

The ſubject of the above print is a young woman careſſing an elderly man while ſhe ſteals his purſe; a ſubject which has been often repeated by other maſters, both on copper and on wood.

In what part of Germany, Hans or John Schauflein was born does not appear. Strutt ſays, "his prints are executed in a bold ſpirited ſtyle, and the compoſitions ſhew him to have been a man of genius, though the ſtiff manner which characterized the early German maſters obſcures much of their merit. Beſides which they are incorrectly drawn; the extremities of the figures, in particular, are very defective. Schauflein uſually marked his prints with an H and an S; or an I and an S joined together in various ways." To theſe he ſometimes added a baker's peel, which formed a pun upon his name, a peel, in the German language, being called *Schauſel*, and the word *Schaeuflein* ſignifying a little peel. At other times we find prints of this early period, marked with two little peels croſſing each other, which perhaps may mean the two Schaufleins, if they ever worked in conjunction.

The works of the elder Schauflein are chiefly very ſmall, and he is therefore claſſed among "the little maſters." The moſt remarkable of them are, "A Crucifixion, with St John, the Virgin, and two Soldiers;" "The Virgin and Child;" "St Chriſtopher," and "St. Laurence in Converſation with St. Auguſtin:" theſe are all of the circular form, and each about two inches and a quarter in diameter.

The principal wood cuts by the younger Schauflein are as follow, "Adam and Eve," a ſmall upright; "Lot and his Daughters," a middling-ſized print, length-ways; "Chriſt preaching to the Multitude from the Ship;" a middling-ſized print, length-ways, marked with an I and an S joined together, without the peel; "The Life of Chriſt;" a ſet of middling-ſized upright prints, in quarto; another ſet of "The Life of Chriſt;" in an octavo volume, conſiſting of 37 prints, entitled "Vite et paſſo Jeſu Chriſti," &c. publiſhed at Francfort by Chriſtian Egolophus, A. D. 1537. To theſe are added, "Hiſtoriæ-Evangelio;" containing the miracles, parables, &c. of Chriſt, in thirty-ſix prints, the ſame ſize as the above, and printed on both ſides. Theſe are marked with the I and S joined together upon the peel.

This artiſt is preſumed by Strutt to have alſo engraved on copper: but perhaps "the very free etching of a landſcape," if not the plate executed with the graver, of "Soldiers converſing," of which this author treats, may be the work of a third engraver of the ſame ſirname. The date of the latter is 1551, and Strutt has previouſly recorded of the third Schauflein, that he has ſeen by him a print of two men fighting, cut on wood, in a coarſe but ſpirited manner, and a very fine maſterly etching in the ſtyle of a painter, repreſenting a large company at an entertainment in a garden; which prints prove him to have been a man of great abilities. He was probably of the ſame family with the former two.

In the year 1493, appeared the celebrated Chronicle of Nuremberg, which was compiled by Hermann Schedel, a folio work, ornamented with a conſiderable number of engravings on wood by Wilhelm Pleydenwerff and Michael Wolgemut. Theſe engravings are greatly ſuperior to all that had previouſly appeared in Europe, and conſiſt, for the moſt part, of figures of various kinds, and landſcapes which, though profeſſedly views of certain cities, towns, &c. bear ſo little reſemblance to thoſe places reſpectively, that they are probably altogether the work of fancy. They are, however, cut in a bold and ſpirited ſtyle, and the characters of the heads are in ſome inſtances far from being badly delineated, though that meagre ſtiffneſs is every where prevalent, which ſo ſtrongly marks the early art of Germany.

Pleydenwerff was a native of Germany, and perhaps of Nuremberg, but it does not appear that he ever engraved on copper, or uſed any monogram or other mark by which to diſtinguiſh his engravings from thoſe of his aſſociate.

Michael Wolgemut, or Wolgemuth, was born at Nuremberg in the year 1434. He is ſaid to have been inſtructed in engraving by a certain Jacob Walch, but both Strutt and Huber doubt this fact, grounding their doubt on the want of reſemblance between the ſtyles of deſign and engraving of theſe two maſters. Walch does not appear to have engraved at all upon wood, whereas Wolgemut did little elſe. The engravings on copper attributed to Wolgemut do not bear even a diſtant reſemblance to thoſe of Walch. The latter was a tame artiſt, or rather workman, and his work characterized by labour and care, which is generally ill beſtowed; whereas Wolgemut may even be termed an artiſt of genius, a word, by the bye, which ſeems to batter down the argument of Strutt and Huber, ſince if a man of genius ſtudy under a mere manual workman, as by chance he may, he will certainly emerge from the ſtyle, or want of ſtyle of his maſter.

Wolgemut did occaſionally engrave on copper, but his works on wood are far more numerous, and more generally known. In Strutt's account of this artiſt, he ſays, "we have ſome few excellent engravings on copper, executed about this time: theſe have much of that ſpirited ſtyle in them which appears in the wooden cuts of Wolgemut; they are marked with a W ſurmounted by a ſmall o, and theſe prints, I verily believe, are the production of his graver."

He proceeds to deſcribe one of the rareſt and beſt of theſe prints which he found in the collection of the late Dr. Monro. It is ten inches and a half high, by ſeven and a half in width, and repreſents an old man ſeated in a praying poſture. He has a ſtandard reſting upon his left ſhoulder, and a book before him. Behind him is an armorial ſhield, with three different bearings; and, at the bottom, a cave with a gate before it. Above the figure is a ſcroll, upon which is written, "ſce Wilhelme Dvx Aqvitaine et Comes Pictavienſis." The head of this figure is well drawn; the hands are marked in a ſpirited manner, the folds of the drapery are broad, and boldly expreſſed, and the whole is compoſed in a ſtyle which does much honour to the artiſt. With reſpect to the mechanical part, it is executed with the graver only, in a dark, clear ſtyle, yet without formality, ſo as to have the effect of a neat etching.

It is no ſmall addition to the honour of Wolgemut, that he was the tutor of Albert Durer, a name ſo greatly celebrated in the annals of engraving.

Arrived at the period when engraving both on wood and on copper began to ſhine forth with ſuperior luſtre in Germany, it is neceſſary to look back a few years in order to note the introduction of the latter branch of the art, into that part of Europe.

The reader will find under the article ITALIAN *ſchool of Engraving*, the popular and perhaps the true account of the diſcovery of the mode of printing from the inciſions of the graver, which, ſoon after the middle of the fifteenth century, was introduced into Germany. As the firſt engravers on wood were the manufacturers of playing-cards, (called *Formſchneiders* and *Briefmalers* in Germany and in France,) ſo the earlieſt modern engravers on metal, both in Germany and Italy, were goldſmiths, and the firſt artiſt who eminently diſtinguiſhed himſelf in the former country was Martin Schöen.

Yet having already mentioned Jacob Walch of doubtful chronology, it may not be improper in this place to add, that this engraver was particularly fond of introducing Gothic architecture into his prints, in the delineation of which he took no ſmall pains; but, from a want of knowledge in perſpective, his deſigns of this kind are ſadly confuſed. He drew very incorrectly, and his compoſitions are in the extreme of that ſtiff and meagre taſte which characterizes the early productions of the German ſchool. His mark, conſiſting of the initial letter of his ſirname and a kind of lozenge croſs, may be ſeen in our firſt plate of monograms, &c. of the German ſchool of engravers; but it is to be obſerved, that there are ſome few prints marked with the croſs only, which have the appearance of being more ancient than thoſe which are marked with the W and croſs.

Of the former kind are, "a hairy, wild, Man fighting with a Bear," and "a Woman ſeated, careſſing a Unicorn," both ſmall, and of the upright form.

Of the latter kind (marked with the W and croſs,) a Gothic ornament for a crozier, a large upright; "The inſide of a Gothic Edifice," a middling-ſized circular plate, "A Ship ſtriking againſt a Rock," with the inſcription, "Haerdze" in German text, a ſmall plate; a ſet of military ſubjects, ſmall, and another of ſaints ſtanding in Gothic niches, ſmall uprights; "Three Skulls in an Arch, ornamented with Gothic work;" and "The Genealogy of Jeſus Chriſt," wherein ſaint Elizabeth appears on a throne, reading, with the Virgin Mary and infant Chriſt below. On the right hand is David with his harp, and on the left Aaron. Behind the throne ariſes a genealogical ſtem of the lineage of Chriſt from David to Joſeph, repreſented (as uſual) by half figures. This laſt is a large upright print.

Martin Schöen, or Schön, or Schöengauer, called by the foreign writers on art, Le Beau Martin, or Hübſe Martin, and miſtakenly called by Vaſari Martin of Antwerp, was born at Culmbach, a ſmall city in the circle of Franconia, in the year 1420. He was educated a goldſmith, and a certain Luprecht Ruſt, and Francis Van Stoſs, or Stohlzirs, have been mentioned as his tutors. At the age of forty, and probably before, he diſtinguiſhed himſelf by his extraordinary powers in the arts of painting and engraving, particularly the latter, and died at Colmar in 1486. His prints are without dates, but he, rather than any other man, may claim the honour of having been the firſt to practiſe the art of engraving on plates of metal, with a view to their being afterward printed on paper.

Schöen engraved from his own compoſitions; his plates are numerous, and ſhew that his mind was fertile and vigorous. If it was not ſufficiently vigorous to burſt the Gothic fetters which at that time manacled the taſte of Germany, his admirers may ſolace themſelves by doubting whether the unaſſiſted powers of any individual whatever would have been found adequate to ſo difficult an occaſion. The tyranny of eſtabliſhed cuſtom is probably not leſs ſtern and unrelenting in the arts of deſign than in thoſe of education.

How the ſtiff and meagre manner,—the angular draperies and emaciated forms which characterize the early productions of the Germans, came to prevail among the Gothic and Celtic nations, from whom they derived them, is a curious, and perhaps not an unimportant, queſtion. By comparing the early efforts in art of all nations of which we have any memorials, we may be led to infer, that man has gradually learned to ſee objects as they really exiſt in nature; the images pictured on the retina of the eye appear to be refracted in their tranſmiſſion to the intellectual retina, and in every country continue be ſo refracted, until, as the ſun of ſcience ſlowly aſcends, the morning denſity of the mental medium is gradually rarefied; it is not leſs obſervable, nor a leſs curious fact, that a ſimilar haggard lankneſs in the attempts of man in an uncivilized ſtate, to imitate the human form, has almoſt univerſally prevailed, even in ages and climates the moſt diſtant from each other. The early art of Egypt, Perſia, and Hindooſtan, agrees in meagreneſs with the rude efforts of the Mexicans and South-ſea iſlanders, and with the German art, derived from the Gothic and Celtic nations, which is now under our obſervation.

In the time of Martin Schöen, and Albert Durer, German art was much in the ſame ſtate with European ethics: theory was ſeparated from practice; and both art and philoſophy remained perplexed with falſe analogies, metaphyſical jargon, and occult nonſenſe; till Bacon, and the reſurrection of the antique, referred them to the reſults of experience, as a criterion of principle.

Neither lord Orford then, nor any other man, ſhould have diſpraiſed either Schöen or Durer, for not having done, what no artiſt of any other ſchool has of himſelf been able to perform: for, not only neither of theſe founders of the German ſchool, but none of the early Italian maſters, has ſhewn that he poſſeſſed the penetration to ſee beyond this gloomy exhalation from the barbaric ages, till the great examples of claſſic art began to re-appear, and reflect back on Nature the light they had received from her.

The works of Schöen evince a ſtrong mind operating on the co-exiſting ſtate of things, brooding over the abyſs from whence the future elements of his art were to be created; and uſing with conſiderable ſucceſs the materials by which it was ſurrounded; and it may be regarded as fortunate for his claims, that in the inſtance of his St. Anthony he has adopted a ſubject that in its nature ſet him free, or nearly ſo, from the Gothic bondage with which, on other occaſions, his genius was ſhackled: he has been the firſt boldly to venture into the regions of Chimera, and by the potency of his art has compelled thence the dæmons that Callot and Teniers were afterward ſolicitous to invoke and proud to employ; while the expreſſion of undiſturbed faith and pious reſignation in the countenance of the holy man whom they are hurrying into the air, ſhews that he ſaw and copied that portion of Nature which ſhe did vouchſafe to unveil to him, with a clear viſion, and delicate, though determined, hand. If his dæmons are more fantaſtic and leſs terrible than modern art would deem it proper to introduce, we ſhould recollect that the age of Schöen was that of Arioſto, and that two centuries elapſed between the groteſque monſters of Arioſto, and the ſublime dæmonology of Milton.

It is conſonant to the progreſſive improvement of critical obſervation, that more ſhould be known of the human countenance at an early period, (or indeed at any period,) than of the reſt of the figure, becauſe it is the kind of ſtudy and obſervation in which men are moſt intereſted. Accordingly, Schöen's heads are in general by far the beſt parts of his performances. Thoſe of his ſingle figures of St. Martin and St. John have conſiderable merit; the divine character and expreſſion of that of his Chriſt bearing his croſs, as it appears in the good impreſſions, have rarely been ſurpaſſed; and ſeveral other heads in this extenſive compoſition poſſeſs a proportional ſhare of excellence.

In this, as well as in ſeveral other of Schöen's prints, may be traced a latent feeling exiſting in the mind of their author, that the engraver's art might be rendered ſubſervient to the expreſſion of the various textures of ſubſtances. Nay more; this elementary principle ſtrongly diſcovers itſelf in the manner in which he has treated the grain of the wooden croſs; in the various modes he has invented of deſcribing the different materials of dreſs in which the figures are habited, and in the ſterility of the ground; perhaps the latter is as much the reſult of the neceſſary operation of the uneducated graver, as of ſtudy. Yet, is it in ſuch full concord with the barrenneſs of the ſcene, and the barbariſm of the ſubject, as to be not unworthy of favourable notice; while the whole together ſeems to ſhew that a ſentiment has ſubſiſted from the very commencement of engraving, that it was ſuſceptible of this particular merit, and which may therefore be fairly preſumed to be not founded in the fallacious refinements of modern faſhion, (though perhaps ſometimes run after with too much of faſhionable avidity,) but one of the primary elements of the art.

The mark which Martin Schöen affixed to his works may be ſeen in our firſt plate of the monograms, &c. of the German ſchool of engravers. Heinneken has enumerated an hundred and fifty of his engravings, moſt of which are much and deſervedly ſought after by connoiſſeurs. We ſhall begin our ſelect liſt with the mention of thoſe of which the ſubjects are taken from ſacred hiſtory.

A Nativity, where the Virgin Mary is in the act of adoring the infant Saviour, who is lying on a ſtraw pallet; behind the Virgin appears a bull and an aſs; and in the diſtance St. Joſeph. Three angels appear in the air, holding a ſcroll.

Another Nativity, where Joſeph is ſeen in profile, holding a lantern. The bull and aſs are here looking at the infant Chriſt; the ſcene in a vaulted ſtable, where, through an opening, are ſeen three ſhepherds in converſation, and three angels hymning hallelujahs above.

On the ſame plate of copper, which is ſtill kept as a curioſity, and may be ſeen in the chapel of the hoſpital at Colmar, is likewiſe engraven “The Adoration of the eaſtern Kings.” The ſcene here is alſo in a ſtable, where the kings are kneeling and offering preſents to the infant Saviour, who is held by the Virgin Mary. This plate is very ſkilfully executed, and is of a ſmall folio ſize.

“The Flight into Egypt,” in which angels are repreſented aſſiſting St. Joſeph to gather dates, and lizards are introduced with both local and allegorical propriety, one on the ground, and two others climbing up a tree. This alſo is in ſmall folio.

A ſet of ten plates of “The wiſe Virgins,” and “The fooliſh Virgins,” ſmall uprights. The former bear their lighted lamps in their hands, and are crowned with garlands of flowers; the latter are trampling on their garlands, while their lamps alſo are on the ground.

A ſet of twelve ſmall quartos from the life of Chriſt. In the firſt he is repreſented in prayer on the mount of Olives; in the ſecond, arreſted by the government; in the third, before the high prieſt; in the fourth, ſoldiers are ſcourging him; in the fifth, he is crowned with thorns; in the ſixth, Pilate is waſhing his hands; in the ſeventh, he is exhibited to the multitude; in the eighth, bearing the croſs; the ninth is the crucifixion; the tenth the holy ſepulchre; the eleventh the deſcent into hell, and the twelfth the Reſurrection.

A large folio of “Chriſt bearing his Croſs,” one of the moſt celebrated of the engravings of Schöen, and on which we have commented above.

A Crucifixion, alſo in folio, and which has been copied by Iſrael von Mecheln. The Virgin Mary and St. John are in this print repreſented at the foot of the croſs, and angels in great affliction; “The laſt Judgment;” a ſet of twelve middle-ſized uprights, of which the ſubjects are taken from the life of the Virgin; “The Death of the Virgin,” ditto, which has alſo been copied by Von Mecheln and other contemporary artiſts, and is a compoſition of conſiderable merit, and one of the moſt carefully finiſhed engravings of the maſter; “St. Anthony hurried into the Air by Dæmons,” a very capital work, of which we have already ſpoken, an upright folio, but not very large. A ſet of the apoſtles, very ſmall.

Of miſcellaneous ſubjects, Schöen has engraved “The Alchemiſts fighting;” “A Biſhop's Crozier,” in folio, in the ſpiral volute of which is the Virgin Mary with the infant Chriſt, and an angel playing on a lute; an incenſe-cup or cenſer with a chain, ditto. Twelve ſmall plates of goldſmiths' ornaments, conſiſting of armorial bearings with their appropriate ſupporters, &c. cloſing with an eſcutcheon, bearing the cypher of the artiſt himſelf, ſupported by a female; and “The Battle againſt the Saracens,” in which St. James appears on the part of the Chriſtians; a large folio plate, preſumed to have been the laſt of Schöen's engravings, from the circumſtance of certain diſtant figures toward the left hand corner being left in an unfiniſhed ſtate.

Bartholomew Schöen is ſaid, by profeſſor Chriſt, to have been the brother of Martin, but of the dates of his birth and death we find no account. His apparently very ancient engravings are known by his initials, having between them a mark of ſeparation exactly reſembling that which ſeparates the initials of Martin Schöen, which confirms the probability of their having been brothers.

The engravings of Bartholomew bear that ſort of reſemblance to thoſe of Martin, that a bad copy does to a good original, and in neatneſs and feeling are exceedingly defective. They are partly original, but the greater number are copies from the very ſuperior prints of his brother.

His original works conſiſt chiefly of groteſque figures, of which ſome are by no means deſtitute of humour. It may ſuffice to mention the few following, which are all engraved on ſmall plates.

A beggar man, with an old woman in a wheelbarrow ; a man playing on a lute, with an old woman holding a ladle and jar ; two groteſque heads of an old man and woman, marked in a better ſtyle than the former ; and a lover and his miſtreſs, a ſmall circle.

He copied the ſet from the life of Chriſt, the large folio of Chriſt bearing the croſs, and various other of the prints of Martin, but the copies may be known from the originals, by their inferiority as well as by the difference between the two ſignatures.

When a man of original genius, or one who may claim that nobleſt of human diſtinctions, the title of *inventor*, ſhines forth on the world, a ſwarm of buſy flutterers round his glory are kindled into exiſtence, buzz in his rays, and think to ſhare his fame. Such was Bartholomew Schöen, when conſidered with reference to his brother ; ſuch probably were Paul and George Schöen, who have been mentioned as goldſmiths and engravers of this early period, and ſuch were thoſe other contemporary imitators and immediate ſucceſſors of Martin, who now claim ſome ſmall portion of our notice.

Of talents far inferior to thoſe of Martin Schöen, yet engravers to whoſe works the virtuoſi are by no means inattentive, were the Iſrael von Mechelns, father and ſon, whom Strutt has miſtakenly inclined to identify, as having been one and the ſame individual. Both were natives of Mecheln or Mekenin, a village near Bocholt, in the biſhopric of Munſter, in Weſtphalia.

The elder Iſrael von Mecheln (or Mekenin) was born in the year 1424, and, like Schöen, he was by trade a goldſmith.

The year of the nativity of the younger Iſrael has not been mentioned. The lateſt of his engravings is dated in the year 1522, and he died in 1523. It has been conjectured, that he ſtudied under Martin Schöen, from the number he has copied of that maſter's works, but this ſeems very inſufficient evidence of the fact. It rather ſeems to ſhew that the barrenneſs of his invention correſponded with the dryneſs and inſipidity of his ſtyle as an engraver.

The works of the Von Mechelns (*if* the father engraved) are numerous. That he did engrave, is inferred by the baron Heinnekin from the following circumſtance. “ An attentive examination (he ſays) will make it appear that all theſe prints are not by the ſame hand. I am almoſt certain that Iſrael, the father, engraved ſeveral, thoſe eſpecially which have the greateſt marks of antiquity, and are executed in a rude ſtyle, approaching neareſt to the work of the goldſmith. Nor, do I deny, that the ſon may have commenced originally as a goldſmith, by engraving armorial bearings, flowers, foliage, croſſes, and other ornaments : but he was a painter as well as an engraver, and a man of tolerable ability, conſidering the time in which he lived.”

Strutt, on the other hand, can ſee no reaſon for dividing the works which paſs under this name, nor can he find any other difference in the prints than might reaſonably be expected in the works of an individual artiſt, who performed ſo many : his moſt early productions being of courſe the rudeſt, but all equally defective where he has attempted to expreſs the naked parts of the human figure.

The difficulty, and the importance alſo, of the queſtion, ceaſes, when we reflect that it was part of the profeſſional buſineſs of the goldſmiths of that day, in which every apprentice was inſtructed, to ornament their productions with engraving.

Of theſe engravings, ſo little worthy of learned controverſy, the principal are ; the portrait of the ſenior Mekenen, an elderly man with a long beard, his head dreſſed with a turban. The plate is in quarto, and bears the inſcription “ Iſrael von Meckenen, Goldſchmit.” Ditto of Mekenen, junior, and his wife, inſcribed “ Figuracio facierum Iſrahelis et Ide Uxoris, I. V. M.” in 8vo.

“ The Deſcent of the Holy Ghoſt ;” “ St. Luke Painting the Virgin and Child,” and a ſet of prints from “ The Life of Chriſt ;” ſmall upright folios, though varying a little from each other in dimenſions.

Theſe are among the prints which Heinnekin ſuppoſes to be the work of Mekenen the father, and Strutt, the early productions of the ſon. They bear the evident marks of being the attempt of a novice, being wretchedly engraved and quite as ill drawn.

“ Judith and Holofernes,” of the folio ſize. In the back ground is an army, where cannon and other modern implements of war are ignorantly introduced. “ The Banquet of Herodias.” This alſo is a folio plate, twelve inches in length, and marked Iſrahel V. M. At one end is ſeen the decollation of St. John the baptiſt ; and at the other, Herodias and her father appear ſeated at table. “ Herod's Cruelty,” is a middle-ſized upright.

Of holy families, the Iſraels engraved ſeveral, the chief of which may be known from each other by the following peculiarities. In one, the Virgin Mary, habited in a long robe, is ſitting with the infant Chriſt, while beyond an encloſure appears St. Joſeph repoſing. Toward the bottom, at the right hand corner, is a ſmall graſshopper, from which it has obtained the name of the Virgin of the Graſshopper. It is in quarto, and inſcribed Iſrael V. M. (This plate has been copied, with improvements, both by Albert Durer and Mark Antonio.) In another, the Virgin Mary, ſeated in a landſcape, is about to kiſs the infant Saviour ; the Deity appears in the clouds above ; and St. Joſeph ſleeping. (This is a middling-ſized upright, and is partly finiſhed by means of ſcratches, which are apparently made with the point of the graver, ſomewhat in the manner of Rembrandt.) In another, which is dated 1480, the Virgin and Child are ſurrounded by four angels. This is alſo a middling-ſized upright.

Of other ſacred ſubjects, we ſhall mention “ The Annunciation,” in 8vo., where an angel appears holding a ſcroll, on which is the motto “ Ave. Gra,” and the Virgin is kneeling before a praying deſk, on which is inſcribed I. V. M. “ The Death of the Virgin Mary,” copied from Schoen. “ The Virgin crowned by Angels, and ſtanding on a Creſcent, while the fall of Satan is repreſented below,” an upright folio. “ The Scourging of Chriſt,” ditto. “ The Bearing of the Croſs,” a large folio, copied from Schöen, and two large folios of the “ Crucifixion of our Saviour,” which are diſtinguiſhable from each other by the following peculiarities : in the one, angels are receiving the blood from the wounds of the dying Saviour, while the Madonna and St. John appear below : in the other, which is eſteemed the ſuperior work, St. John holds a book in one hand, while the other is lifted, and the hands of the Madonna are claſped ; and the ground in the latter is almoſt left white, whereas in the former it is nearly covered with engraving.

From the legends of the Roman Catholic rubrics, the younger Iſrael has engraven, “ St. George and the Dragon,” in 4to. inſcribed I. V. M. Schöen's “ St. Anthony tormented by Dæmons ;” and “ St. Jerome,” in which the ſaint appears ſeated in a room and pointing to a ſkull. On the right hand corner is the lion's head. The latter has been copied by Lucas of Leyden, and in the opinion of Strutt is Iſrael's maſter-piece, though perhaps that diſtinction ought rather to be granted to his moral print of "A Cavalier and Lady, walking in amorous talk, while Death from behind a Tree is ſhaking an Hour-glaſs," a deſign which, whoever was its original author, had previouſly been engraven by Sporer or Schauflein, and has been ſubſequently copied by Albert Durer and ſeveral others.

Of the ſingular deſign conſiſting of three naked women, with a globe hanging above, which is inſcribed 𝕲.𝕭.𝕸. there is alſo an engraving by Iſrael.

A folio plate of "The Death of Lucretia;" a pair in quarto, of "A Woman ſinging, while a Man accompanies her on the Lute," and "A Man playing the Organ, while a Woman blows the Bellows," both marked I. M.; Schöen's richly ornamented incenſe cup; and ſeveral plates of groteſque foliage and other goldſmiths' ornaments, are all that we ſhall mention of the two hundred and fifty engravings by the Iſraels which are enumerated by Heinnekin. Neither of them appears to have had any ſettled monogram, but marked his engravings variouſly, as we have ſtated in the courſe of our liſt, ſometimes adding to his name and reſidence the word "Goldſchmit," and at others "Tzu Bockholdt," in the German character. The beſt of their works, as has been before intimated, are copies from the ſuperior productions of Martin Schöen.

Matthew, or Martin Zagel, Zaſinger, or Zinck, goldſmith and engraver, was born in the year 1430, but in what part of Germany is not known, though, from the ſubjects of two of his engravings, it may be gueſſed that he was of Munich: neither is the year of his death certain, though, that he lived to the beginning of the ſixteenth century, and engraved till the age of ſeventy-five, may be inferred from the circumſtance of one of his prints being dated in the year 1505.

The extreme of Gothic ſtiffneſs appears in his works. His compoſition is bad, and his drawing ſtill worſe: the mechanical part of his engraving, indeed, poſſeſſes a certain degree of neatneſs, but is without the fainteſt ray of taſte. It is proper, however, to obſerve, that from the delicacy, or rather faintneſs of Zagel's manner of engraving, his plates would not ſtand many good impreſſions; that many of the retouched prints, which are exceedingly bad, are abroad in the world, and that therefore, to do juſtice to the ſlender ſhare of merit which he poſſeſſed, it is neceſſary to ſee the early impreſſions of his plates; nor ſhould be left unmentioned, that in his latter engravings he diſplays a more intimate knowledge of perſpective than we find among his predeceſſors in Germany. Zagel marked ſome of his prints ſimply with the initials M. Z.; and others, as will be ſound in our firſt plate of the monograms, &c. of the engravers of Germany. Among his beſt engravings may be reckoned "Solomon's Idolatry," a middling-ſized upright, dated 1501. "A Holy Family," in which the Virgin Mary is receiving water from a fountain, in a cup of the ſame date with the preceding. "The legendary Story of St. Chriſtopher bringing the Infant Jeſus acroſs an Arm of the Sea," a ſmall upright. "A Lover ſeated in a Landſcape, entertaining his Miſtreſs," and "Two Lovers Embracing," ditto. Two large and very rare folio engravings of "The Grand Ball and Tournament at Munich:" in the former of which is repreſented a dance and card party, in which the duke of Bavaria is engaged at play, and in the latter a tournament, at which the duke is preſent. "The Martyrs St. Catherine and St. Urſula," both in 8vo. "The Martyrdom of St. Sebaſtian," in 4to. "The March to War," ditto, and "Ariſtotle the Philoſopher," a ſubject often repeated, and called by ſome Socrates and Xantippe. The laſt is a very rare print, in 4to.

Albert Glockenton was a native of Nuremberg, born in the year 1432, and who flouriſhed as an engraver at the commencement of the ſixteenth century; but the time and place of his death are uncertain. Strutt ſays of him, that if he did learn his art from Schöen, he not only imitated his manner, but copied a great number of his prints: which copies conſtitute the greater part of the works of Glockenton. He executed his plates with the graver in a neat but ſervile manner, by no means improving the drawing of his originals. He marked his engravings with a ſort of half Gothic initials of his name, as may be ſeen in our firſt plate of the monograms of the German engravers, and ſometimes added the date.

The principal works of Glockenton, after the originals of Martin Schöen, are "Chriſt bearing his Croſs," and "Chriſt crucified;" both rare and of the folio ſize: "The death of the Virgin." The ſet of the wiſe and fooliſh virgins, ten plates; the paſſion of our Saviour, a ſet of ten others, both of which are more particularly mentioned in our account of Schöen, and the "Virgin and Child at an Altar;" in 4to. The latter is ſuperior, in point of compoſition, to the German art of that period, is marked with only a Gothic G, and bears the very early date of 1466; which is perhaps the moſt ancient that is to be found on any copper-plate print whatever. Of this engraving particular mention is made under the article Glockenton. in the "Catalogue Raiſonnée du Cabinet d'eſtampes de Brandes"

Contemporary and co-equal with Zagel and Glockenton, was an engraver for whom Strutt claims a ſort of doubtful exiſtence, by the name of Wenceſlaus of Olmutz, in Bohemia. He found a copy of Martin Schöen's "Death of the Virgin" in the Monro collection, which had not only the name of this artiſt inſcribed upon it, but the date of the year in which it was engraved, namely 1481. He adds, "there is no doubt of its being a copy from Schöen, becauſe it bears the evident marks of a ſervile imitation. It is highly probable that Wenceſlaus was the diſciple of Schoen,"—"another obſervation ariſes from a ſtrict examination of this print, upon comparing it with the ancient German engravings marked with the W only; which is, that they are evidently the work of the ſame artiſt as the preceding, though they have uſually been attributed to Michael Wolgemut, the maſter of Durer. The name is perfectly plain," but the words that follow are far leſs legible, and in the opinion of the preſent writer are much more like *Olomuce Ibidem* than Olmutz in Bohemia.

Of theſe prints marked with the letter W only, Strutt mentions the following:

The "Annunciation," where the Deity appears above and a pot of flowers is introduced on the fore-ground; a ſmall upright; "The Cavalier and Lady heedleſs of Death;" "The Laſt Supper;" "The Crucifixion of St. Anthony;" ſmall and nearly ſquare; and the ſet of ſmall uprights from the "Life and Paſſion of Chriſt."

The above are all from Schöen; thoſe which follow are from the Iſraels of Mekenin.

"An old Man leading a little Boy, with a Woman following carrying a Girl at her back;" and "A Lover entertaining his Miſtreſs;" two ſmall uprights; and "The naked Women with a Globe ſuſpended from above."

We are now again arrived at the time when the Nuremberg Chronicle was publiſhed, and thoſe extraordinary works both on copper and on wood began to appear, which are known to the world under the highly reſpected name of Albert Durer.

Of the various powers of Albert; his reputation as the father of the German ſchool of painting; and his general merits as an artiſt, we have already treated pretty much at large; (ſee DURER, ALBERT.) It remains to add our liſt of his principal engravings, and to comment more particularly on ſome of thoſe which are, and deſerve to be, moſt conſpicuous. Though the defects of the artiſt are pointed out in the critical remarks which follow, and which are chiefly extracted from lectures delivered at the Royal Inſtitution in the years 1805 and 1806, yet are they calculated to lead the attentive obſerver to a more intimate acquaintance with the merits of this extraordinary engraver, and to confirm the general and juſtly merited praiſe which has now, for three centuries, been beſtowed on Albert Durer.

The reſemblances between the ſeveral objects which this maſter has introduced into his engravings, and their archetypes in nature, proceed, for the moſt part, too much upon fac-ſimile principles for the generalized dignity of his ſubjects; and his powers of imitation are too prodigally laviſhed upon ſubordinate and uneſſential parts.

The expreſſion of his figure of "Melancholy," which would elſe have approached ſublimity, is conſiderably injured by the introduction of a multitude of objects, moſt of which the mind does not readily aſſimilate with the ſentiment of melancholy. It muſt firſt be perceived or diſcovered, that theſe objects are alluſions to aſtrology, alchemy, and the occult ſciences, as they are called. The performance addreſſes itſelf, therefore, to the curious and inquiſitive part of mankind, and not to man: and as neither the eye nor the mind can at once dilate with greatneſs and deſcend to littleneſs, it is evident that the reſearch it requires muſt be the deſtruction of ſublimity.

Though there is nothing of the "holy calm," with which Collins has ſurrounded his figure of melancholy, this compoſition may ſtill be thought intereſting on another account, namely, as a true picture of the times in which it was engraven; for preciſely thus was attention perplexed and diſtracted on moſt philoſophical ſubjects in the age of Albert Durer; and as he is author of ſeven treatiſes, moſt of which are on the metaphyſics of art, he had probably experienced much of that ſpecies of melancholy which proceeds from the mental exhauſtion and diſſatiſfaction in which ſuch ſtudies often terminate. Regarded in this view, it is no inapt verification of the old adage, "The painter paints himſelf." It might have aſſiſted to reconcile us to the defects of this performance, if Albert Durer had named it Study; or, if we could fancy the figure out of the picture, we might be content to let our attention dwell awhile on the ſkill with which he has repreſented moſt of the other objects, when abſtractedly and ſeverally conſidered. This talent, however, of repreſenting the characters and textures of individual objects, is ſtill more conſpicuous, and ſomewhat leſs objectionable, in the print of "St. Jerome in the Room," wherein all the objects are rendered with a fidelity little ſhort of the camera obſcura. Regarding the art as in its infancy, we may look at this engraving with the ſame kind of pleaſure, (and we ſhould at all the works of art of this period, with the ſame candid indulgence) with which Reynolds contemplated "The Virgin and Child" by Van Eyck, in the cathedral church of Bruges—"the artiſt," ſays ſir Joſhua, "having accompliſhed the purpoſe *he* had in view."

Another of the moſt celebrated, though not the beſt, of Durer's engravings, is his "Adam and Eve." He has, in this inſtance, had recourſe to nature for his models, but his Eve is not "the faireſt of her daughters," nor his "Adam the goodlieſt of men ſince born:" yet we may perceive that he ſelected from the nature with which he was acquainted; and though we do not behold the ſymmetry and ſuperlative grace of Greek beauty, we probably ſee the felt and acknowledged beauty of Nuremberg. It will alſo be allowed, that the Paradiſe they muſt ſhortly quit, does not ſeem very deſirable to inhabit; here is no genial light, no luxuriance of vegetation, and no abundance of animal life. To uſe more of the words of Milton, nature is ſo far from wantoning as in her prime,—ſo very far from playing at will her virgin fancies, that ſhe appears, in thoſe of Shakſpeare, "bald with dry antiquity:" yet if Raphael has violated this cardinal principle of propriety, by erecting a church, and houſes two ſtories high in his Paradiſe, who ſhall throw the firſt ſtone at Albert Durer? The boles of his trees, though among the firſt, if not the very firſt that were ever engraven, have much of the truth of individual nature, and their foliage, and the fur of the cat, are expreſſed with a degree of freedom that muſt ſurpriſe thoſe who reflect that no etching has been employed, and how comparatively ill calculated are the ſleek and ſtiff lines of the unaſſiſted graver to the expreſſion of ſuch objects. The introduction of the cat and mouſe in Paradiſe could not fail to be underſtood, from its familiarity; but though ingenious, this very familiarity rendered it unfit for the occaſion. The prophet Iſaiah has far more nobly expreſſed the primæval harmony and happineſs of the brute creation.

The Eve of Albert Durer is apparently of the ſame family that Otho Venius, and Rubens, afterwards adopted for their models; and in the engraving which collectors call "The Death's Head," is a female figure, which ſtill more evidently ſhews the eſteem in which Rubens muſt have held the works, or at leaſt the women, of Albert Durer. It is not eaſy to conceive the occaſion that could have given birth to this myſterious print of Death's head. It preſents us either the ordinary routine of human life in allegory, or perhaps a ſort of poetic armorial bearing. The creſt is a winged helmet, richly ornamented, and beautifully executed; and though a ſkull, which one ſhould think could not fail to be an awful monitor, is highly emboſſed on the ſhield, the female ſupporter, heedleſs of her charge, heedleſs of the moral leſſon, and of the moral character ſhe has to ſuſtain, is obviouſly liſtening to the very ſuſpicious ſuggeſtions of a ſort of ſavage man. It appears to be one of the night thoughts of Albert Durer, and perhaps, like thoſe of Dr. Young, may be intended to mark the lamentable influence of the groſſer paſſions. Whatever its author may have intended to inculcate by this print, its execution as an engraving is admirable. The helmet, with all its pomp of heraldic appendage, and the actual and reflex lights on its poliſhed ſurface, are characteriſtically, though minutely, expreſſed; the ſkull is accurately drawn, and its bony ſubſtance is deſcribed with a maſterly hand; the author has even ſedulouſly attended to the finer enamel of its two remaining teeth. The head of the ſavage, with its beard and wild redundance of ſnaky tangled hair, has conſiderable and well-managed breadth of light and ſhade, though its character is far leſs ſavage than ſhould ſeem to belong to the reſt of the figure: its expreſſion is, doubtleſs, meant to be aſſumed and inſinuating. The countenance of the female has ſeldom been ſurpaſſed for that ſucceſsful mixture of character and expreſſion that lends a willing ear to a deluſive promiſe; and the hands of both figures are far better drawn than we have hitherto ſeen among the productions of the German ſchool: the drapery alſo, which we have been accuſtomed to ſee ſtiff, ſtarched, and complicated, is here relaxed into freedom and ſimplicity, and is ſo remarkable for ſilky texture; approaches ſo near to what is now termed pictureſque compoſition of forms and light and ſhade; and is, on the whole, ſo ſuperior to that of his Melancholy, and ſome other of his ſubſequent works, as leaves us either to wonder that Albert Durer, having once attained, ſhould ever loſe ſight of the excellence of its principles; or to infer that he did not perceive their excellence, or that the ſcience he deduced from his own obſervation of nature prevailed but occaſionally over the prejudices of his education.

In his ſmall prints of the life of Chriſt, of which Marc Antonio is ſaid to have pirated the copy-right, other inſtances occur of this ſtyle of ſuperior ſimplicity in the draperies, and ſome of broad and captivating effects of light and ſhade. His Jeſus Chriſt ſuffers greatly, or beams with God-like benevolence; his Magdalens and Madonnas are ſometimes divinely pathetic; and many other of the heads in theſe intereſting and often grand compoſitions, are exquiſitely finiſhed miniatures, remarkable for that ſort of accordance and conſiſtency of parts which we deem the internal evidence of truth and nature. The principal portraits of Durer, engraved on copper, are thoſe of the elector Frederic of Saxony, dated MDXXIIII. Albert, elector of Mayence, dated 1523. Bilibald Pirkheimer, dated 1524. Melancthon, dated 1525. Theſe are all of the quarto ſize.

In folio he has engraven his friend Eraſmus, good impreſſions of which are now become very rare, dated 1526, and two figures of himſelf, on the ſame plate, one being his portrait in the year 1509, and the other in 1517. They ſtand on either ſide of a piece of architecture.

Of the portraits of Durer, it may with truth be ſaid, that, in point of drawing, they poſſeſs the ſame internal evidence of correctneſs which diſtinguiſhes the beſt of his hiſtorical heads: in ſtyle they are laboured; but the labour is not ill-beſtowed; and the chiaroſcuro is frequently comprehenſive and clear. His compoſitions from holy writ, and thoſe legends which in his day were thought to be nearly of equal authority, are numerous. The principal of thoſe on copper are “The Adam and Eve in Paradiſe, or Sin of our firſt Parents,” which has already been the ſubject of detailed comment, a very elaborate work in folio, dated 1504. Another “Adam and Eve,” which repreſents them after their expulſion from Paradiſe. “Adam crawling, and Eve ſitting with an Infant at the Entrance of a Cavern,” in quarto. “A Man with a Beard, ſeated on the Ground (his Horſe faſtened to a Tree) careſſing a Young Woman,” a ſmall quarto plate, known by the name of “Judah and Tamar,” and believed to be the earlieſt of Albert Durer's engravings. “The Nativity,” where the Virgin Mary is adoring the Infant Chriſt, while St. Joſeph is drawing water from a well. “A Holy Family,” known, among connoiſſeurs, by the title of “The Virgin of the Butterfly,” where the Madonna is ſeated in a landſcape, with the infant in her arms, and St. Joſeph aſleep near her. Another, known by the title of “The Virgin of the Ape,” where the Infant Chriſt, kneeling, is playing with a bird, and an ape is tied near the group. Another, known by the title of “The Virgin of the Pear,” which is dated 1511, where the Infant Chriſt, holding a pear, is ſitting with his mother at the foot of a tree. Another, known by the name of “The Virgin of the Apple,” which is dated 1514. All of them are of the 4to. dimenſions. An etching of the “Holy Family,” in folio, wherein the Virgin Mary is ſtanding and holding the Infant Chriſt in her arms, and a girl is introduced at prayers, dated in the year 1519. A ſet of fifteen, including the frontiſpiece, entitled “The ſmall Paſſion,” very rare, and dated from 1507 to 1512. “Chriſt Crucified, with the Holy Women at the Foot of the Croſs,” a ſmall circle, without the artiſt's mark, and ſaid to have been done for the ſword-belt of Charles V. “The Saviour proſtrate in the Garden of Olives,” very rare, and dated 1515. “A Group of Angels bearing the Inſtruments of Crucifixion, &c.” engraved on tin, or iron tinned over, and dated 1516. “The grand Ecce Homo,” in large 4to. with a Latin inſcription, and dated in 1512, a very rare print, much ſought after by connoiſſeurs. “The Entombing of Chriſt by the Holy Women,” in ſmall folio, a print dated 1507, and in which ſeveral cats are ſtrangely introduced, but which ſome think is not by Albert Durer. “The Infant Prodigy,” a kneeling figure, in folio: ſome pretend that this is a portrait of Durer himſelf. “St. Hubert at the Chaſe,” a folio print, in which the ſaint is repreſented kneeling before a crucifix, which appears upon the head of a ſtag: the ſcene is a wood, with a caſtle at ſome diſtance.

Albert Durer has been analogically compared with our poet Spenſer, and it has been remarked, that “if any one of his performances were to be pointed out as more particularly reſembling Spenſer, it ſhould be that of the Legendary Tale of St. Hubert. They are characterized by the romantic heights of extravagance; the ſame abundance of ideas; the ſame unremitted and ſucceſsful attention to minute excellence; the ſame general air of incredibility rendered credible, and, as we ſhould ſay now, if the works of the poet and engraver were now produced for the firſt time; the ſame want of concentration, brevity, and general effect; but a temporary adoption of the ſympathies of the ſixteenth century, as far as art is concerned, reconciles us to theſe.”

Of the ſubject of St. Jerome, Durer has engraven two plates in ſmall folio, on one of which, where the ſaint is ſitting in a chamber, we have already commented; in the other he is kneeling before a crucifix, in a rocky deſart, and the engraving is far leſs elaborately finiſhed than the former.

“A naked winged Woman ſtanding on a ſmall Globe ſuſpended in the Clouds, holding in one Hand an elaborately wrought Cup, and in the other a Bridle,” a folio print, known among dealers by the name of the Larger Fortune. According to Vaſari, it ſhould be called Temperance, according to others, Prudence: but, perhaps, Albert Durer meant it for the Guardian Genius of Nuremberg, of which city a bird's eye view appears beneath.

Another “Naked Woman on a Globe,” in 12mo., called the Leſſer Fortune. She holds a long ſtick and a thiſtle. The figure of “Melancholy,” on which we have already commented. She is ſitting, her head reſting on her hand, ſurrounded by various emblems, a folio plate, of exquiſite workmanſhip, dated 1514. “The Dream of M. Wolgemut,” where he is repreſented aſleep near a frying pan: the devil is behind with a large pair of bellows, and on the ſide Venus, with Cupid walking on ſtilts. “The great Satyr,” who is attacked by a fawn whilſt repoſing with a nymph, a ſmall folio, the work of the graver, and performed with admirable ſkill. “The Sorcereſſes,” four naked women in a room: a globe, with the letters O. G. H. is ſuſpended from above, and in an adjoining chamber appears the devil ſurrounded by flames: it is dated 1497. Baldinucci thinks it is the earlieſt of Durer's engravings. It is copied from Wolgemut, and is a rare print. “A Chevalier on Horſeback, and in complete Armour, purſued by Death on Horſeback, (who is holding forth an Hour-Glaſs,) and another Spectre:” this is a very highly finiſhed and exquiſite engraving, in ſmall folio, of which good impreſſions are rare. It is by ſome termed “Death's Horſe,” and by others, with more propriety, “The Worldly Man:” it is dated 1513, and the impreſſions which were taken before this date was inſcribed, are much valued. "The Death's Head," of which we have already given a particular deſcription, in ſmall folio, dated 1503. Another heraldic ſubject of the ſame dimenſions, diſplaying a lion rampant on a ſhield, and a helmet ſurmounted by a cock ſpreading his wings. "A large Horſe," behind which marches an armed man with boots, bearing a halbert, and another horſe of more beautiful form, behind which marches another armed man with a halbert, having a griffin on his helmet: both in 4to., and dated 1505. "A diſhevelled Sorcereſs, mounted on a He-Goat, and flying through the Air, with a Diſtaff in her Right-Hand. "The Prodigal Son," a ſmall upright folio, of which the impreſſions, before the date 1513 was added, are held in moſt eſteem.

Under the article Etching we have aſcribed the invention of this mode of art to Albert Durer. The earlieſt of his etchings, which bears a date, is called "The Rape of Proſerpine," a folio print, dated 1516, and in two years afterwards appeared his more celebrated etching of the march of an army, which has been called "The Cannon," from a large piece of ordnance forming the principal object on the fore-ground: the ſcene repreſented is the entrance of a village, with a bird's eye view over an extenſive country, and three Turks are introduced near the fore-ground. Both theſe etchings are reported to have been performed on plates of iron or ſteel; and the latter, which is now become rare, is among the largeſt of the works of Albert Durer.

The principal of thoſe works of our artiſt which are commonly ſuppoſed to have been engraven on wood, are as follow:—The portraits, in folio, of Albert Durer, inſcribed "Albrect Durer counterfeyt in ſeinem alter des LVI." without the engraver's cypher; another with his cypher; the emperor Maximilian I.; a buſt with numerous ornaments, inſcribed "Imperator Cæſar Divus Maximilianus Pius Felix Auguſtus 1519;" Ulrichus Varnbuler, a rare print, with the following inſcription on a ſhield, "Albertus Durer Noricus reddere que conatur 1522."

From the numerous hiſtorical works which Durer performed in this manner, we ſelect the following: A ſet of thirteen folio prints, including the frontiſpiece, from the life and paſſion of Jeſus Chriſt, inſcribed "Paſſio Domini, &c." dated 1510, 1511. A ſet of twenty-ſeven ſmall uprights, known by the name of the Smaller Paſſion, and inſcribed "Figuræ Paſſionis Domini Noſtri Jeſu Chriſti 1519, 1520." An "Ecce Homo," in folio, engraved in a bold and broad ſtyle, and with great freedom. "The Holy Trinity, ſurrounded by the Angelic Hoſt," and dated 1511. Another "Ecce Homo," known by the title of "The Myſtery of the Maſs." A ſet of ſixteen folio pieces, incluſive of the frontiſpiece, of which the ſubjects are taken from the Apocalypſe, and the text printed on the reverſe of every leaf. A ſet of twenty-two ſmall folio prints from the life of the Virgin Mary, dated 1509, 1511: ſeventeen of this beautiful ſet of engravings were copied by Marc Antonio at Venice, to all of which copies, except one, the Italian artiſt added the cypher of Albert Durer. "The Holy Family," of the folio dimenſions, where St. Anne holds the infant Saviour, and the Virgin Mary is in the act of adoration. "The Rhinoceros," a rare print, in folio, with a German inſcription, dated 1515.

In clair-obſcure (or chiaroſcuro) printed from a ſucceſſion of blocks, the following are aſcribed to Albert Durer: "A Holy Family in a Landſcape:" two angels are crowning the Virgin Mary, and on the fore-ground are three rabbits; in large folio. Two, of legendary ſtories from the lives of St. Auguſtin and St. Chriſtopher, in large folio, the latter of which is ſcarce. A ſort of apotheoſis of the emperor Maximilian, where, accompanied by the Virgin Mary and numerous ſaints, he is adoring the Saviour. (Of this piece Huber poſſeſſed an impreſſion on vellum very richly coloured.) A pair, which are ſcarce, of "A Fortreſs in a ſtate of Siege," generally called the Siege of Vienna, dated 1527. A ſet of ſix ornamental deſigns for tapeſtry, of aſtronomical ſubjects. The whole number of engravings by Albert Durer, and after his deſigns, are ſtated to amount to 1214: but Mariette's collection amounted to no more than 420, which were ſold at his death for 1830 livres. See the article Durer in the Catalogue Raiſonnée of the Brandes cabinet.

The triumphs of the emperor Maximilian, which, when paſted together, form two very large and long prints of the frieze form, have been generally aſcribed to Albert Durer, but the reſearches of Mr. Douce of the Britiſh Muſeum, and Mr. Edwards of Pall-Mall, have determined that they are the performances of various other artiſts, though perhaps executed under the general ſuperintendance of Albert Durer.

Lucas Cranach, or Kranach, was born at Cranach, in Weſtphalia, in the year 1472 or 1474, and died at Weymar in 1553. He was educated a painter; yet whether he ſtudied under any other maſter than his father has not been recorded. He paſſed ſeveral years in the ſervice of the elector of Saxony as an artiſt, diſtinguiſhing himſelf by his engravings on copper and wood, and in that manner which is technically called *chiaro-ſcuro*. His fertility of invention far outran his judgment: led away by the livelineſs of his fancy and talent for compoſition, he took ſuch forms as were before him, following the ſtiff Gothic taſte which prevailed in his country at the time, without attempting to improve it. His manner of drawing is rather dry and taſteleſs, than abſolutely incorrect, but his heads have a moderate portion both of character and expreſſion, though they are not marked with preciſion or in a pleaſing ſtyle: his hands and feet are very defective, and a total ignorance of the art of diſtributing light and ſhade confuſes his effects.

Cranach ſometimes marked his plates with the initial letters of his name: and ſometimes with the cypher, but more frequently with the dragon holding a ring in his mouth, which will be found in our firſt plate of German marks and monograms. The dragon is the creſt of the elector of Saxony, to which, on ſome occaſions, Cranach added the electoral ſhield.

The following will probably be found among the beſt of his engravings, beginning with thoſe which are executed on copper: Portraits of Jean Frederic elector of Saxony, where an angel appears on high with a crown of laurel, in large 4to. and very rare. The two electors of Saxony, Frederic and Jean, the former of whom is holding a chaplet, in 4to. dated 1510, and almoſt ſquare. Chriſtianus II. king of Denmark and Norway, ſurrounded by ornamental architecture, armorial bearings, &c. in large 4to. Profile of Martin Luther in the habit of a monk of St. Auguſtin, inſcribed "Des Luters geſtalt," in 4to. and dated 1523.

The chief of his hiſtorical works are: "Adam and Eve after their Fall," (called by ſome the Penitence of St. Chryſoſtom) the ſcene is a deſart, where a naked woman and child appear on the fore-ground, and in the back-ground a man is crawling, a folio plate, dated 1509, marked with the cypher and little dragon of Cranach, and executed quite in his Gothic manner. "The Temptation of our Saviour in the Deſart," where the Chriſt has ſomewhat better pretenſions to merit, than generally belongs to the figures of Cranach, but the tempter is as groteſque and entertaining a devil as you would wiſh to ſee: the print is in ſmall folio, and marked L. C. W. the laſt letter denoting Wittenbourg: it is very rare and bad. A whimſical compoſition, of "Jeſus Chriſt in the Clouds," ſurrounded by angels, and inſpiring the elector of Saxony, a half length of whom appears below; a ſmall print, almoſt ſquare.

In chiaroſcuro, that is, on two blocks of wood, the one for the outline and darker ſhadows, and the other for the demitints and lights, Cranach has engraven "St. Chriſtopher carrying the Infant Chriſt over an Arm of the Sea," a folio print, dated 1507. "St. George and the Dragon," a large 4to. "St. John preaching in the Deſart," in folio, dated 1576. And, "A Naked Venus" (of ludicrous beauty) accompanied by Cupid, who is trying his bow, in folio.

The letter-preſs engravings of Cranach, commonly ſuppoſed to have been performed on wood, are as follow: Buſt of Jean Frederic, elector of Saxony; ditto of Martin Luther in the coſtume of a monk of the order of St. Auguſtin, dated 1520; both in 4to.

Whole length portraits of Martin Luther; Philip Melancthon; the emperor Charles V.; the emperor Ferdinand; Jean Fredric, elector of Saxony; and Jean Guillaume, duke of Saxony, all of the folio ſize.

A half length of the elector of Saxony, holding a book open before a crucifix, a rare print, marked with the little dragon, dated in 1552, and inſcribed with a Latin ſentence.

Of his hiſtorical works, the following are held in moſt requeſt among collectors. "Adam and Eve in Paradiſe, or the Sin of our Firſt Parents," dated 1509. "The Annunciation." "St. John preaching in the Deſart," which has been called a grand compoſition, and is dated 1516, and the "Decollation of St. John:" all of the folio ſize.

A ſet of twelve in ſmall folio from the life and paſſion of Jeſus Chriſt, inſcribed on the title page "Paſſio D. N. Jeſu Chriſti venuſtiſſimis imaginibus," &c. and dated 1509: this ſet is highly eſteemed among connoiſſeurs. Another ſet of twelve, of the Martyrdoms of the Apoſtles, in 4to. and which are held in ſtill more requeſt for rich compoſition and the expreſſion of the heads, and are on the whole ſuperior to the preceding: they are dated in the year 1549.

It is curious to reflect with how frequent inſenſibility, the Gotho-german artiſts of the age of Cranach ſelected ſubjects that called for the introduction of beauty even of the higheſt kind, and dreſt out their virgin Maries and Venuſes in all the ſtiff meagreneſs of their age and country. "Paris viſited by the three Goddeſſes on mount Ida," is a rare piece in large folio, dated 1508. "Curtius leaping into the fiery Gulph" is alſo in folio, and dated 1508. Three plates of tournaments, of which two are called the great, and the other the little tournament, dated 1509; and a pair of park ſcenes with ſtags in the rutting time, and which are very rare, conclude our liſt of the engravings of Lucas Cranach.

Hans or John Burgkmair painter, and engraver on wood, was born at Augſburg in the year 1474. He ſtudied under Albert Durer, and ſome of his engravings are dated ſo early as 1510, but the time and place of his death are unknown. He engraved chiefly, if not entirely on wood, and his prints poſſeſs much of the fire and ſpirit which diſtinguiſh thoſe of his maſter. Profeſſor Chriſt attributes to him ſome ſmall ſpirited woodencuts which were made for the ancient edition of the works of Geyler de Keiſerberg, which bear the above date (of 1510), and are marked I. B. Many of the works of this artiſt bear his name at length, the reſt are marked with one or other of the two cyphers which will be found in our plate of the monograms, &c. of the German ſchool.

The following are the engravings by Burgkmair, which are moſt ſought after by collectors: "The Emperor Maximilian I. on Horſeback;" of which deſign there is a duplicate engraving in clare obſcure, which bears the name of Joſt de Negker, but which is partly the work of Burgkmair. It is a very rare print, dated in the year 1508, both of the folio ſize. "St. George on Horſeback," alſo bears the name of Negker, and is of the folio ſize, and in clare obſcure. "Joſeph and the wife of Potiphar," is of a ſquare form, and in 4to. "St. Thomas," "St. Bartholomew," and "St. Sebaſtian," dated 1515, are all in folio. "A young Woman mourning the loſs of a Hero that Death has overcome," is a rare print in folio; by Burgkmair and Negker.

The remainder of the letter preſs cuts of this artiſt are, a ſet of two hundred and thirty-ſeven for a folio work, of which the manuſcript by Marc Treitz Sauerwein is in the Imperial library at Vienna: its title is "Der weiſs Konig" (the wiſe king), and it conſiſts of the diſtinguiſhed acts of the emperor Maximilian.

"The triumphal Entry of Maximilian," conſiſting of one hundred and thirty-five blocks or plates, have remained for a long period of time unknown at the caſtle of Ambras, but within theſe few years have been removed to the Imperial library at Vienna, ſince which, impreſſions have been taken, and ſeveral ſets have been brought to England. Many of theſe engravings are the work of Burgkmair, and are marked at the back with his name or initials, though the whole generally paſſes under the name of Albert Durer, and were probably executed under his direction. Another work, executed by theſe artiſts conjointly with Hans Schaufflein, is called the Tewrdanck; but the greater number of the prints contained in it are from the graver of Burgkmair.

Johanſen, or Hans Baldung, ſurnamed Grien or Grun, painted and engraved for the letter preſs and in clare obſcure. He was a native of Gemund in Suabia, and was born in the year 1476. He flouriſhed as an engraver through the earlier part of the ſixteenth century, and the lateſt of his works is dated in the year 1534, but the time of his death is uncertain.

His engravings are executed in a bold ſtyle, and with conſiderable power over the inſtruments of his art. Strutt ſays of him, that "his figures are rather expreſſive than correct; the naked parts of them are poorly drawn; and the extremities, though free and ſpirited, are often heavy, and not well marked:" yet conſidering the period and place at which Baldung lived, he may be regarded as a meritorious artiſt. His engravings are ſometimes marked with his name at length, and at others with the cyphers which we have given in our plate of German monograms. His principal works are, "Adam and Eve in Paradiſe." "The Fall of Adam:" in the latter, a tablet is ſuſpended from a tree, bearing the motto "Lapſus humani generis," and the date 1511. Both are of the folio ſize, and the Fall of Adam is a performance of merit in clare obſcure.

A ſet of thirteen figures in ſmall folio of the Saviour and twelve apoſtles, dated in 1514, and marked with the artiſt's cypher. "The Crucifixion," with the holy women and St. John at the foot of the Croſs, in clare obſcure. A ſet of four ſmall uprights repreſenting the Effects of Love, or Influence of Women, exemplified in the ſtories of Samſon and Dalilah, Solomon's Idolatry, David and Bathſheba, and Xantippe and Socrates, (called by ſome Ariſtotle and Phryne,) dated 1515. "A drunken Bacchus lying at the mouth of a Caſk," in 4to. "The Sorcereſs," who is mounted on a he-goat, holding a cauldron. A pair, cut in a maſterly ſtyle, of wild horſes in a foreſt, with the name of Baldung at length, and the date 1534. Another pair of ſmall landſcapes, which are ſaid to be etched on plates of iron, and are very rare.

Of Hans Bréſang, a deſigner and engraver for the letter preſs, very little more is known than that he was contemporary with Baldung, and has ſometimes been miſtaken for him from the ſimilarity of their cyphers, and their taſte in deſigning and engraving. Miſtaking the numeral 5, in the dates of his engravings, for a 6, Strutt has placed him a century too late.

Thoſe of his works which are beſt known, are "Adam and Eve in Paradiſe," of the folio ſize; bearing the cypher of Breſang, and the date 1519. A ſet of three of the 4to. dimenſions, dated 1504; *viz.* "Chriſt on the Croſs;" "Chriſt lamented by the holy Women;" and "A dead Chriſt," with angels bearing him away. Another ſet of thirteen, of the Saviour and twelve apoſtles, alſo in ſmall 4to. and the three Deſtinies in a landſcape, dated 1513, a very rare print in 4to.

Lucas or Louis Krug, or Krugen, painter, goldſmith, and engraver, was born at Nuremberg in the year 1489, and died in the ſame city in 1535. He formed his taſte, in deſigning and engraving, from ſtudying the works of Lucas of Leyden, and drew the human figure better than many of his contemporaries, though his attitudes are ill choſen, and his draperies ſtiff. His mark was a ſmall pot or jug placed between his initials on a tablet, as repreſented in our firſt plate of the monograms, &c. of the German engravers, to which the date was in ſome inſtances added. His principal engravings are as follow:

"The Nativity," "The Adoration of the Shepherds," and "The Adoration of the Kings," three ſmall uprights, dated 1516. "The Holy Family," and two prints of the Ecce-Homo, with the inſtruments of flagellation, in ſmall 4to. "St. John the Divine, writing," while the holy Virgin is dictating to him from the clouds, and below is the ludicrous incident of the devil emptying the ink-horn of the ſaint. "Two naked Women contemplating a Skull and Hour glaſs," and "A naked Woman ſitting with her Back towards the Spectator," with a city and mountain appearing in the diſtance; all ſmall uprights.

Hans Schauſflein, the third engraver of that name, was born at Nuremberg ſome time about the year 1487, and died at Nordlingen, a town in Suabia, in 1550. He ſtudied under Albert Durer, and imitated his ſtyle with conſiderable ſucceſs.

The moſt diſtinguiſhed of his performances are, "The Creation of Eve," in 4to.; "Chriſt with the Crown of Thorns, and the Virgin Mother in Grief;" and "Herodias with the Head of St. John the Baptiſt," both in folio. "The Banquet of Herodias," a grand compoſition, ſuppoſed to be engraven on two blocks in large folio. "Numa Pompilius recommending religious worſhip to the Romans," and "Lucretia ſtabbing herſelf," a pair in 4to. A ſet of eight plates of military ſubjects in folio. Another ſet of four rare prints of "The Triumphs of the Wives of the celebrated Sots," in ſmall folio. The greater number of the ſet of twenty of marriage proceſſions. Part of the ſet of an hundred and eighteen of "The Perils and Adventures of the excellent and famous chevalier Tewerdanks," a curious and very rare book, printed at Nuremberg in the year 1517.

But few libraries have the honour of poſſeſſing a complete copy of this celebrated work, of which Melchior Pfintzing ſays, in the dedication to Charles king of Spain, that he had ſeen moſt of the actions that are therein engraved and deſcribed, which in fact are thoſe of the emperor Maximilian I. under the fictitious name of Tewerdanks.

Albert Altdorfer, whom ſome have miſtakenly ſuppoſed to have been of Altdorff in Switzerland, was a native of Altdorf in Bavaria, born in the year 1488. His name is found in the regiſter of the citizens of Ratiſbon in the year 1511, where, having paſſed the routine of preparatory civil offices, he was made a member of the interior ſenate, and architect of the city of Ratiſbon, and where, in 1538, he died without iſſue.

Some of his pictures may yet be ſeen at Ratiſbon, and at the town houſe is preſerved a complete collection of his engravings. The French call him "le petit Albert," preſumptively in contradiſtinction to the *great* Albert Durer, and becauſe his engravings are ſmall, for which reaſon alſo he is uſually ranked with "the little maſters."

His merit was however not inconſiderable. He engraved both for the rolling-preſs and letter-preſs; but thoſe which he did for the latter are his beſt performances. He poſſeſſed a lively fancy, a free hand, and great facility of invention. Yet his ſtyle is German, and his drawing, though ſpirited, is incorrect. He marked his plates and blocks with the two ſorts of monograms which appear in our plate of the cyphers, &c. of the German ſchool. One of theſe marks has been attributed to Aldegrever; but the evident ſuperiority of the latter maſter is of itſelf ſufficient (independent of the cypher) to correct the miſtake.

From the ſpirited wooden cuts of Altdorfer, Holbein, of whom we ſhall preſently ſpeak, is ſaid, and probably with truth, to have derived great aſſiſtance in the progreſs of his ſtudies.

Altdorfer's principal engravings on copper are the portrait of himſelf; and that of Martin Luther, in an oval, ſurrounded by foliage; the head of an infant, one of his earlieſt works, dated in 1507; "Adam and Eve in Paradiſe;" "Solomon's Idolatry;" "Dalilah and Sampſon;" "Judith and Holofernes;" ſeveral ſmall prints of the Madonna and infant Chriſt; a Crucifixion, with numerous figures; another with the Virgin Mary and St. John, both ſmall uprights; "St. Jerome ſtanding in a Cavern," where is an altar, book, crucifix, and a tablet, with the monogram of the artiſt; another St. Jerome among buildings, accompanied by a lion; "St. George combating the Dragon;" two etchings of the death of Dido, and that of Lucretia; a pair copied from Marc Antonio, of "Venus accompanied by Cupid entering the Bath," and "Venus leaving the Bath:" theſe are ſmall uprights and in a neat ſtyle. "Cupid Sporting with Sea-horſes." "Amphion ſaved by Dolphins," dated 1525. A pair of "Laſciviouſneſs," and preſumptively, "Chaſtity," repreſented by a female ſitting on an altar, and holding a ſceptre, with numerous attendants bearing lanterns. "A Warrior precipitating himſelf into the Sea." A pair of ſmall landſcapes lengthways, one with rocks and the other with trees, which are touched with conſiderable freedom. The "Synagogue," with a Latin inſcription; and two plates of ornamented vaſes in 4to.

The number of engravings by this maſter, which are ſuppoſed to have been performed on wood, is conſiderable, probably exceeding a hundred, of which the following are moſt valued:—A ſet of forty of "The Fall and Redemption of Man," ſmall uprights, executed in Altdorfer's beſt manner, and much valued: but collectors ſhould be careful not to admit into their portfolios, inſtead of theſe, a ſet of which all but two are *copies* from Altdorfer, and which were publiſhed at Zuric A. D. 1604, under the forged name of Albert Durer. "The Sacrifice of Abraham," and "Joſhua and Caleb," both ſmall. "The Annunciation," ditto, dated 1513.

The four following are in 4to. "The Purification;" "The Maſſacre of the Innocents," dated 1511; "The Decollation of St. John the Baptiſt," and "The Reſurrection of Chriſt," both dated 1512, and the latter eſteemed one of the moſt ſpirited works of the maſter.

The beautiful virgin of Ratiſbon, engraved from her ſtatue in Ratiſbon cathedral, is engraved in chiaroſcuro, though ſome few impreſſions were printed without the half tint: this is a rare print.

Of the often repeated ſubject of St. Jerome, Altdorfer has engraven two blocks, in one of which the holy man is kneeling before a crucifix in a cavern, and the other may be diſtinguiſhed by its very romantic back ground, both are ſmall, but juſtly held in eſteem. "St. George and the Dragon," and "The Judgment of Paris," both dated in 1511, and "St. Chriſtopher and the infant Chriſt," are all in 4to. A mountainous landſcape with buildings, and a large tree on the right hand, another of a gateway, and a grand baptiſmal proceſſion, a ſort of allegory, where, inſide of a church, the virgin and child, ſome angels, and a pilgrim, appear in the proceſſion, are all of the folio ſize.

Hans Holbein the elder flouriſhed towards the cloſe of the fifteenth century, and was of Augſbourg, but afterwards removed to Baſle in Switzerland. According to profeſſor Chriſt, he engraved on wood, and certain prints marked with an H., or the cypher H.B., the B being joined to the firſt perpendicular ſtroke of the H., are attributed to him; but Strutt doubts whether they ought not rather to be aſcribed to Burgkmair or Baldung.

The great celebrity of his ſon has reflected a ſteadier light upon his name. Hans, or John Holbein the younger, was born at Augſbourg in the year 1495 or 1498, and died of the plague in London A.D. 1554. He was the pupil of his father, and gave earneſt of his very extraordinary powers, at a very early age.

About the time of his father's removal to Baſle, the genius of Holbein began to dawn on the arts of Europe. At this time, beſide engraving, as has been ſaid by various authors, for the letter-preſs in a very ſuperior ſtyle, he painted portraits, and occaſionally hiſtorical ſubjects in diſtemper and in oil, and Eraſmus, who was then ſuperintending the printing of his works at Baſle, came to ſit for his likeneſs to young Holbein.

Being charmed with his portrait, Eraſmus ſoon formed a friendſhip for the artiſt, and at his perſuaſion Holbein ſoon after travelled to England. He brought with him the portrait of his friend, and letters of warm recommendation to the great ſir Thomas More, who was at that time lord chancellor, and high in the favour of Henry VIII.

Holbein was received by the chancellor in the moſt friendly and flattering manner, and the family of the Mores, beſides ſeveral other perſons of diſtinction, and finally the king himſelf, honoured our artiſt by ſitting to him for their portraits. Patronized by ſir Thomas, and poſſeſſed of ſuch talent in the arts as had not appeared in England before, he was eaſily received into the royal ſervice upon very liberal terms, and ſo proud was Henry of the abilities of his protegée, or ſo juſt to the claims of his genius, that he frequently ſat to him for his portrait, and the ſtory which we have related of the condeſcenſion of the emperor Maximilian to Albert Durer has been often repeated of king Henry and our artiſt.

After the death of Henry, Holbein ſtill continued to enjoy the royal favour, and ſeveral portraits of Edward VI. from his hand are ſtill extant.

The career of Holbein was but ſhort, but as the poet on a leſs intereſting occaſion has beautifully ſaid, "the ſands of his hour-glaſs were diamond-ſparks," which, as they fell, glittered in the radiance of his reputation. He died, as we have before mentioned, of the plague, in his apartments at Whitehall.

For an account of his merits as a painter the reader is referred to the article Holbein. He began engraving when he was about ſixteen years of age, and very numerous and of extraordinary merit are the letter-preſs cuts which are ſaid to be from his hand, and after his own deſigns, which adorn the books that were printed about this time at Baſle, Zuric, Lyons, Leyden, and London.

Holbein appears to have formed his ſtyle, probably under the direction of his father, from ſtudying the works of his contemporary Altdorfer, who was now riſing in reputation, though not more than ten years older than our artiſt, and it ſeems highly probable that the whole of whatever letter-preſs engravings are from the hand of Holbein himſelf, are the production of thoſe fifteen years of his life which elapſed between the years 1511 and 1526, when he came to England, for it is not very likely that he would be led aſide from the advantages of the royal and noble patronage which he enjoyed in England as a painter, by any inducements which the printers and bookſellers of the continent might offer. Engaged in ſuperior purſuits, the preſent writer is inclined to think that he did no more than deſign the little wood-cuts which are aſcribed to him during his reſidence in our iſland.

The foreign writers on art, however, call him "the glory of wood engraving," and "the phenomenon of his age," adding that in order duly to appreciate his merit as an engraver, the connoiſſeur ſhould not look at the haſtily printed and worn impreſſions which are common, but ſhould have before him, early proofs, printed only on one ſide the paper, ſuch as were lately in the collection of M. Otto, an amateur of Leipzig, which, in point of delicacy, exceed all that had previouſly been exhibited.

His moſt eſteemed production in this way bears the Latin inſcription

> "Cernere vis Hoſpes ſimulacra ſimillima vivis?
> Hoc opus Holbinæ nobile cerne manus;"

and conſiſts of a ſeries of ninety ſmall letter-preſs cuts, of unequal merit, of which the ſubjects are taken from the Old Teſtament. The encomiums that have been repeatedly paſſed on the whole, namely, that "boldneſs, ſpirit, and delicacy are united in their execution," are only applicable to the beſt of theſe cuts: the reſt are ſcarcely, if at all, ſuperior to the common place of the day.

The firſt edition of this work, which is commonly termed Holbein's Bible, is ſaid to have been printed (at Lyons, by the brothers Melchior and Gaſpar Treſchel) in the year 1539, and as this was thirteen years after his departure for England, it is not eaſy to believe that theſe cuts are really *engraven* by Holbein, notwithſtanding what is aſſerted in the inſcription: and they are on the whole inferior both in deſign and engraving to the "Dance of Death," of which we ſhall preſently ſpeak.

That the craft of publiſhers on ſuch an occaſion ſhould have outſtripped the ſtrictneſs of truth, and that a name which had reſounded through Europe ſhould be uſed as the trumpet of popularity and the means of profit, would be no very extraordinary occurrence. The work was for the multitude, and the multitude, on ſuch a point, were eaſily deceived; nor could Holbein, if he were really the author of the *deſigns*, eaſily contradict the complimentary inſcription.

"The Dance of Peaſants," engraved from a picture which he painted in the fiſh-market at Baſil, and evidently before his departure for England, of which fine impreſſions are now become rare and valuable.

The cuts for "The Praiſe of Folly," of his friend Eraſmus, have alſo been aſcribed to Holbein, beſides ſeveral detached frontiſpieces, jewellery ornaments, and vignettes, and, laſtly, we ſhall mention the "Imagines Mortis," or "Dance of

Death," over Holbein's claims to which the accurate reſearch of M. Douce of the Britiſh Muſeum has thrown a ſhade of doubt that may not eaſily be diſpelled.

It conſiſts of forty-ſix ſmall upright prints, each ſurrounded by a double-line border, wherein Death, in the ſkeleton form, is poetically repreſented as leading off an individual from every ſtation and condition of life, from the emperor in his imperial ſtate, down to the meaneſt peaſant; and the general moral which combines the whole is, that Death pays no regard to age, ſex, or condition.

It ſeems proper here to be obſerved that theſe engravings are not taken, as Papillon, Strutt, and others have miſtakenly ſuppoſed, from an ancient painting on the walls of a cemetery at Baſil, and that this painting is not from the hand of Holbein, but is of much older date. The originals are drawings or ſmall pictures which have been ſuppoſed to be by Holbein, between which and the large picture in the cemetery there is this material difference, that the former forms one long and connected proceſſion of ſingle figures, each led by a ſkeleton, whereas the latter is compoſed of ſeparate groups, in which one or more living figures or ſkeletons are occaſionally introduced, as ſuited the views of the artiſt, and altogether forming a ſeries, the idea of which was no doubt ſuggeſted by the walls of the cemetery, and by the dances of death that were ſometimes found painted in the crypts of ancient cathedrals, and of which there was one at Lubec, another in the church of the Innocents at Paris, and another in our old cathedral of St. Paul.

Of Sigiſmund Holbein we ſhall ſay but little, for much could not be ſaid to his credit. He was uncle to our Hans, and painted, and engraved on wood; but his powers were very inferior to thoſe of his nephew, and even to thoſe of his brother. The prints marked with the monogram, which will be found in our firſt plate of thoſe of the German ſchool of engraving, are aſcribed to him, but Strutt doubts the fact of his having engraved them, nor does it much matter.

The cypher formed of an H and an L, which appears to that cut in the Imagines Mortis, of which the ſubject is called "The Ducheſs," is certainly not that of either of the Holbeins, and is very likely to have belonged to ſome German wood engraver, whoſe initials might be thus conjoined, who was the real engraver of the whole ſet of the Dance of Death, and who might perhaps be Hans Lederer, as is conjectured by Mr. Douce.

Bartolomeo Beham was born at Nuremberg ſome time about the year 1496, and, according to Sandrart, ended his days in Italy, a ſhort time before the middle of the ſucceeding century. He travelled thither with duke William of Bavaria, and became the diſciple of Marc Antonio, under whoſe inſtruction he advanced rapidly in his profeſſion, and whoſe ſtyle he imitated without implicitly following. He remained ſeveral years at Rome and Bologna, working chiefly in the excellent ſchool of Marc Antonio, and incorporating with the careful and patient manual execution of Germany, the accurate drawing of his maſter, and the fine taſte of Italy and Raphael. Strutt accordingly ſays of him, that "his drawing is correct and maſterly; his heads characteriſtic, and the other extremities of his figures well marked."

Sandrart ſtates of this maſter, that in his time a great many of his engravings (preſumptively engraved *plates*, and not impreſſions from them) might be ſeen in the gallery of the elector of Bavaria at Munich, and in the cabinet of the prince of Neubourg.

The collection of the works of Bartolomeo Beham is however attended with conſiderable uncertainty, from the circumſtance of many of them having been publiſhed without his name, monogram, or other mark. Strutt attributes to him the engravings that are marked with a ſmall die, on which ſometimes appears the letter B, whilſt the abbé Marolles, Huber and Roſt, contend that theſe prints are the production of Beatrici.

Of the works generally attributed to this maſter the following are the principal:—the portraits of William, duke of Bavaria; Eraſmus Balderman, at the age of 33, and Leonard van Eck, a counſellor of Bavaria, all in octavo. The emperor Charles V., at the age of 31, with the Latin inſcription "Progenies divum quintus ſic Carolus ille imperii Cæſar et ora tulit;" and the emperor Ferdinand I. with the inſcription "Proximus a ſummo Ferdinandus Cæſar Rex Romanorum ſic tulit ora genas," both in quarto, and marked B.B. Theſe are a finely engraved pair of portraits, and ſo much in the ſtyle of Marc Antonio, that Vaſari thinks the portrait of Charles V. is really engraved by that maſter.

The beſt hiſtorical works of Beham are "Adam and Eve, with the figure of Death introduced into Paradiſe." "Judith beheading Holofernes," dated 1525, and in the taſte of Marc Antonio. "The Madonna ſuckling the Infant Chriſt at a Window," (without the mark of the artiſt.) "A Sybil reading, and having before her a Boy holding a Flambeaux," (marked B. B. but apparently after Raphael.) "Suſannah and the Elders," after Julio Romano. The deaths of Lucretia and Cleopatra, both without the engraver's mark. "The Judgment of Paris," with a dark back ground, a ſmall frieze, repreſenting a combat, and marked "Titus Gracchus," and another ſmall plate of a combat, wherein ſoldiers are fighting with clubs, companion to the above. "An Infant careſſing a Dog," a ſmall circle, dated 1525. Another Child, with a ſkull near him, marked B. B. and dated 1524. An emblematical piece, inſcribed "Der Weif Lauf," in which appears a half naked woman fettered, and aſleep under a tree, an infant at her ſide, and a lamb at her feet; and an indelicate ſubject from Eccleſiaſtes.

Hans Sebald Beham, the couſin or nephew of Bartholomew, was born at Nuremberg in the year 1500, and died at Frankfort on the Maine in 1550. He is ſaid by Sandrart to have ſtudied under his relative, but Bartholomew went early to Rome, and, it muſt be remembered, was but four years older than Sebald; perhaps he merely learned of him the rudiments, and afterwards ſtudied with Aldegrever, of whom we ſhall preſently ſpeak, the works of Albert Durer.

He was obliged to quit Nuremberg on account of his libertiniſm, but ſettled ſoon after at Frankfort; where, however, he relapſed into his former courſes, and after engraving for ſome years, in the courſe of which the number of plates and tablets which he produced is ſurpriſing, he became the landlord of a tavern.

The German biographers of Sebald maintain, that when he eſtabliſhed himſelf at Frankfort, he altered his monogram, by ſubſtituting the letter B for the P which he uſed at Nuremberg; they do not ſay he did it for the ſake of concealment, and it may in ſome degree account for this variation, when we recollect that theſe letters are often orally confounded among the people of that nation. The Abbé Marolles, Le Comte, and the French writers, on the other hand, often call him Hiſbens, and Sebald de Bohemé, for which we cannot ſo readily account.

Sebald Beham ranks deſervedly high among the little maſters; he engraved chiefly from his own compoſitions, which ſhew a lively and vigorous invention, though ſomewhat hampered by the Gotho-german taſte, which was then prevalent, and which chiefly appears in the ſtarched and inelegant folds with which he loaded his draperies. His drawing of the naked, on which he ſeems to have juſtly prided himſelf, though not free from manner, is often correct, and ſometimes maſterly; his heads are expreſſive, and his other extremities carefully determined. The manual part of his engraving on copper, executed with the graver only, is clear and delicate. The prints which he has cut on wood are ſlight, but ſpirited and free, as wood engraving ought to be; for wood engraving ought not to emulate the delicacies and difficulties of the art of engraving on copper.

His two monograms will be found among thoſe of the firſt plate of the German ſchool. From thoſe which he engraved between the years 1519 and 1530, with the Nuremberg cypher, we ſelect the following; *viz.* the portraits of Sebald Beham and his wife Anne, where his cypher appears encircled by laurel. Two ſmall plates of "Adam and Eve in the terreſtrial Paradiſe," dated 1519. "St. Jerome with his Lion holding the cardinal's Hat." "The Madonna ſuckling the infant Chriſt." "The Virgin of Ratiſbon," where ſhe is repreſented ſtanding on a creſcent, and ſurrounded by radiance, and "The Death of Dido," all dated in 1520. "St. Anthony writing in the Deſart," and "St. Sebald, (the patron ſaint of Nuremberg,) ſitting among trunks of Trees, and holding in his right hand the Model of his Church," both dated 1521. "Two Peaſants marching and playing on the Flute and Bag-pipes, and a male and female Peaſant Dancing," dated 1522. "A Triton ſupporting a Nereid," dated 1523. "Force, allegorized by a Woman ſitting on a Lion," dated 1524. "A young Man ſitting under an Arbóur embracing a young Woman," dated 1526. "The Death of Cleopatra," dated 1529. An ornamented vaſe with an inſcription. "A combat between the Greeks and Trojans," inſcribed "Krichen und Droioner," and another combat, inſcribed "Achilles und Hector," both ſmall friezes.

Of thoſe which S. Beham engraved at Frankfort, between the years 1531 and 1549, and which are marked with his ſecond cypher, the following are held in moſt eſteem.

A vaſe enriched with ſculptured ornaments, at the baſe of which are two ſyrens, dated 1531. "Adam and Eve careſſing each other." "Adam and Eve in Paradiſe," between whom is Death, with a ſerpent wound round him, preſenting the fatal apple; a high finiſhed plate, dated 1543. "The emperor Trajan arreſted at the head of his Army." "Melancholy and Patience," two female figures, the former copied from the celebrated engraving of the ſame ſubject by Albert Durer, dated 1539; the latter ſitting on a column, which is inſcribed "Patientia," and dated 1540. Another pair, of Good-fortune and Evil-fortune, the former figure ſtanding and holding a wheel, the latter arreſted in her courſe by an evil genius, who is preſenting her with a lobſter or craw-fiſh. An etching of a buffoon preſenting flowers to a young woman. A ſet of the four evangeliſts, dated 1541. Another ſet of twelve of the labours of Hercules, dated from 1542 to 1548. "An Enſign beating a Drum," inſcribed "Im Baueren Kreig;" ſmall, and dated 1525. "A Roman Charity," very finely engraven, dated 1544. The arms of Beham, as granted to the family by the emperor Maximilian, a hexagonal print, inſcribed "Sebalt Beham, von Nurnberg, maler, jekt wohnhafter Burgher in Frankfurt," dated 1544. Buſt of Domitian in the manner of an antique medal. A ſet of ſix, and a title-page of the months repreſented by male and female peaſants dancing, the laſt dated 1545. "The Judgment of Paris," dated 1546. "Death ſeized from behind by a naked Female," a beautifully finiſhed plate, dated 1547, with the following words inſcribed on a ſtone, "Omnem in homine venuſtam mors abolit." "A Man endeavouring to root up a Tree," dated 1549, and inſcribed "Impoſſibile, &c." and a virgin and child copied from Bartholomew Beham, dated 1549.

The letter-preſs cuts of S. Beham have not been thus carefully arranged and ſeparated. We ſelect from them the following. His own portrait in a bonnet and without a beard. A ſet of eight from the Paſſion of our Lord, two of which are marked with his former, and two with his latter cypher. An "Holy Family," in which St. Joſeph is plucking fruit. "The Virgin and Child." "A Penitent." "St. Jerome with a Bible and Crucifix." "Immortality," repreſented by a female crowned with ſtars, and trampling on a ſkeleton, dated 1548. A public bath of Anabaptiſts, of both ſexes and all ages, of the circular form. Another public bath, a large print on four leaves. "A village Fair" of the frieze form, and "A March of Soldiers," alſo of the frieze form, and large; the four laſt-mentioned engravings are very rare; a ſet of three hundred and forty-eight, engraved for "Biblicæ Hiſtoriæ Artificioſiſſime depictæ," printed at Frankfort in 1537. But it is to be obſerved that there are two editions of this bible, of which the former is in Latin, and the latter, dated 1539, is in the German language.

Gregory Peins, or George Pentz, was alſo a native of Nuremberg, born in the year 1500. He firſt ſtudied in the ſchool of Albert Durer, and profited much by the inſtructions of that diſtinguiſhed maſter, but it was in Italy, and under Marc Antonio, that he finiſhed his taſte, formed his ſtyle of engraving, and acquired that correctneſs of drawing which we regard with ſo much admiration in his beſt works. His plates are executed entirely with the graver, which he handled with much ſkill, uniting with great preciſion a degree of freedom which was unexampled. He appears to have worked on ſome of the beſt plates that paſs under the name of Marc Antonio.

The far greater number of the engravings of Peins are of ſmall dimenſions; wherefore he is uſually claſſed among "the little maſters;" but he has produced ſome few large prints; one eſpecially of great merit, of "An Army paſſing a Ditch, and ſcaling the Walls of a fortified City," after Julio Romano; which, as Strutt has ſaid, is "an admirable ſpecimen of the artiſt's ſuperior abilities."

Peins died at the age of fifty-ſix, but where, his biographers have not mentioned: his monogram will be found in our plate of thoſe of the German ſchool; and the moſt eſteemed of his numerous works are thoſe which follow: Portraits of Gregory Peins and his wife on the ſame plate, with the inſcription "Imago Gregori Peins Imago Duxore Gregori Peins." From this engraving it ſhould appear, that the name it bears was the true name of our artiſt, and that the name Georgius Pentz, which appears under his large plate after Julio Romano, is probably an error of the publiſher Van Aelſt. Portrait of Jean Frederic, elector of Saxony, a rare print, dated 1543.

The beſt of the hiſtorical works of Peins are, a pair of "Eſther before Ahaſuerus," and "The Temptation of Job;" another ſmall pair of "Judith in the Tent of Holofernes, and Judith appearing afterwards with his Head;" another pair, finely executed, of "Solomon's Idolatry," and "The Judgment of Solomon."

Peins appears to have poſſeſſed ſome judgment, at leaſt ſome humour, in pairing his prints; the next companions which we have to notice, are "Suſannah ſolicited by the Two old Men," and "Lot intoxicated by the Two young Women, his Daughters."

From the hiſtory of the patriarch Joſeph, we find a ſet conſiſting of four plates; another ſet from the hiſtory of Tobit of ſeven, including the title-page. A pair of "The Good Samaritan, and the Converſion of St. Paul." A ſet of the Four Evangeliſts after Aldegrever, which bear the cyphers of both artiſts. Another ſet of the Seven Works of Mercy, of the circular form, and with German inſcriptions. Another ſet, very highly finiſhed, conſiſting of twenty-five, from the Life of Chriſt. "Herodias receiving the Head of John the Baptiſt." A pair of "The Rape, and Death, of Lucretia." A pair of "King Porſenna paſſing the Tiber, and Horatius Cocles ſingly defending the Bridge." Another pair from the Life of Virgil. Another pair, dated 1539, of "Cephalus and Procris, and Medea and Jaſon." "The Death of Dido," and "The Death of Virginia." A ſet of three, of "Mutius Scevola thruſting his Hand into the Fire;" "Marcus Curtius precipitating himſelf into the fiery Gulf;" and "The Puniſhment of Titus Manlius;" in the latter of which the artiſt has introduced the beheading machine, which is ſince known in France, the dreadful guillotine. A pair of "Sophoniſba" and "Artemiſia;" "The Supplication of Regulus;" "The Centaur Chiron inſtructing Achilles;" "The Triumph of Bacchus," a frieze in the antique taſte. A ſet of ſix emblematical triumphs of human nature, *viz.* of Valour, Chaſtity, Love, Time, Death, and Religion. A ſet of five of the ſenſes perſonified, with Latin inſcriptions; another ſet of the ſeven liberal arts; and another of the ſeven mortal ſins.

But his principal and largeſt work, of which we have already ſpoken, is "The taking of Carthage by the Romans," after Julio Romano.

Among that claſs of the ancient engravers of the continent who are called the "Little Maſters," from the ſmall dimenſions of their works, Henry Aldegrever ſtands in the very firſt rank. He was born at Zouſt in Weſtphalia, A. D. 1502, but of his anceſtors we find no account. Both his baptiſmal and family names have been miſtaken, for, by ſome authors, he is called Aldergraft; while others, perhaps, miſtaking ſome of the ſmaller works of Albert Altdorfer for his, ſay that his chriſtian name was Albert; but profeſſor Chriſt aſſures his readers that the name of this artiſt was Henry, and not Albert; and upon his own portrait his ſirname is written, at full length, "Aldegrever."

Nuremberg was at that time the head-quarters of German art; and thither young Aldegrever was ſent to ſtudy under Albert Durer. He imitated the ſtyle of his maſter with great ſucceſs, and gradually learned to blend with it a certain ſmall portion of the elegance and ſimplicity which Italy firſt caught from the reſurrection of Grecian art; and Germany from the engravings which were brought thither from Italy.

Aldegrever is a lofty object, which receives the firſt faint rays of a riſing ſun, and it is univerſally allowed by his critics, that had he reſided in Italy, "the genius and ability which diſplayed itſelf ſo conſpicuouſly in his own country, would have ſhone with double luſtre."

The manual part of his engraving, executed entirely with the graver, is extremely neat, and in a ſtyle evidently founded upon that of Durer. He is among the firſt who gave texture to the light parts of fleſh by the admixture of ſmall long dots, which has ſince been carried to ſuch admirable perfection by Nanteuil and others. His drawing of the naked, which he ſeems fond of introducing, is more correct than is found among his predeceſſors of Germany, and his men more correct than his women. His heads are, in general, expreſſive, and his other extremities well marked, though occaſionally ſomewhat heavy.

The time of the deceaſe of Aldegrever is not accurately known, but the lateſt of his prints is dated in the year 1558. The Abbé Marolles had ſeen at leaſt three hundred and fifty different prints from his graver, of which the following liſt contains the names of the principal; but the great demand for his works has occaſioned his plates to be much worn, and often re-touched; and Strutt, with becoming ſolicitude for his fame, adviſes the collector to be circumſpect as to the impreſſions he admits into his port-folios. His monograms may be ſeen in our plates of thoſe of the German ſchool.

The principal portraits of Aldegrever, are thoſe of himſelf without a beard, aged 28, and dated 1530. Another of himſelf, aged 35, in which he appears with a long beard; Martin Luther, dated 1540; Philip Melancthon, of the ſame date; and Albert Vander Helle, aged 28, and dated 1538; all in quarto.

His folio portraits are thoſe of William duc de Julius; John of Leyden, king of the Anabaptiſts, and Bernard Knipperdolling, another fanatic.

Of his hiſtorical engravings, the moſt celebrated are, A ſet of ſix, from the Hiſtory of Adam and Eve, dated 1540. A ſet of four, from the Hiſtory of Lot, dated 1555. A ſet of four, from the Hiſtory of the patriarch Joſeph, dated 1528 and 1532; all in 12mo.

A ſet of ſix, from the Hiſtory of Abſalom, dated 1540, A pair of "David and Bathſheba;" and "The Judgment of Solomon," in 8vo. A ſet of four, of "The Hiſtory of Suſanna and the Elders," dated 1555. Another ſet of four of "The Good Samaritan." A ſet of five, from "The Parable of the Rich Man," dated 1554. A ſet of the "Four Evangeliſts," bearing the monograms of both Aldegrever and Peins. "The Annunciation and Nativity," a pair, in 8vo. Two of "The Madonna and Infant Jeſus." Two ſmall friezes of "Battles between Hector and the Greeks, and Scipio and the Carthaginians." A ſet of ſix, of "The Deities who preſide over the Planets." A ſet of twelve, of "The Labours of Hercules," each with a Latin diſtich, dated 1550. A ſet of fourteen allegorical figures, ending with the Saviour victorious, and inſcribed "Pax noſtra Chriſtus." A ſet of the ſeven Cardinal Virtues. A ſet of the ſeven worſt Vices. Another ſet of ſeven, of "The Empire of Death," dated 1541.

The only etching from the hand of Aldegrever is now become very ſcarce: its ſubject is Orpheus and Euridice, dated in 1528, and in 12mo.

James, or Jacob Binck, was alſo of Nuremberg, or, according to ſome authors, was born at Cologne, in the year 1504, and died at Rome in 1560. His ſtyle of engraving greatly reſembles that of Aldegrever, under whom, or Albert Durer, he probably learned the rudiments of his art, and improved himſelf afterward in the ſchool of Marc Antonio: yet his ſtyle is not always the ſame; it often poſſeſſes more ſeeming facility than that of Aldegrever, and when, at the beſt, more of Italian taſte. He apparently ſtudied alſo, and imitated, that of Marc de Ravenna.

His cypher, compoſed of the initial letters of his name, is that of many other artiſts who lived about the ſame period; but he ſometimes added a little bird, and at others uſed the monogram, which will be found on our ſecond plate.

The chief works of Jacob Binck are, "A young Man dreſſed in a Bonnet, holding a Skull under his Cloak, and a Cup in his Right-Hand." This, according to Sandrart, is his own portrait; but, though the face may poſſibly reſemble him, the reſt of the compoſition is copied from an engraving of the ſame ſize by Iſrael von Mechenin.

The portraits of Francis I., Chriſtianus II. ſurrounded by ornamental architecture; a young princeſs, dated 1526; Luke Gaſſele, dated 1529; the archducheſs Elizabeth of Denmark; a pair, of Martin Luther, inſcribed "In ſilentio Veſtra," and Philip Melancthon, inſcribed "Si Deus pro nobis quis contra nos."

His principal hiſtorical engravings are, a ſmall plate of St. Jerome. "Marcus Curtius precipitating himſelf into the Fiery Gulf," marked 15 I. B. 29. A pair, of the frieze proportions, of "Infant Bacchanals gathering grapes, &c." and "The Triumph of Bacchus," wherein his car is drawn by ſatyrs, and attendant nymphs are playing on muſical inſtruments, dated 1528, 1529. A ſet of the Seven Planets perſonified. Another of the Seven Cardinal Virtues. An emblematical piece en medallion, in which a flaming heart, *i. e.* an heart of ardent virtue, is beaten on an anvil, by four allegorical females: which figures, as we are informed in Bilibald Pirkheimer's emblems, are Experience, Envy, Tribulation, and Intolerance, marked 15 I. B. 29. "Hiſtory," a female figure with wings, writing. A pair of "Peaſants marketing with People of ſuperior Condition." A ſet of twenty, of Divinities ſtanding in Niches, copied from Curalices, who copied them from Roſſo

The above are marked with the initials of the artiſt: the following are with his monogram. A pair, very ſmall, of "Eve with Two Apples, and Adam holding the Branch of a Tree." "Lot and his Daughters," a ſmall circle. "David with the Head of Goliah;" and "Judith with that of Holofernes;" both ſmall. "The Millennium, or Archangel Michael, chaining the Devil." "The Holy Family." "The Slaughter of the Innocents," a very rare print, after Raphael, but perhaps copied from the engraving by Marc Antonio. "The Deſcent from the Croſs." "St. John aſleep with the Lamb," dated 1526. "St. George and the Dragon." "Mercury travelling in a Deſart," a ſmall circle. "A Soldier defending himſelf againſt Death, who has overthrown him." "A Woman beating the Devil with a Diſtaff." "A Woman advancing with Surpriſe towards a Man who is ſeated near a Pedeſtal, on which is a Child," after Raphael, and engraved under the direction of Marc Antonio. "A Male and Female Peaſant Dancing." "The Blind Child." A vignette, with Cupids mounted on dolphins.

Strutt begs leave to add, a figure of "Saturn ſtanding in a Niche devouring One of his Children," a ſmall upright, which differs in the ſtyle of engraving from the foregoing, being more bold, ſpirited, and correct. The real meaning of this allegory muſt be, that Time is ſwallowed up by Eternity. On a tablet which is introduced is "Jacobus Binck Colonienſis, fecit 1530.

Another of "the little maſters" of Germany was Hans or John Broſamer, born at Fulda, in the circle of the Upper Rhine, in the year 1506. His manner of engraving often bears reſemblance to that of Aldegrever, but the ſchool in which he ſtudied is not known; ſometimes, however, he differs from that diſtinguiſhed maſter by interworking the lines of his draperies and backgrounds with ſtippling. His drawing of the naked is however very deficient, and in manual execution he by no means equalled the Behams. He died at the age of fifty-four, and his cypher, compoſed of the letters H and B, will be found in our firſt plate of thoſe of the German ſchool.

His principal engravings are, the portraits of Martin Luther, and the abbot of Fulda, dated in 1541.

And in hiſtory, "Samſon and Dalilah;" "David and Bathſheba;" and "Solomon's Idolatry;" dated 1543, all ſmall uprights. "Xantippe and Socrates;" "Laocoon and his ſons;" dated 1538; "The Rape of Helen;" of the frieze form, dated 1540; "Marcus Curtius leaping into the Gulf;" a ſmall circular plate; "The Judgment of Paris;" "A Crucifixion, with Angels, the Virgin Mary, and St. John;" "The grand proceſſion of Chriſtian Heroes;" a rare print, engraved on wood, and ſometimes attributed to Burgmair; and "Biblia Veteris Teſtamenti artificioſis picturis effigiata," printed at Frankfort in the year 1552, and conſiſting of a ſet of engravings on wood, chiefly, but not entirely, copied from thoſe of Holbein, which were publiſhed at Leyden in 1547; but by no means equal to the originals, either in ſpirit, neatneſs, or truth.

Auguſtin Hirſchfogel was born at Nuremberg A. D. 1506, and died in the ſame city in 1560. He was probably educated a painter, but produced ſeveral etchings, of which the landſcapes poſſeſs conſiderable merit, being etched with ſome taſte and the touch of a maſter, but when he introduced the human figure it is very incorrectly drawn. The ſingular monogram of Hirſchfogel, ſurmounted by a little croſs, will be found in our firſt plate of thoſe of the German ſchool, and his principal productions are as follow:

Part of "Raphael's ſlaughter of the Innocents," from a ſketch by that maſter, which differs from the print by Marc Antonio, dated 1545. A ſet of four, and another ſet of ſix landſcapes, from his own compoſitions of caſtle and mountain ſcenery, in 4to., dated 1546. A folio landſcape, in which is introduced an ill-drawn female intended for Cleopatra, dated 1547. An ornamented vaſe in 4to. dated the ſame year, and two ſmall views of ſea-ports, with ſhipping, &c. dated 1549.

Henry, whom Strutt has miſtakenly confounded with Hans or John Lautenſack, was alſo of Nuremberg, or, according to ſome authors, was of Doppelmayr, and born in the ſame year with the preceding artiſt. He was the ſon of a painter, and learned the principles of deſign in his father's houſe, which he probably continued to inhabit, for we find that he died in his native city in the year 1590.

The elder Lautenſack employed much of his time in engraving on the precious metals for the ſideboards and perſonal ornaments of the opulent and the great, but in the year 1567 he publiſhed at Franckfort on the Mayne the "Geometrical proportions and perſpective of the Man and Horſe;" in ſmall folio; "The Martyrdom of St. Catherine;" two ornamental plates of boys, &c.; "The decollation of St. John the Baptiſt;" "Chriſt expiring on the Croſs," and a boy ſtanding on a globe with a bow in his hand, and below whom is a deluge, with many ſmall figures, are alſo engraved by Henry Lautenſack, whoſe marks will be found in our ſecond plate of German monograms.

Of the ſame place and family with the preceding, was Hans Sebald Lautenſack, who was born in the year 1508, but of the principal events of whoſe life, and the time of whoſe death, we are ignorant.

His portraits are held in eſteem among connoiſſeurs for their truth of reſemblance; and his landſcapes, which are chiefly etchings, for their wild, or beautiful, or grand effects; but the figures which he has introduced are generally diſproportionate.

His landſcapes are of an hiſtorical character, and are commonly denominated after the figures they contain. Of theſe the following will probably be found moſt worthy of the collector's attention: "The little David combating the Great Goliah," dated 1551. "The Blind Man of Jericho, reſtored by our Saviour," and another miracle of "The Devil caſt out from the Canaanite," both dated 1559. "Balaam and his Aſs," in a very mountainous landſcape, and a very rich ſcene of "The Labours of the Vintage," are alſo dated in 1559, all of the folio ſize. An upright landſcape with a large farm, dated 1551. A pair of intereſting and extenſive ſcenes in 4to. dated 1553 and 1555. A grand tournament, of large folio dimenſions, entitled "Equeſtris pedeſtriſque pugnueicon," 1560; and another grand jouſt, entitled "Secundum Circenſium Ludorum, equeſtre certamen continens," 1560, both of which are now become very rare. A pair of views of the imperial city of Nuremberg, in large folio, each engraved on three plates, and dated 1552 and 1555.

The principal portraits by Hans Sebald, are thoſe of his father Paul Lautenſack, painter of Nuremberg, in folio. Himſelf, in ſmall folio, dated 1552. Hieronimus Seurſtab.

Georgius Roggenbach, and two other half-lengths, all in folio.

The brothers David, Jerome, and Lambert Hopfer appear to have been the ſons of a goldſmith, and flouriſhed at Nuremberg within the firſt fifty years of the ſixteenth century. They produced a great many ſpirited etchings, which Hollar afterwards made the foundation of his ſtyle. David was the moſt induſtrious of the three, but deſigned in the vicious taſte of his age and country: yet his freedom of handling is very pleaſing, and diſplays itſelf to advantage in buildings and ornaments. He uſually marked his plates with the initials of his name, between which he introduced what the Abbé Marolles appears to have miſtaken for a candleſtick, for he emphatically calls the Hopfers “le Maitres du Chandelier,” but what is really intended for a hop-plant, in alluſion to their name, which in the German language ſignifies hop-plant. Theſe letters, with the plant, ſometimes appear on a tablet, for which ſee our plate of German monograms.

The principal works of David, are the portraits of Nero and Galba, of the 4to ſize, as medallions. Carolus Rex Catholicus, the ſame. Martin Luther, dated 1523, and Claude Sturzenbecher, a rare print in folio.

Of his hiſtorical engravings, we ſhall mention, “David beheading Goliah,” in 4to. and “David Playing on the Harp before Saul,” in folio, dated 1531. “The Adulterous Woman;” “The Preſentation in the Temple;” “The Laſt Judgment;” and “A Grand Altar,” with the figures of Jeſus Chriſt, the Virgin Mary, St. John the Baptiſt, and others, all in folio. A ſort of ridiculous “Morice Dance of Groteſque Figures.” “The Monopoliſer of Grain, execrated by the People,” inſcribed, “die Sprich Salomo. Das XI. Capitel.” A ſubject from the 10th chapter of Solomon's Proverbs, dated 1534, both in folio. “The Three Great Jews, Joſhua, David, and Judas Maccabeus, on horſeback.” “The Three Chriſtian Heroes, Charlemagne, king Arthur, and Godfrey of Boulloigne,” companion to the above, both in 4to. and after Hans Burgmair. “A Grand Village,” of ſquare form and folio dimenſions. “Two Females Surveying themſelves in a Mirror, behind whom are Death and the Devil.” Two very groteſque figures, inſcribed “Bolikana, Markelfas,” in folio. “The Crucifixion betwixt the two Thieves.” Another “Crucifixion,” in which St. John and the Virgin Mary are introduced, the latter pierced by a ſword, in alluſion to her exceſſive grief; and a ſmall copy of a celebrated work of Andrea Mantegna, of “A Combat of Marine Monſters.”

Jerome Hopfer etched much in the ſame ſtyle with his brother, but was ſomewhat his inferior in merit. He made ſeveral copies from celebrated works of Albert Durer, and ſometimes engraved from his own compoſitions, marking his prints as did his brother.

His beſt works after Durer are, “St. Hubert,” “St. Jerome,” and “The Grand Cannon.” “Hercules Combating the Hydra,” is from Andrea Mantegna: and the beſt from his own deſigns are “Lucina holding a Moon in her right Hand, and a Flambeau in her left.” “Minerva holding a ſmall Figure of Victory.” A rare print of “The Engliſh and French drawn up in battle array, previous to the Fight at Agincourt.” And a battle, after Julio Romano.

Of ſtill leſs merit than his brethren, was Lambert Hopfer, who copied in etching a great number of the wood cuts of Durer, but his works diſplay little taſte and leſs correctneſs.

Among them are a ſet of fifteen of “The Life and Paſſion of Chriſt.” “The Converſion of St. Paul.” “The Fall of our Firſt Parents.” Several plates of arabeſque ornaments, and four beautiful candelabra, with an arabeſque band which is eſteemed the beſt of his engravings.

Strutt has added to theſe another Hopfer, for whom he claims equal merit with the beſt. The initial letter of his chriſtian name was an N. He worked with the graver, but imparted to his lines ſomewhat of the roughneſs of etching, and drew more correctly than David or any other of the family. To this artiſt he aſcribes “The Call of Jeremiah,” a ſmall upright, dated 1525. “A female Saint, holding a Palm Branch, and ſeveral Figures ſleeping with the Deity appearing above,” which, he ſays, is “a fine ſpirited etching.”

David Funck, a printſeller of Nuremberg, towards the beginning of the laſt century, collected and publiſhed all the plates of theſe artiſts, amounting to two hundred and thirty, under the title of “Opera Hopferiana:” ſome of which were found to be executed on plates of iron or tin.

Virgile Solis engraved both on copper and on wood, chiefly from his own deſigns; was born at Nuremberg in the year 1514, and died in the ſame city in 1570. Under what maſter he ſtudied does not appear. His early works reſemble thoſe of Beham, but when he came to engrave after Raphael, and other Italian maſters, he adopted a ſtyle more open and ſpirited. His prints on wood bear great reſemblance to thoſe of Joſt Ammon, both in deſign and execution.

Virgile Solis was a man of ability. His compoſitions are often judicious, but his drawing of the naked is not equally correct. He is claſſed among the little maſters, and uſed occaſionally three cyphers, which will be found in our ſecond plate of the monograms of the German engravers.

Mr. Evelyn ſays, that for “imitating the vile poſtures of Aretin, he had his eyes put out by the ſentence of the magiſtrate.” Strutt preſumes, that if this ſtory be true, the engravings of Solis muſt have been copies from thoſe which Marc Antonio did after the deſign of Julio Romano, (and which had nearly coſt him his life,) to which the poet Aretin did but ſupply verſes.

The engravings of Solis amount to upwards of eight hundred, of which it may ſuffice to ſpecify the following: “The Marriage of Cupid and Pſyche;” “The Aſſembly of the Gods;” and “Mount Parnaſſus,” all after Raphael. “The Bath of the Anabaptiſts,” a ſmall plate, after Aldegrever. A ſet of four plates of fragments of ancient architecture. A ſet of ſix heads of Roman emperors, ſmall. A pair of ſmall friezes, in which are numerous parroquets. A ſet of portraits of the kings of France, from Pharamond to Henry III. The above are on copper, with ſome few etchings, which are inferior to the reſt of his works.

His principal engravings on wood, are a ſet of one hundred and ſeventy from Ovid's Metamorphoſes, ſmall, and dated 1563. A ſet for the emblems of Nicolas Reuſner, dated 1581. And, another ſet for thoſe of Andrea Anciatus, both of which books were printed at Frankfort in the year 1581.

Melchior Lorch, or Lorich, was born at Flenſburg, in the dutchy of Sleſwic, in the year 1527, and died at Rome in 1586. He was diſtinguiſhed both as an artiſt and an antiquary: ſome time about the middle period of his life, he made a voyage to Conſtantinople, where he painted and engraved the portraits of the grand ſeignior and his favourite, which are now become very rare, and where he formed that collection of Turkiſh dreſſes, which were afterwards engraven on wood, and publiſhed in the year 1576, in a folio volume. His engravings are decidedly thoſe of a man of talent: he drew with conſiderable ſpirit, and a tolerable degree of correctneſs. His works on wood are executed with much freedom and boldneſs, while in thoſe on copper theſe qualities are in ſome degree loſt in the neatneſs to which he laboured his finiſhing. Strutt ſpeaks of a crucified figure, (which is deſigned ſo much in the ſtyle of Michael Angelo, that he ſuppoſes it to be engraven after ſome work of that great maſter) as a very extraordinary production. It is executed entirely with the graver, and the left leg and arms are much fore-ſhortened. He ſays, " if this figure be not quite correct in all its parts, it is however well drawn upon the whole, notwithſtanding the difficulty of the fore-ſhortenings, and is finiſhed in a ſtyle of neatneſs equal to that of Jerome or Anthony Wierix, while it is ſuperior to them in point of taſte." His monograms, which he ſometimes ſurmounted by the date of his work, will be found in our ſecond plate of thoſe of the German ſchool.

The works of Lorich, which are held in moſt requeſt among connoiſſeurs, are: the portrait of Martin Luther, dated 1548. That of Albert Durer, with four Latin verſes, dated 1550, a very rare print, done in imitation of a Cameo, and thoſe which we have mentioned above of the grand ſeignior and his favourite ſultana, very neatly executed on copper, and very ſcarce. Ariſtotle, the Stagyrite, dated 1561. " St. Jerome in the Deſart," dated 1546; and a ſmall upright of a female head, beautifully executed, are alſo on copper.

His beſt engravings on wood, are a ſet mentioned above, of the coſtume of Turkey, in ſmall folio, dated from 1570 to 1581. " The Tiburtine Sybil," dated 1571, executed in his beſt ſtyle. " A Woman preſſing her Breaſt, with numerous Animals below," and inſcribed " Ops Saturni conjux materque Deorum," a very ſpirited engraving in folio, dated 1565. And " The Deluge," a large folio, engraven on two blocks, the impreſſions from which are afterward paſted together.

Theodore de Bry, or de Brie, the elder, was born at Liege in the year 1528, and died at Frankfort on the Maine in 1598; at which latter place he chiefly reſided, but to whom he owed his early initiation to art is not known. He appears to have formed his taſte by copying the works of Sebald Beham. He worked almoſt entirely with the graver, and acquired a neat and free ſtyle, which was well adapted to ſmall ſubjects, in which numerous figures were required to be introduced, ſuch as ſtate, and funeral, proceſſions. He drew correctly: his heads in general are ſpirited and expreſſive, and his other extremities well marked, and his back grounds, though frequently ſlight, are touched with a maſterly hand.

About twenty years before his death he viſited England, and engraved at leaſt two large and laborious plates, of which we ſhall preſently ſpeak, in the city of London. He died, as his ſons in the 3d part of Boiſſard's collection of portraits inform us, March 27, 1598. De Brie marked his plates with the cypher T. B. F., and at other times with that of Rene Boivin; and his principal engravings are thoſe which follow: an etching of " St. John in the Deſart," a rare print. A pair of " The Fountain of Youth," and the " Little Village Fair," copied from Sebald Beham. " A Bacchanalian Proceſſion," from Julio Romano. Three mixtures of the groteſque with the allegorical, of the circular form. " The Golden Age," a ſmall circle, after Abraham Bloemart. A pair of portraits en medallion, of Scanderbeg and Donice his wife. A ſet of nine figures of the muſes, in folio. The plates for the four firſt volumes of Boiſſard's Roman Antiquities (of which the two laſt volumes were completed by the ſons of our artiſt). The plates of the manners and cuſtoms of the Virginians, publiſhed in " The brief true Report of the New-foundland of Virginia, by Thomas Harriet, ſervant to Sir Walter Raleigh," from drawings by J. White, printed at Frankfort by J. Wechelius, A. D. 1590, which were afterwards copied by Picart, for his " Religious Ceremonies, &c." The plates to the Latin narrative of Spaniſh cruelties in America, publiſhed 1598.

His largeſt work appeared in the ſame year, and is entitled " Deſcriptio Indiae Orientalis et Occidentalis," in nineteen tracts, which are contained in five folio volumes.

De Brie is alſo the author of a work which may be thought ſtill more intereſting to Britiſh feelings, becauſe connected with Britiſh hiſtory. It is the proceſſion of the knights of the garter in the 18th year of the reign of Elizabeth, of which Strutt gives a very particular deſcription: " The proceſſion is repreſented as moving along a portico quite open on the ſide next the obſerver, but ſupported by thirty-three pillars of the Ionic order, on the ſide from him. Over each knight companion of the order, are his arms within the garter, and, in a compartment below, his name, titles, &c. are written in French. The laſt ſtall was vacant, and there is only a fancy portrait given, without name or arms. There are ſixty portraits in the proceſſion, each of them between four and five inches in height! Under the arches of the portico is a delightful view of a hilly country, (too hilly for an Engliſh proſpect,) interſperſed with caſtles, churches, houſes, rivers, woods, &c. and an exact view of Windſor caſtle as it appeared in that reign. The roll is ſixteen feet three inches long, and was engraved on twelve plates."

Hollar to his plate of the proceſſion, copied in ſmall from this engraving, in Aſhmole's order of the garter, ſays, " the original was deſigned by Marc Garrerd, who could be then only fifteen years old." Wherefore Strutt concludes this to be a miſtake, but perhaps Garrerd made a reduced copy from this print, from which copy Hollar's plate was engraven, which would reconcile the accounts; for lord Orford dates Garrerd's drawing in the year 1584, whereas De Brie's plate was finiſhed in the year 1578; and Strutt, reaſoning from the dedication being made in the name of Thomas Dawes, Rouge-Croix, concludes that it was deſigned by him.

Strutt ſays he never heard of any other impreſſions from this plate than the proof, which, after belonging to the Norroy king at arms, came finally into the poſſeſſion of John Fenn, eſq. of Eaſt Durham in the county of Norfolk; but the engraving is mentioned by Huber, and preſumptively therefore, is not unknown on the continent.

To this detailed account of this very curious hiſtorical engraving, Strutt adds the order of proceſſion, and the names of the ſixty portraits of the knights companions and officers of ſtate; and the reader who wiſhes to be informed on theſe points, is therefore referred to his biographical dictionary.

The other plate which our artiſt is known to have engraved in London, is "The Funeral Proceſſion of ſir Philip Sydney," on thirty-four plates, forming, when paſted together, a very long roll, but more frequently forming a book. In the inſcription beneath, it is ſaid to be " contrived and invented by Thomas Lant, gent. ſervant of the honourable knight, and graven on copper by Derick, or Theodore de Brie, in the city of London 1578;" and prefixed is the portrait of Mr. Lant, aged 32.

Jean Theodore de Brie the younger was the eldeſt ſon of Theodore, of whom we have juſt concluded our account. He was born at Liege in the year 1561, and died at Frankfort on the Maine in 1623.

The engravings of Jean Theodore are on the whole ſuperior to thoſe of his father both in taſte and preciſion, and he aſſiſted his father in the literary parts of thoſe works in which he engaged, as well as in the engravings; but Jean Iſrael, the ſecond ſon of Theodore, who alſo aſſiſted, and ſucceeded him, was far leſs ſucceſsful.

The brothers John, Theodore, and Iſrael, completed the plates for Boiſſard's Roman Antiquities, and added ſeveral to the collection of portraits of illuſtrious perſons, which their father had begun to form.

Among other portraits, we find thoſe of Gerard Mercator the celebrated geographer, and Daniel Specklin, both in 4to.

The beſt hiſtorical works of Jean Theodore are, a ſet of the elements, conſiſting of four plates in 4to. "The Return of Rebecca," after Balthaſar Peruzzi. "A March of Soldiers," and "A March of Soldiers conducting Priſoners," ſometimes called "The Triumph of Death," both of the frieze form, and by ſome ſuppoſed to be after Titian. "The Village Fete," with a Latin inſcription, after Sebald Beham, and "The Fountain of Youth," after the ſame, both of the frieze form; and a ſet of ſeventy-four plates for "Proſcenium vitæ humanæ ſive Emblematum, &c." accompanied with explanations.

Jean Kelertaler was born at Dreſden in the year 1530; under whom he ſtudied is not known, but he continued engraving in his native city, until ſome time about the cloſe of the ſixteenth century. He engraved ſome plates after Jean Marie Noſſeni, who was ſculptor and architect to the elector of Saxony, of which the following are thoſe of moſt importance.

"Nimrod building the Tower of Babel;" "The Deſtruction of the Babylonian Empire;" "The Empire of Rome," in the back ground of which is the death of Cæſar. "The Empire of the Church," where the Pope is repreſented receiving the homage of Charlemagne; and "An Allegory," where a winged figure of Death, with two trumpets, is ſupporting a globe, all of the 4to. ſize.

Tobias Stimmer was born at Schaffhauſen towards the cloſe of the ſixteenth century, but reſided chiefly at Straſburg, where he was patronized by the margrave of Baden, and became both a painter and engraver of eminence. His engravings are chiefly on wood, and from his own compoſitions; the engravings in the "Noviæ Tobiæ Stimmeri ſacrorum Bibliorum figuræ verſibus Latinis et Germanicis expoſitæ," are from compoſitions by Stimmer, though he was aſſiſted in the engraving by his brother Chriſtopher, and his pupil Chriſtopher Maurer. Stimmer underſtood the human figure very well, and compoſed with ſo much taſte and judgment, that Rubens has been heard to declare, that he had ſtudied Stimmer's bible with attention and with great benefit, and Sandrart, who relates this anecdote, calls the book, "A Treaſury of Science for the art of Painting."

In the earlier part of his career, Stimmer was unfortunate, and paſſed ſome of his beſt days in painting the façades of houſes at Frankfort on the Maine, and at Straſburg. But let no man of talent, who poſſeſſes the means of ſhewing his talent, deſpair; it was the pleaſure he received from ſome of theſe, which accidentally caught his notice, that occaſioned the margrave to engage Stimmer in his ſervice, and became the foundation of his fortune. For him our artiſt painted the hiſtory of his anceſtors, and the margrave's own portrait to this day aſſerts the ſuperior powers of Stimmer in this department of art.

We have given his monograms in our ſecond plate, and his principal work, excepting his bible, is "The Annunciation," in folio.

Jean Chriſtopher Stimmer was born at Schaffhauſen in the year 1552, and died at Paris ſome time about the commencement of the ſucceeding century. He was the brother and diſciple of Tobias, and engraved on wood a great number of his compoſitions with conſiderable ſucceſs, for he drew with ability, and hatched his engravings in a bold, but mellow ſtyle.

After the death of his brother, Chriſtopher travelled to Paris, where he performed ſome engravings, and was commonly known by the name of "the Swiſs," and where he died, leaving behind him a ſon, who alſo engraved on wood a conſiderable number of tablets after Francis Chaveau.

Chriſtopher uſed the complicated cypher which will be found among thoſe of our monograms of the ſecond plate of the German ſchool, and his beſt engravings are thoſe which follow:—A ſet for the New Teſtament, with the Apocalypſe, printed at Straſburg in the year 1588. A collection of portraits of the ſcholars and theologians of the German nation, printed alſo at Straſburg by Bernard Jobio, in 1591. "Icones Affabrae;" a collection of emblems printed in the ſame year, all of the 4to. ſize; and a capital print of an hiſtorical portrait of a kneeling figure, inſcribed "Contrafacite Bildnus des Hernn Laſarus von Schwende," &c.

Joſt or Jodocus Amman or Ammon, deſigner and engraver on wood and on copper, was born at Zurich in 1539, and died at Nuremberg in 1591. Not meeting with encouragement in his youth at Zurich, he travelled to Nuremberg, a city where the arts were reported to be in a flouriſhing ſtate, the year he became of age, and in 1577 renounced the rights of a citizen of Zurich, in order the more firmly to attach himſelf to his adopted country. Strutt ſays of him, that if patience and aſſiduity of themſelves could conſtitute an artiſt, Amman would well deſerve that character, from the multitude of deſigns which he made, and the great number of plates which he engraved, amounting, according to Huber, to more than five hundred and fifty. But though a great genius may be improved by cultivation, yet it is equally certain that neither pains nor ſtudy can create a great genius. Much merit, however, was certainly poſſeſſed by our artiſt; who lived at a time when almoſt every book which appeared was ornamented with prints, and was employed by moſt of the great bookſellers, eſpecially Siegmund Feyerabandt of Frankfort.

The engravings of Joſt Amman upon copper are not equal to thoſe which he performed for the letter preſs. His invention was not very copious: his figures are tolerably proportioned, and the detail of his drawing is careful and moderately correct; animals in particular he touched with great ſpirit. His ſtyle of engraving is neat and decided, yet if his lines are more regular, they are leſs free than thoſe of many of his predeceſſors. He affixed various marks to his performances, as may be ſeen in our ſecond plate of the monograms, &c. of the German ſchool of engraving.

His principal works on copper are, a ſet of twelve illuſtrious women, beginning with Eve, under the title of "Eva die Geberirin;" a ſet of figures of warriors, ſmall uprights, marked Joſt Amman inventor 1590; the ſet conſiſts of eight, and there is a ſet of eight others, fighting with ſwords and ſticks. The four ſeaſons, and the four elements, dated 1569. A ſet of the twelve months, perſonified, and a ſet of ſixteen friezes of hunting ſubjects; a conſiderable number of etchings of ſubjects of piety, after Winceſlaus Jamitzer; the bombardment of a city, dated 1570, in folio, and the portrait of Carparis di Colignon, D. Caſtilione, marked Joſt Ammon Figurinus, 1573.

His beſt engravings on wood are, "The Creation of Man;" "The Diet of the Empire," both in folio, the latter an oval. "The Marriage at Cana," in quarto; a ſet of one hundred and fifteen, entitled, "De omnium liberalium mechanicarum et ſedentarium artium genera continens, &c. Edit. per Hoſtmann Scoperum Francof. 1564." This work conſiſts of artiſts and artiſans, repreſented in their reſpective employments: among them are ſome excellent figures, and in that which repreſents the engraver, Amman has given his own portrait. A ſecond edition was printed A.D. 1574, and a third in 1588, but the firſt is now become very ſcarce. The book is a large octavo.

A ſet of one hundred and two, beſides the portrait of Feyerabandt, for a Latin edition of Livy, printed at Frankfort 1572-3 in oblong quarto.

Another ſet for a folio edition of Pliny, printed alſo at Frankfort A.D. 1584. Another ſet for a quarto book of hunting, printed at Frankfort in 1582, which book was conſiderably augmented after the death of Amman, and reprinted in 1617. Another ſet of one hundred and three of eccleſiaſtical habits, dated 1564, and another of one hundred and twenty, for "Gynaceum, ſive Theatrum Mulierum, in quorum præcipuarum omnium per Europam, &c." in oblong quarto, printed at Frankfort, 1586.

Chriſtopher Maurer engraved from his own compoſitions, and from thoſe of T. Stimmer, both on copper and on wood. He was born at Zurich A.D. 1558, and died at Winterthour in 1614. His father Joſhua was an artiſt, and under the paternal roof he learned the rudiments of art, but was afterwards removed to Straſburg, and placed under Tobias Stimmer, where both the maſter and ſcholar were cloſe ſtudents, and ſoon began to be diſtinguiſhed by the number of intereſting and beautiful works which they produced.

The cypher of Maurer will be found in our ſecond plate of German monograms. After paſſing ſome years in the ſchool of Stimmer, he returned to his native city, and added to his reputation by his freſco pictures which adorn the façades of diſtinguiſhed houſes, and by the juſt likeneſſes he diſplayed in his portraits; with the true ſpirit of a Swiſs artiſt, he always preferred patriotic ſubjects, and has often painted the origin of the Helvetic confederacy.

Of his engravings, thoſe on copper are moſt ſought after by connoiſſeurs, particularly a ſet of bible cuts, and four emblematical etchings relative to proceedings in the courts of law, which, after the death of the artiſt, were introduced into a Latin book.

Of his letter-preſs engravings, which are neatly executed, the beſt are probably the ſet of animals of the chace, which he executed in conjunction with his maſter, and which were publiſhed at Straſburg in the year 1605. And a ſet of the bible under the title of "Hiſtoriſche Vorſtellungen über die ganze Bibel," which do honour to his inventive talent, as well as to his manual powers as an engraver.

Chriſtopher Jamitzer, or Jamnitzer, was born at Nuremberg in the year 1560, and died in the ſame city in 1617. He performed ſeveral etchings which are marked with the cypher which the reader will find among our monograms of the German engravers, but they are far from being of firſt rate merit.

Of the ſame family were Bartholomew and Wenceſlaus Jamitzer, whom we paſs as unimportant perſons.

The beſt works of Chriſtopher conſiſt of groups of boys variouſly occupied, and the beſt of theſe groups are thoſe which follow: A ſet of twelve, in 12mo.; another ſet of twelve, mounted on marine animals; another ſet of four combined with ſwans, flowers, &c.; four children dancing in an arbour. A ſet of groteſque chimeras, in quarto; Chriſtopher Jamitzer alſo engraved a portrait of himſelf ſitting in a perſpective machine, in the act of drawing or meaſuring.

Matthew Greuter was born at Straſburg A.D. 1564. He travelled more than once to Lyons and Avignon, and from thence to Rome for profeſſional improvement, in which latter city, in the year 1638, he died.

Strutt deſcribes him as a man of genius, but ſo much praiſe as is implied in this word, cannot juſtly be allowed him. He worked partly from his own compoſitions, but his drawing is by no means correct; his extremities in particular being ſadly neglected. He ſometimes executed his plates with the graver only, in a neat ſtyle, and in other inſtances has employed etching. His principal productions are, the portraits of the popes Innocent X., and Sixtus V., the latter ſurrounded with an ornamental border in which the papal coinage is introduced. Cardinal Seraphinus Olivarius Razzalius; all in quarto.

Of his hiſtorical works we ſhall only mention "The Virgin and Child," ſeated in a landſcape, after Baroccio. Mary Magdalen leaning her right hand upon a ſkull, after S. Gaetano, dated 1584; both in quarto. An emblematical print of Venus ſtanding on a globe, with various virtues and vices perſonified, very neatly finiſhed, and marked M. Greuter inv. et fec. 1587, in ſmall folio. "The Fall of Phaeton," after Windel Dieterlin, in large folio, dated 1588. "The Deſtruction of Troy," after Lanfranc, and the magnificent cavalcade of the emperor Charles V. engraved by Greuter in concert with Lucas Vorſterman, a large print of the frieze form, engraved on ſeveral plates.

As Jean Frederic, the ſon of Matthew Greuter, was born at Rome, and lived and died in Italy, our account of him will be found under ITALIAN *School of Engravers*.

Matthias Kager was born at Munich in the year 1566, and died at Augſburg in 1634. He ſtudied in Italy, and beſide ranking high among the hiſtorical painters of his time, was an engraver of merit. His ſtyle is neat, and performed chiefly with the graver, though ſometimes with the admixture of etching. His attachment to liberty, and averſion to the manners of a German court, induced him to quit that of Bavaria, and he became a citizen and finally a burgomaſter of Augſburg.

S. Kilian engraved a portrait of him in 1626. The beſt of his own prints are: "The Adoration of the Shepherds," dated 1610. "St. John Baptiſing Chriſt in the river Jordan," both of the folio ſize, and from compoſitions by himſelf: "The Holy Family," in an oval, alſo from his own picture, and in 4to. and "St. Francis ſurrounded by the Monks of his Order, to whom Chriſt and the Virgin Mary are appearing in the Clouds," a middling-ſized upright from P. Remigius Bozzulo.

Of Adam Elſheimer, ſurnamed Adam of Frankfort, who ſhould elſe have been mentioned in this place, we have already ſpoken. See ELSHEIMER.

Theodore Kruger, or Cruger, was born in the city of Munich A.D. 1576. He travelled to Italy for improvement, where he formed his ſtyle of engraving on that of Franciſco Villamena. He handled the graver, which was the ſole inſtrument of his art, with boldneſs, freedom, and facility, but his chiaroſcuro is very defective, and his outlines incorrect and hard.

His principal engravings are: "The Life of St. John the Baptiſt," on twelve upright folio plates, after Andrea del Sarto, with the portrait of the painter prefixed, and dedicated to Coſmo de Medicis, dated 1618. "The Laſt Supper," in large folio, after the ſame. "The return of the Holy Family from Egypt," where the infant is embracing Jeſus Chriſt, after F. Bigio, alſo in folio. "The infant Saviour bleſſing the little St. John," after the ſame painter. And "A Prince on a Tribunal, ſurrounded by divers Stateſmen," after Lanfranco, and inſcribed "Vox mihi."

Cruger has alſo engraven ſome portraits after Gabriel Wayer, to which he ſigns his name Ditrich Cruger, by which Chriſtian name he is beſt known in Italy.

Theodore Cruger, the younger, was born in the year 1648, and was the ſon of the preceding artiſt. The Italians call him Della Croce, the Flemings Vercruys, and the German Kruger. In the year 1710, he engraved, in concert with two others, the Florentine gallery. He alſo engraved "St. Francis at Prayer," after Carlo Maratti, and a couchant Venus, both in folio, beſide ſeveral portraits, among which is the daughter of Georgione, after that maſter; and Ludovicus Adimari, after P. Dandini.

Dominic Cuſtos, otherwiſe called Baltens, was the ſon of Pierre Balthaſar Baltens, a painter and poet, who had ſome pretenſions alſo to knowledge in the art of engraving. He was born ſome time about the year 1560 at Anvers, and died at Augſburg in 1612. His real family name appears to have been Baltens, but he ſettled at the laſt named city, at an early age, under the name of Dominique Cuſtos, and marrying there the widow of Barthelemy Kilian, the elder, was enabled to eſtabliſh a lucrative print trade, which continued to flouriſh for a long period of time.

Cuſtos had ſeveral daughters, of whom ſome were educated to the art of engraving, and ſucceeded tolerably well. He worked in a neat ſtyle, entirely with the graver, but his prints are laboured, taſteleſs, and without harmony of effect. Florent le Comte ſays he engraved portraits in the taſte of Vandyke, but as Strutt properly remarks of this miſtaken aſſertion, there is not the leaſt reſemblance between the ſtiff portraits of Cuſtos, and thoſe ſo highly and ſo juſtly eſteemed by Vandyke.

The principal engravings by this artiſt, are; the effigies of the German emperors, large whole length figures, in folio, dated 1601.

The portraits of the Fuggera family, of which the firſt edition, which is now become very rare, and is dated 1593, contains but ſixty-four portraits: in the ſecond the number of portraits is increaſed to ſixty-ſeven: the third contains a hundred and twenty-ſeven, beſides the arms of Fugger, and an ornamented title, but the names are added, of Lucas and Wolfgang Kilian. Another ſet of portraits of heroes, &c. entitled "Atrium Heroicum, Cæſarum, Regum, aliorumque ſummatum ac principium, &c."

The chief of his engravings of ſeparate portraits are thoſe of pope Sixtus V. prince Sigiſmond in the coſtume of Moldavia, after J. ab. Ach, and from the ſame painter Marcus Bragadino, dated 1591. Chriſtianus II. duke of Saxony, Henry biſhop of Augſburg, (in an oval,) Johan Philippi, biſhop of Bamberg, ditto. Maximilian, duke of Bavaria, and Elizabeth Lotharingea his wife, a pair of ovals, dated 1598, all of the folio dimenſions.

The moſt eſteemed of the hiſtorical works of this artiſt, are a ſet of "Female Saints," half lengths, after Frantz Aſpruck. A ſet of four in folio, of "L'Hiſtoire de l'Enfant prodigue," and "Judith beheading Holofernes," after John Von Auchen, of the folio ſize.

Lucus Kilian, the patriarch of a numerous progeny of engravers, was born at Augſburg in the year 1579. Under whoſe directions he ſtudied, is not known, but the works of Henry Goltzuis and Muller appear to have been his ſchool. It appears, however, that he went to Italy, in order to complete his ſtudies, where he engraved ſeveral plates from the pictures of the great Italian maſters: but returned, and died in his native city in the year 1637.

"Few artiſts have manifeſted a greater command of the graver than Kilian; whether we conſider the apparent facility with which his ſtrokes are turned over each other, or the firmneſs with which they are executed, one cannot help admiring the author, though it evidently ſtrikes us that by paying too cloſe attention to this part of his art, he neglected the correctneſs of his outlines, and fatigued the lights with unneceſſary work." Such is the opinion of our countryman Strutt: to which ſhould be added, that his drawing is not accurate, nor his chiaroſcuro broad and impreſſive.

Of the numerous works of Kilian, the following are held in moſt eſteem: "The Adoration of the Shepherds," a middling-ſized plate, from the younger Palma. The ſame ſubject, a large upright, after Spranger. Another of the ſame ſubject, after Rotenhamer. And another (a large upright) from J. Heintz. "A Holy Family," from Cornelius de Haerlem, and "The Miracle of the Loaves and Fiſhes," from Tintoret: both large uprights. "Chriſt Praying in the Garden," a ſmall upright, arched at the top, from Frederic Suſties. "A dead Chriſt," from Michael Angelo. And "A Nymph and Satyr," from J. Heintz, both ſmall uprights. "The Rape of Proſerpine," a large folio plate, from the ſame maſter. "The Entombing of Chriſt," an upright, without the painter's name, dated 1600, which perhaps, with many other of the engravings of Lucas Kilian, is from his own deſign.

The beſt portraits by this maſter, are thoſe of himſelf, aged 55, a rare print in 4to. "Petrus Cuſtos, vulgo Baltens, Pictor et Poeta Antwerpianus," dated 1609. Nicholas Chriſtophe, Prince de Rudzivil, both in 4to. The emperor Chriſtian II. dated 1615. Maria Eleonora Suevorum Gothorum Regina. Guſtavus Adolphus Suevorum Gothorum Rex. And Albert Durer, a half-length; all of the folio ſize: but whether the latter is from a picture by Rotenhamer, or after Albert Durer himſelf, the preſent writer is uncertain.

Wolfgang, the brother of Lucas Kilian, was alſo of Augſburg, and born in the year 1581. He ſtudied under Dominic Cuſtos, and, after his return from Italy, under his brother Lucas, whoſe ſtyle he imitated without attaining to the ſame degree of excellence: his prints are ſomewhat neater, but more ſtiff and formal.

Wolfgang employed the greater part of his time in engraving portraits, of which the following are thoſe of moſt importance. Erneſt Count Mansfield. Maximilian of Wallenſtein, dated 1642. Jean Major, mathematician of Augſburg. Frederic Baron de Teuffenbach. Jean Godefion, biſhop of Wurzburg, and Ferdinand III. king of the Romans, all in 4to. Of the folio ſize; the archbiſhops of Mayence, Cologne, and Treves; his own portrait, inſcribed "Labor improbus omnia vincit," and a ſet of twenty-ſeven of the emperors and archdukes of the houſe of Auſtria, from 1229 to 1623, with their lives and eulogiums, publiſhed at Augſburg, in 1629.

The moſt eſteemed of his hiſtorical works, are the "Baptiſm of Jeſus Chriſt," after Paolo Veroneſe. "The Aſſumption of the Virgin Mary," after Tintoretto; "The Deſcent from the Croſs," after Paolo Farinato, and the "Good Samaritan," after Giacomo Baſſano, all in folio. "The Reſurrection of Chriſt," arched at the top, after F. Baſſano. The four Evangeliſts, in upright ovals, from his own deſigns; and the "Feſtival of the Peace of Weſtphalia," after Joab Sandrart, in large folio, engraved on two plates, and which is now become a rare print.

Bartholomew Kilian, the third ſon of Wolfgang, was born at Augſburg in the year 1630, and died in the ſame city in the year 1696. He diſtinguiſhed himſelf at a period of life ſo early, that Sandrart emphatically ſays, "he was *born* an artiſt." At the age of eighteen he engraved a Magdalen after M. Gondelach, which induced his father to place him under M. Merian of Frankfort, after ſtudying with whom two years and a half, he travelled to Paris for further improvement. Here he remained more than three years, availing himſelf of the inſtructions of different artiſts, and here he engraved his "Aſſumption of the Virgin," after Philip Champagne, and "Crucifixion," after Teſtelin.

Returning to his native city, he continued to cultivate his art, and produced a great many excellent portraits, with ſome few hiſtorical ſubjects. Strutt is miſtaken in ſaying he worked entirely with the graver, but is right in what he aſſerts of the originality of Bartholomew's ſtyle. He worked in a manner entirely different from thoſe of the Kilians, who had preceded him; ſometimes, in order to make a ſtriking diſtinction between the fleſh and the draperies of his figures, he finiſhed the former with dots only; and at other times expreſſed the darker ſhadows of his fleſh by lines, which he blended with dots in the lighter parts. Mariette and Barthelemy talk of him as an example for a painter, but theſe writers are warmer in his praiſe than an inſpection of his work will fully warrant.

B. Kilian generally marked his engravings, of which the following liſt contains the principal, with his name at length, but ſometimes uſed only his initials, and at others, according to Huber, a cypher which does not appear to belong to him, but which we have copied, with others of the Kilian family, in the ſecond plate of our German monograms.

Six half length portraits, in folio, of celebrated proteſtant preachers at Augſburg, after B. Hopfer. Three medallions of archbiſhops of Salzburg, with allegorical accompaniments, after Henry Schoenfeldt. Johannes III. king of Poland, after Bloemart, dated 1681, a large buſt of learned execution. Maximilian Emanuel, electoral prince of Bavaria, with hiſtorical acceſſories, a celebrated work, and the ſubject of a theſis. The emperor Joſeph as king of the Romans, on horſeback, the ſubject of another academical theſis, dated 1694; which Huber pronounces one of the fineſt prints exiſting for natural grandeur; all theſe are in large folio. The portrait of Auguſtus II. Abbas Einſidlenſis, is a large upright folio, dated 1686.

The beſt hiſtorical production of Bartholomew is a "Madonna and Child," a beautiful engraving in large folio, after Caſpar Sing.

Philippe Kilian was a younger brother of Bartholomew, imitated his ſtyle, and confined his talents almoſt entirely to portraits. He engraved, among many others, the portrait of his elder brother, whom he never equalled, though many of his works poſſeſs no ſmall portion of merit.

Strutt mentions another engraver of this family of the name of Wolfgang Philip, who flouriſhed in the next century, and who executed a great number of portraits, which however have too little merit for our particular notice.

Yet to ſhew that nature had not exhauſted the Kilian ſtock of talent, we ſhall here mention a little out of his chronological place, Philippe Andrea Kilian, great nephew of Bartholomew, who was born at Augſburg A.D. 1714, and died in that city in the year 1759.

Deſcended from a family of artiſts, he imbibed, in early life, what may perhaps be termed an hereditary taſte for fine art. He firſt ſtudied drawing and engraving under Frederick of Augſburg, and afterwards became the pupil of G. M. Prieſler of Nuremberg, where he diſtinguiſhed himſelf by engraving ſome plates for the "Phyſica Sacra of Scheuchzer," and laid the foundation of his future fame.

Some years after, whilſt engaged in engraving from the Dreſden gallery, the reputation of our artiſt ſtood ſo high, that Auguſtus III. of Poland emphatically called him "the Magnet of Dreſden," and when any other engraver produced an inferior plate from the collection, was uſed to ſay, in the way of delicate reproof, that it ought to be re-engraven by Kilian.

But our artiſt, notwithſtanding theſe honours, felt ſo much reſtraint, whilſt reſiding at the court of Dreſden, or ſuch paſſionate deſire to return to his native city, that he ſought an occaſion to make ſuch arrangements as enabled him to quit Bavaria after a reſidence of ſome years.

P. A. Kilian is uſually reckoned among the moſt meritorious hiſtorical engravers of Germany. On a baſis of ſound drawing, he erected rather a ſingular ſtyle of execution; he interworked his principal or firſt courſe of lines with very delicate ſtrokes, which he croſſed with a courſe of lines exceedingly lozenge upon the firſt, and ſometimes added a third courſe ſomewhat more ſquare; at other times he interworked his ſhadows with long ſlender *pecks*, as they are technically termed among engravers. But the characters of his heads are not equal to his general knowledge of the human figure.

His beſt hiſtorical engravings are, "Jeſus Chriſt at prayers in the Garden of Olives," an upright plate of the folio ſize, from a deſign of his own. "The Adoration of the Kings," after Paolo Veroneſe; "The Woman taken in Adultery," after Tintoret; and "The Family of a noble Venetian," after Paolo Veroneſe, are all large folio plates, executed for the Dreſden gallery. "Mary Magdalen waſhing the Feet of Chriſt" is from Nicholas Graſſi; "The Baptiſm of St. Auguſtin," from J. B. Pittoni; and "Herodias with the Head of John the Baptiſt," from Carlo Dolce, are all of folio dimenſions; "Regina Angelorum," where the Virgin appears ſurrounded by Angels in Glory, after Bergmuller, and another from the life of the Virgin, after C. T. Scheffler, are a large and highly eſteemed pair of engravings. But perhaps his moſt juſtly celebrated work is a very large plate of "St. Coſmo and St. Damien," after J. Wolfgang Baumgaertner.

The beſt portraits from the graver of Philippe Andrea, are thoſe of Francis I. emperor of Germany, in a coat of armour, after Meitens. And Clemens Rezzonicus Venetus, Pontif Max, after G. D. Porta, a pair in large folio. Maria Thereſa, queen of Auſtria, an upright folio. Johan Martin Chriſtell, from a picture by P. A. Kilian, himſelf. Chriſtoph Henry Andre Geret, after J. Romelli. Field marſhal Curtius Chriſtophel Graff von Schideren, after Stranz. Ferdinand, duke of Brunſwick, general in chief of the allied army, after Ant. Peſne; and Godofredus Schnurbein, marked P. A. Kilian, pinx. et ſculp. 1750, all of the folio dimenſions.

George Chriſtopher Kilian, another engraver of the ſame family, was living at Augſburg when Heinnekin publiſhed his "Idée generale d'une Collection complete d'Eſtampes," and perhaps may be living ſtill.

Iſaac Major was born at Frankfort on the Maine in the year 1578, and died in 1630. Diſcovering an early inclination for the arts of deſign, he was placed with Roland Savery, under whom he ſtudied landſcape painting for a time, but deſirous of becoming an engraver, he placed himſelf, for inſtruction in that art, with Giles Sadeler. He united etching with the work of the graver, but his works want energy, though they were held in ſome eſtimation at the time in which he lived. His principal productions are, a ſet of ſix middling ſized landſcapes, wild ſcenes in Bohemia, from Pietro Stephani. A very large landſcape from Rowland Savery, in which St. Jerome is introduced. Another ſet of eight mountainous and ſavage landſcapes in Bohemia, in large folio, after Jer. Wolf, and an allegorical portrait of the emperor in a car of triumph drawn by eagles and ſwans.

Chriſtopher Jegher was a juſtly celebrated engraver on wood, who was born ſome time about the year 1590, but the incidents of whoſe life are but little known. He eſtabliſhed himſelf at Antwerp when he was about thirty years of age, where his extraordinary merit ſo ſtrongly recommended

mended him to Rubens, that he was engaged by that great maſter to engrave a conſiderable number of his compoſitions, and it is no ſmall praiſe to add that he ſucceeded to the perfect ſatisfaction of the painter.

After the death of Rubens, Jegher re-purchaſed moſt of theſe engravings, and publiſhed them on his own account. Collectors ſhould therefore bear in mind, that thoſe impreſſions, from which the name of Rubens as the publiſher is taken away, and that of Jegher ſubſtituted, are of the ſecond edition, and conſequently of inferior value to the firſt.

There is a degree of freedom and vigour in the ſtyle of Jegher that is perfectly homogeneous with that of Rubens; his hatchings are broad and powerful, and the imitation of the croſs hatchings is ſo well expreſſed, that his beſt prints very much reſemble drawings made with the pen and ink. He drew with maſterly correctneſs; the extremities of his figures are well marked; and his heads, though ſlight, are full of expreſſion.

His beſt, and by far the greater of Jegher's productions, are after Rubens, but he has engraved a Crucifixion after F. Franck, which is dated 1637, and ſome few more from other maſters.

The following are after P. P. Rubens: "Suſannah ſurpriſed by the Elders." "A Repoſe in Egypt," both in large folio. Some of the latter are printed in chiaroſcuro, (*i. e.* with an additional block or two to add the demitints,) and are now become ſcarce. "The infant Chriſt and St. John playing with a Lamb." "The Coronation of the Virgin Mary," and "The Temptation of Chriſt in the Deſart," all middling-ſized folios. "Hercules deſtroying Envy and Diſcord," is from the cieling at Whitehall. "The Converſation of Lovers," is a very large garden-ſcene, engraved on two blocks. "A drunken Silenus ſupported by Satyrs," is of the upright form, and a very fine compoſition of the maſter, which was alſo engraven on copper by Bolſwert.

Matthew Merian, the elder, was born at Baſle in the year 1593. His firſt ſtudies were under the direction of Theodore Meyer, who inſtructed him in drawing. He afterwards became the diſciple of Theodore de Brie. He was a man of talent, and his principal engravings are landſcapes, which he etched in a ſlight free ſtyle, and finiſhed with the graver. His views have much of that rare but valuable topographical quality, the appearance of having been really copied from the places of which they bear the names, and which quality Merian had the ſkill and the honour of imparting to his diſciple Wenceſlaus Hollar, of whom we have given an account in our progreſs of ENGLISH engraving, but whoſe monograms will be found in our third plate of thoſe of the German ſchool.

Merian married the daughter of his tutor de Brie, by whom he had iſſue: he died in the year 1657, aged 58, at Frankfort, or, according to ſome of his biographers, at Schwalbach.

His works, according to Le Compte, amount to upwards of five hundred plates. They are well known, and there is not ſo much diſparity in their merits as to make a ſelection here either eaſy or neceſſary. His marks and monograms are five in number, as will be found in our third plate.

Of Matthew Merian the younger, who was for a ſhort time in London, we have made ſlight mention in a former place.

His daughter, Maria Sybilla Merian, was a much more diſtinguiſhed character. She was born at Frankfort on the Maine in the year 1647. At the age of four years ſhe loſt her father, which in moſt caſes is a great misfortune, but not ſo here, for her mother found in her ſecond huſband, Jacques Morell, a kind and indulgent protector, who foſtered the infant genius of Maria.

Morell, as is well known, was a diſtinguiſhed painter of fruits, flowers, and inſects, and under his inſtruction our young artiſt ſoon diſtinguiſhed herſelf as a painter and natural philoſopher, to which attainments ſhe afterwards added the art of etching.

In the year 1665 ſhe married Jean André Graf, a meritorious painter of Nuremberg, who ſtudied in the ſchool of Morell. In 1679 ſhe publiſhed the firſt volume of her "Hiſtoire des Inſectes de l'Europe deſſines d'après nature, et expliqués par Marie-Sybille Merian; où l'on traite de la genêration et des différentes metamorphoſes des inſectes et des plantes dont ils ſe nouriſſent;" and in 1683, ſhe pnbliſhed the ſecond volume of the ſame work, in the execution of which ſhe paid attention to the engravings, as well as the deſigns, it being the firſt work wherein is diſplayed the minutia which is ſo important in the eye of the connoiſſeur, and ſhe managed the etching-needle with the dexterity ſhe had before evinced in the management of her pencil.

In the courſe of the next year, ſhe returned to Frankfort with her family, and, from a miſtaken zeal in religion, ſeparated from her huſband; retired with her mother and two daughters to Weſt Frieſland, and became a member of the ſociety of Labadiſtes. The fraternal ſociety of Labadiſtes, (who called themſelves brothers and ſiſters) had then aſſembled under Peter Yrond, and their head-quarters were the caſtle of Den Boſch, ſituated between Franeker and Levardin, of which the poſſeſſor's name was Sommerdyck. Here ſhe remained a conſiderable time, and here ſhe had opportunity to inſpect at leiſure a fine collection of the inſects of America, of which ſhe made very exact drawings, and from hence her thirſt after profeſſional knowledge led her to make occaſional excurſions to Amſterdam and other parts of Holland, which at that time abounded with cabinets both of pictures and natural hiſtory.

Her enthuſiaſm now took a new turn, and coinciding with the wiſhes of the Dutch naturaliſts, ſhe was induced, in the year 1699, to undertake a voyage to Surinam. On her arrival, after an agreeable paſſage, a wide field opened to her profeſſional ambition. She painted the inſects and reptiles of the country on vellum, and examined with philoſophical care their various habits and changes: but the heat of the climate, and her intenſe application, having injured her health, it became neceſſary for her to return to Europe in the following year.

She brought home an ample collection, not only of drawings, but of ſhells, dried inſects, &c. She now ſettled at Amſterdam, and immediately ſet about publiſhing the fruits of a voyage, than which none had ever been performed more truly intereſting to the naturaliſts of Europe.

Of the ſixty large folio plates contained in her "Metamorphoſes Inſectorum Surinamenſium, &c." ſeveral were executed by herſelf, and ſhe alſo ſupplied the deſcriptions. It was publiſhed at Amſterdam in the year 1705.

In the ſecond edition, which was publiſhed by the phyſician Jean Marret, in the French language, more plates and explanations were added by the author, who conſecrated the remainder of her days to delineations and reſearches of this nature.

Too far advanced in life to venture on a ſecond voyage, yet knowing that much had been left unaccompliſhed at Surinam, Maria Sybille now formed the deſign of ſending thither her eldeſt daughter, who had accompanied and aſſiſted her in her former voyage. Jeanne Helene cheerfully undertook the commiſſion, landed at Surinam, painted with hereditary ſkill all the remaining ſubjects of natural hiſtory that ſhe could find intereſting in the country, added her remarks, and tranſmitted them to Amſterdam; but death had now interpoſed to prevent this conſummation of the pleaſures of Maria

Sybille. The ſupplement was however publiſhed by her ſecond daughter Dorothea Maria, who was born in 1678, and herſelf painted flowers and inſects with great ability.

The curious, who would form an adequate idea of the knowledge and talent of this extraordinary artiſt, ſhould viſit the principal cabinets of Holland. Yet in our own national collection at the Britiſh muſeum, are ſome volumes of her paintings on vellum, which are almoſt daily turned over with wonder by its numerous viſitants.

John William Baur was a very meritorious painter and engraver of landſcape and hiſtory. He was born at Straſbourg in the year 1600, ſtudied under Frederic Brendel, and afterwards in Italy, where he reſided a conſiderable time, and where he was patronized by the duke at Bracciano and prince Guiſtiniani. In the year 1637 he removed to Venice, and from thence to Vienna, and died there three years afterwards, at the age of forty.

The landſcapes which he painted with water colours on vellum are particularly celebrated, and he engraved a vaſt number of plates from his own deſigns, ſome of which are in a ſtyle reſembling that of his contemporary Callott, to which he affixed the cypher which the reader will find in the third plate of our monograms, &c. of the German ſchool of engravers.

Melchior Kuſſell completed the volume of his works, which contains not leſs than five hundred engravings, after the death of Baur, whoſe "deſigns," in the language of Strutt, "manifeſt great marks of a ſuperior genius, but without cultivation." The cypher with which he uſually marked his engravings, of which the following are the names of the principal, will be found in our plate of monograms.

Portrait of Don Paolo Geordano II.; Orſino, duke de Bracciano, an oval, dated 1636, a rare print; a ſet of eighteen, of the coſtume of different nations; a ſet of fifteen of the battles of various nations, entitled "*Caprici* di varie Baittallie," in quarto; another ſet of fourteen battles; a ſet of eight landſcapes, and another of four, entitled "The Elements." A ſet of twenty of a ſuperior character, of the battles of "La Guerre Belgique," and

His principal work, conſiſting of one hundred and fifty plates in quarto, from Ovid's metamorphoſes, publiſhed at Vienna in 1641. Theſe are ſlightly etched, and finiſhed with the graver. The figures introduced are generally ſmall and incorrect in the drawing, the back-grounds rather dark, and the trees deficient in lightneſs and freedom. The architecture, which Baur is fond of introducing, is well deſigned, and correct in the perſpective.

Hans or Jean Ulric Franck was a native of Kaufbeuren, an imperial city of Suabia, born in 1603, and was particularly excellent in painting and etching ſmall figures. He ſettled at Augſburg, where he died in the year 1680.

In conjunction with Suſan Sandrart, A. Zelt and J. Meyer, Franck engraved a ſet of the Fountains in Rome and its environs. The beſt of his other engravings are four combats in quarto, dated 1643. "David and Abigail," and "Alexander defeating Darius," dated 1644, and both in folio.

Joachim Sandrart was born at Frankfort on the Maine in the year 1606, and began his career of art by ſtudying under Theodore de Brie and Matthew Merian, of whom we have ſpoken. At the age of fifteen he went on foot to Prague, to viſit and obtain inſtruction from Giles Sadeler, after which he placed himſelf under Gerard Honthorſt, of Utrecht, to learn the principles of painting, with whom he travelled to England. He afterwards viſited Venice, Bologna, Naples, and Rome, and received inſtructions from Titian, Paul Veroneſe, Guido, Guercino, Pouſſin, and others: in ſhort, if inſtruction and example alone could have produced a great artiſt, Joachim ſhould have been the firſt of his time. He returned however to Germany, and finally ſettled at Nuremberg, where he eſtabliſhed an academy of art, and where he died ten years afterwards, at the age of 77.

Sandrart was rather an artiſt of acquirement than of genius, and hence his works are deficient in vividneſs and warmth. He painted and engraved hiſtory and portrait; he was alſo a man of letters, and his "Academy of Architecture, Sculpture and Painting," which was firſt publiſhed at Nuremberg in the year 1679, though prolix, is ſtill celebrated through Europe.

This book, which contains much hiſtorical information, and the biography of the moſt diſtinguiſhed artiſts, is enriched with a conſiderable number of engraved portraits, beſide other prints. It was firſt publiſhed in the German language, but an edition in Latin was printed in the year 1683, and it has ſince received various additions from the ſucceſſors of Joachim Sandrart.

His own engravings are performed chiefly with the point, and the beſt of them will probably be found to be a half length figure of the goddeſs Flora, after Titian; an elderly woman contemplating a Cupid in no very delicate action: and "The Death of Cleopatra," from his own compoſitions, all in quarto.

Jacques Sandrart, the nephew of Joachim, was born at Frankfort in the year 1630, and died at Nuremberg in 1708. He ſtudied engraving at Amſterdam under Cornelius Dankerts, and afterwards at Dantzic under W. Hondius.

He ſettled finally at Nuremberg, where he purſued his art with ſingular induſtry, the number of his portraits alone being not fewer than four hundred, ſome of them of the folio dimenſions, and executed with the graver alone, in a clear and neat ſtyle, beſide which he publiſhed a number of geographical charts and other engravings.

His portraits are not uncommon, and among the moſt meritorious will be found to be thoſe of his uncle Joachim Sandrart, a half length figure, inſcribed "Seculi Noſtri Apelles." The buſts of Rodolphus II., Ferdinand II., Ferdinand III., and Frederic, prince of Norwegia and duke of Sleſwic; a half length of Hohannes Michael Délherrus, after R. Wernfels; Ermuth Sophia, electoral princeſs of Saxony, &c. Johannes Paulus Auer, painter of Nuremberg; Joachim Sandrart, junior, dated 1688; all in folio.

Jean Jacques Sandrart, the ſon of Jacques, whom we have juſt diſmiſſed, was born at Ratiſbon A.D. 1655, and died at Nuremberg in 1698. He ſtudied the arts of deſign under his father and his great uncle Joachim; his works prove the facility of his invention. He enriched the volumes of Joachim with ſeveral taſteful and ſpirited etchings, and his portraits, which are etched, and finiſhed afterwards with the graver, are deſervedly held in eſteem. His beſt works are, the portraits of Elizabeth Henrietta, princeſs of Brandenburg, ſurrounded by emblems; and Silvius Jacob de Dunkelmann, both in folio, after Adam le Clerck; "The Holy Family," after Joachim Sandrart; "Æneas ſaving his Father from the Flames of Troy," after Raphael, dated 1682. "Marphorius, or the Statue of the Rhine," among ruined edifices; "The Nile" among ruined monuments of antiquity, all in folio, and the latter pair, with many others after Joachim, are introduced into his "Academy, &c."

Jean Jacques alſo engraved ſeveral plates of merit for a folio work, entitled "Suecia Antiqua et Hodierna."

Suſan Marie Sandrart was the ſiſter of Jean Jacques, and was born at Nuremberg in the year 1658. She ſtudied under the direction of her father, and engraved with ſome ability a conſiderable number of plates of ornaments.

She engraved alſo a Bacchanal, with the inſcription "Immoderatum dulce Amorum ;" "The Aſſembly of Gods at the Marriage of Cupid and Pſyche," after Raphael, and the antique bas relief of "The Aldobrandini Marriage," after Pietro Santo Bartoli, for the academy of Joachim Sandrart, all of the folio dimenſions.

Of Hollar, who flouriſhed about this time at Prague, we have already ſpoken. See Origin and Progreſs of ENGLISH *Engraving*.

That extraordinary artiſt, Adrian van Oſtade, for an account of whoſe merits as a painter, ſee the article OSTADE, performed about this time ſome etchings, which are very juſtly admired for their freedom and ſpirit. They are not all executed in the ſame ſtyle, though the ſame mind be every where evident. Some are dark and coarſe, and were printed juſt as the aquafortis left them, while others are more neatly executed, and appear to have been ſubſequently worked upon with the triangular point, as was the cuſtom of Rembrandt and Worlidge. The two marks with which Oſtade occaſionally ſubſcribed his etchings, will be found in our third plate of the monograms of the German ſchool.

The whole of his etchings conſiſt of at leaſt fifty-two plates of various dimenſions, all from his own deſigns, of which the following are perhaps moſt worthy of being ſpecified : "Several Peaſants at the Door of a Cottage," with a fair in the back ground, a middling-ſized upright. "A Dutch Wake," the ſame. "Several Peaſants Fighting with Knives," a ſmall plate, lengthways, dated 1658. "The Cottage Dinner," the ſame, dated 1653. All theſe are in his bold ſtyle of etching. Thoſe which follow are ſuch as he finiſhed with more care. "The Painter," with an inſcription beginning in this manner : "Pictor Apellæ, pingas," and the firſt impreſſions of this plate are with the cap conſiderably above the eyes of the figure ; in the ſecond impreſſions, the cap nearly touches the eyes. "A Mountebank," a ſmall upright plate, arched at the top. "The Spectacle Seller," a ſmall upright plate. "A Man, Woman, and Child, at the Door of a Cottage," a middling-ſized plate, lengthways, dated 1652. Several peaſants, half figures, at a window, one of them is ſinging a ballad, and another holds the candle, a ſmall upright plate. "A Man Leaning over a Hatch, blowing a Horn," the ſame. "A Cottage Entertainment," with figures dancing, a middling-ſized plate, lengthways.

The biographers of lieutenant-colonel de Siegen, (an officer in the ſervice of the landgrave of Heſſe,) have conteſted with the friends of prince Rupert for the honour of the invention of mezzotinto. The lieutenant-colonel was born in the year 1620, and, according to the baron Heinnekin, executed in that manner a portrait of the princeſs Amelia Elizabeth of Heſſe Caſſel, in 1643.

For an account of prince Rupert's pretenſions to the diſcovery, ſee the article Origin and progreſs of ENGLISH *Engraving*. "An Holy Family," after Caracci, in folio, is alſo mentioned (but without a date) as a mezzotinto production of Siegen.

Jean François Ermels, who poſſeſſed conſiderable talents in the art of painting and engraving landſcapes and cattle, was born in the environs of Cologne in the year 1621, and died at Nuremberg in 1693. He ſtudied under J. Holzmann and Jean Both, and the following plates, conſiſting chiefly of landſcape ſcenery, adorned with ruined edifices and animals, were etched by him with great ſpirit and freedom. A pair of upright landſcapes, "A Rocky Scene, and a compoſition of Ancient Architecture," in 4to. "A Landſcape," in which the figures introduced are a faun and bacchante. Another, with monuments of antiquity. And a pair of "Paſtoral Scenes," with ſhepherds, cattle, and ruined edifices, all of the 4to ſize.

Matthew Keeſell, or Kyſell, was born at Augſburg in 1621, and died there in the year 1682. He ſucceſsfully mingled the work of the graver with that of the point, and his beſt prints, which are named in the following liſt, poſſeſs a large ſhare of merit. The portraits of Chriſtopher Benden, in 4to. Carolus Sulzer. Adolphus Zobelius. Andreas Winkler Johannes Michael Dilherrus, after Ulricus Mayr (an highly finiſhed head in an octagon border). Leonardus Weiſſius, after Jos. Werner, all in folio. A ſet of forty-two after Ludovico Burnacini, entitled "Il Pomo d'oro," and conſiſting of ſcenic decorations, &c. dated 1668, are folio etchings : and the only hiſtorical work from his hand, with which we are acquainted, is "The Virgin and Child," apparently from a compoſition by himſelf

Melchior Keeſell, the brother of Matthew, was born at Augſburg in the year 1622, and died in the ſame city in 1683. Here he acquired the rudiments of his art, but perfected his ſtudies under Merian of Frankfort, from whence, after reſiding ſome few years, he returned to Augſburg, and began to engrave the "Iconographia," of Wilhelm Baur, a folio work, which conſiſts of one hundred and forty-eight prints of various ſizes, conſiſting partly of the "Life and Miracles of Jeſus Chriſt," and partly of views of the "Seaports and Gardens of Italy," which work was publiſhed at Augſburg, A. D. 1682.

Strutt ſays of this artiſt, that "there is ſomething very agreeable in his manner of engraving, eſpecially when he confined himſelf to ſubjects where the figures are ſmall, for as he drew but incorrectly, his figures appear defective, as they increaſe in ſize." Baur was fond of ornamenting the back-grounds of his compoſitions with ſuperb buildings, which Keeſell has executed with much ſpirit; his rocks alſo, and mountainous diſtances, have great merit ; but his trees want freedom, lightneſs, and characteriſtic determination of their foliage ; his chiaroſcuro is alſo ſpotty and fatiguing to the eye, if this be not rather the fault of Baur.

Melchior engraved other plates beſide thoſe for the Iconographia of Baur, of which the principal are, "The Hiſtory of Ulyſſes," from Theodore van Talden ; ſome antique ſtatues, executed entirely with the graver ; and the portraits of Sebaſtianus Kirchmajerus, public profeſſor at Ratiſbon, after Benj. Block, in 4to. ; Johannes Hozius ; Maximilianus Curz, dated 1658 ; and Antonius Schottius, dated 1680, all of the folio ſize.

Jeanne Sibelle Keeſell, born at Augſburg in the year 1646, was the third daughter of Melchior, married Jean Ulrich Kraus, engraved, among other plates, a ſet of four, of the Satyr and Villagers, Juno, Venus, and Pallas, after Elſhiemer, and died in her native city in 1717.

Jonas Umbach was alſo of Augſburg, born in the year 1624, and merits an high rank among the artiſts of Germany. His prints conſiſt chiefly of etchings after his own deſigns, executed with ſpirit and an appearance of facility. He engraved one hundred and eleven plates, of which the following are the ſubjects of the principal, and died in his native city about the commencement of the ſeventeenth century. "A Madonna and Child." "An Holy Family." "A Penitent Magdalen," and "St. Peter," all of ſmall dimenſions. Four plates from "The Parable of the Good Samaritan." Four ditto of "Infantile Sports." A pair of "Triumphs of Marine Deities." "A Family of Satyrs," all of ſmall ſizes ; and a ſet of four landſcapes, adorned with ruins of ancient monuments and paſtoral figures, dated 1678, in 4to. highly eſteemed engravings.

Lingelbach, Backhuyſen, and Jean Henry Roos, alſo performed ſome meritorious etchings in Germany about this time. The animals of the latter are much celebrated, and among his beſt plates may be reckoned a ſet of twelve, of “ Domeſtic Animals,” in 4to. A pair of “ Grand Landſcapes,” adorned with cattle and ruined buildings, and “ Un Berger endormi au pied, &c.” He was born at Otterdorf, in the Palatinate, in 1631, and died at Frankfort in 1681, and his maſters were Julian Jardeyn, and Adrian de Bie.

The family of the Wolfgangs contributed but little to the advancement of engraving: we therefore paſs them briefly. George Andrea Wolfgang was originally a goldſmith and engraver on the precious metals, but afterwards ſtudied engraving on copper under Matthew Keeſell, and ſcraped ſome few mezzotintos. He was born at Chemnitz, in Saxony, A. D. 1631, and died at Augſburg in 1716. The beſt engravings of George Andrea are the portraits of George Frederic, margrave of Brandenberg, after C. Zierl, in folio, and Pierre Muller, Juriconſulti, in 4to. And, in hiſtory, “ A Grand Sacrifice to Diana,” after A. Schoenfeld, and “ Saul conſulting the Ghoſt of Samuel,” after Joſ. Werner, both of the folio ſize.

Andrea Matthew, the ſon of George Andrea Wolfgang, was born at Augſburg in the year 1662, and died in the ſame city in 1735. He ſtudied the elements of deſign under the direction of his father; but embarking for England with his brother, preſumptively at ſome port in the Mediterranean ſea, they were intercepted by an Algerine corſair, and carried into captivity. On their liberation, which was in conſequence of a ranſom paid by their father, they both returned to Augſburg, where Andre Matthew ſettled, and began to engrave portraits: he alſo engraved a print of “ The Court of Algiers,” in which he has repreſented himſelf as a ſlave.

His beſt portraits are thoſe of George Andre, his father, and Nicolaus Nuremberger, both in 4to., and in folio, John George Buttner, biſhop of Frankfort, and Chriſtopher Rad. In mezzotinto he has engraven Charles VI., king of the Romans. But, perhaps, his very beſt performance is a portrait of the margrave of Anſpach.

His younger brother, Jean George Wolfgang, was born in 1664, received the ſame inſtructions as Andrea Matthien, and ſoon after their releaſe from captivity travelled to Berlin, and in 1704 became engraver to the court. He engraved and publiſhed there a great number of portraits, among which that of the elector Frederick William, after Jacobi's equeſtrian ſtatue in bronze, is deſervedly held in moſt eſteem, though, in moſt of his portraits, the fleſh is executed with delicacy, and Jean George is, on the whole, as an artiſt, the flower of the Wolfgang family. He died at Berlin in the year 1704.

Guſtavus Andrea Wolfgang was the ſon of Andrea Matthien. He was born at Augſburg in the year 1692, and, after ſtudying portrait engraving and miniature painting under his father for a time, followed his uncle to Berlin, where he remained for many years, but returned finally to his native country, where he died in the year 1766.

His beſt portraits, of which the fleſh is engraved chiefly in dots, are thoſe of M. François Reyter, admiral pour l'Armee navale Angloiſe en Afrique. Wolfgangus Jacobus Sulzer, Reipublicæ Auguſtanæ Decemvir, after G. Eichler, and Carl. Freyher von Stien; in ſmall folio.

Jean Jacques Thurneiſen, or Thourneyſen, was born in the year 1636 at Baſle, in Switzerland, and died in the ſame city in 1718. After having learned to draw in his own country, he went to Straſbourg to ſtudy engraving under Pierre Aubry, where he remained about three years, and removed ſucceſſively to Lyons, and to the court of Turin. In 1695, he returned to Vienna, accompanied by his ſons; and his great merit, which was called by his rivals his ſuperior fortune, obtained for him the patronage of the emperor Leopold. He was now the object of envy to the artiſts of Augſburg, where he continued to reſide for ſome years; but as age approached, he wiſhed to ſee again his native land, and departed for Baſle in the year 1699, where, as we have already ſaid, he finiſhed his career.

Thourneyſen was a man of a robuſt frame, vigorous mental powers, and extreme profeſſional aſſiduity. His monogram will be found in our third plate of thoſe of the German ſchool. Among the engravings he performed, thoſe which are executed with a ſingle ſtroke or ſpiral, in imitation of Mellan, have been moſt admired, though, perhaps, not moſt juſtly. He alſo occaſionally imitated the ſquare croſſings of F. de Poilly.

His ſon, Jean Jacques the younger, worked in imitation of his father, but was leſs ſucceſsful. The beſt engravings by Thourneyſen the elder are, the portraits of Laurentius Scotus, after Luc Damaret, dated 1661. François Turretein, after P. Haud. Petrus Werenfelſius, profeſſor in the academy of Baſle, after L. F. Wetſtein, engraved of the folio ſize, (by the Thourneyſens, father and ſon,) in 1702.

Of his hiſtorical works, our allotted ſpace only allows us to mention “ The Virgin Mary, Infant Chriſt, and St. John,” in a circle, after Carl. Dauphin, a folio plate, engraved in the faſhionable ſtyle of Mellan. “ An Infant Chriſt,” after Blanchet, in 4to. “ La Bilancia Politica del Boccalini.” Two large folio plates of “ Grand Theſes in Philoſophy,” in which whole length portraits of the princes palatine of Neubourg are introduced, and the ſtatues of Laocoon, Antinous, and Latona, in the ſtyle of Mellan, for Sandrart's academy.

François Ertinger was born at Wyl, in Suabia, A. D. 1640, travelled to Italy for improvement, but died at Paris in the year 1700. As an engraver, neither his judgment nor his taſte ranks very high; but the following liſt of his beſt works will ſhew that the ſubjects of his prints at leaſt were ſometimes wiſely choſen.

A ſet of eight plates, after Rubens, from the Hiſtory of Achilles. “ The Marriage of Cana in Galilee,” a large folio, after Raymond le Fagi. A ſet of ten, from the ſame maſter of the Hiſtory of the Counts of Thoulouſe. A large folio, of a Bacchanalian ſubject after N. Pouſſin; and the portraits of Nicholas Machiavel of Florence, the celebrated political philoſopher, in 8vo. Gabriel de Pinaco, Jureconſulti; and Jean Ferdinand de Beughem, biſhop of Anvers, after F. de Cock; both in folio.

Gerard Laireſſe was born at Liege in the year 1640, and died at Amſterdam in 1711. He was inſtructed by his father, Regnier, in the rudiments of art. For an account of his merit as a painter, ſee the article LAIRESSE. He etched a vaſt number of plates, from his own compoſitions with great freedom, and the fearleſs hand of a painter who has other objects in view than the graces or blandiſhments of manual execution. His chiaroſcuro is broad and powerful, and ſo contrived as to conduct the eye of a ſpectator at once to the principal objects in the compoſition.

The major part of his deſigns were engraven by himſelf, and, as Baſan obſerves, are highly eſteemed by connoiſſeurs, and exceedingly uſeful to ſtudents in art.

The portrait of Laireſſe, in folio, ſurrounded by emblematical ornaments, has been engraven by N. Viſſcher.

The moſt eſteemed of his own engravings are, “ The Sin of our firſt Parents,” and “ Adam and Eve expelled from Paradiſe,” a pair in folio. A rich compoſition of

"Joſeph and his Brethren," and another from the Hiſtory of Solomon, both in large folio. "The Incredulity of St. Thomas;" and another in folio, from the Life of Chriſt, inſcribed "Sapientia unigena Dei Maximi." "St. Thereſa in Extaſy," a large folio. "The parting of Hector and Andromache," in folio. A rich compoſition of Marc Antony and Cleopatra, with the motto "quam Mars nunquam, vicit Venus." A march of Amazons, inſcribed "Virtus viri computa actionibus probis." A grand Bacchanalian ſubject. "Venus lamenting Adonis." A ſet of four plates of the ſeaſons. "Diana and Endymion." "Bacchus Silenus and Nymphs;" all of the folio dimenſions: and three large allegorical ſubjects, in compliment to the prince of Orange.

The prints of Laireſſe are generally inſcribed with one or other of the four monograms which the reader will find in our third plate of thoſe of the German engravers.

Samuel Bottſchild was born at Sangerhauſen, in Thuringia, A. D. 1640, and died at Dreſden in 1707. He was an artiſt of taſte; and, being poſſeſſed of elevated habits of thinking on profeſſional ſubjects, he was appointed director of the Dreſden academy, and inſpector of the electoral gallery. His excellence in freſco painting is atteſted by his picture of "The Deſcent from the Croſs," in the church of St. Martin at Halberſtadt, and by ſeveral paintings which adorn the caſtle gardens near Dreſden; and his etchings are performed with much pictureſque freedom: the general character of his art partaking much more of the grand than the graceful. His principal engravings are, "The Army of Sennacherib defeated by the exterminating Angel," in folio. A ſet of four, entitled "Le Don de l'Entendement:" "Le Don de la Science;" "Le Don de la Sageſſe;" "Le Don de la Force," in 4to. A ſet of the four parts of the day, with Latin inſcriptions. A pair of emblematical ſubjects, intitled "L'Eſperance et la Patience;" "La Foi et la Charité," ovals, in 4to. "Ulyſſes and Epius," and a ſubject from the Life of Hercules, both of the folio ſize.

Elias Hainzelmann was born at Augſburg in the year 1640, and died in the ſame city in 1693. He ſtudied engraving at Paris in the ſchool of François de Poilly, whoſe ſtyle of manual execution he imitated with great ſucceſs; and Strutt has well obſerved, that had his drawing been equally correct, his works would have ranked with thoſe of the greateſt maſters. They poſſeſs, however, eſpecially his portraits, a conſiderable ſhare of merit.

From Hainzelmann's hiſtorical works, the following will probably be found moſt worthy of ſelection: "The Silence," after Annibal Caracci; ſo called, becauſe, while the Infant Chriſt is ſleeping, the Madonna holds up her finger to St. John, as he approaches, to prevent his diſturbing the Saviour. This picture has ſince been engraved by others, but particularly by Bartolozzi in a very ſuperior ſtyle. A large upright plate of an Holy Family, after Sebaſtian Bourdon; and two others lengthways, of the ſame ſubject, from the ſame painter, in one of which the infant St. John preſents a lamb, and in the other an apple, to Jeſus Chriſt. St. Francis, after Dominichino. "The noli me tangere," or Chriſt in the garden, approached by Mary Magdalen, after Albano. "The Madonna and Child," after Raphael. Jeſus Amabilis; Mater Amabilis; St. Regard; all of the folio ſize.

His beſt portraits are thoſe of Francis Zavier, of the fraternity of Jeſuits; George Philip Riſs, after Ulric Mayr; Marcus Haberns, and Juliana Benedicta Winklerin, after the ſame. David Thoman ab Hagelſtein, after de Neve. Agnes van Schoenberg; Godfreed Eggerus; Gabriel Willer; John Jacob Haller, after D. Savoy, all in folio, and Johan Chriſtoph ab Adelmannsfelden, after C. C. Kretzſchmann, in very large folio; the head, the ſize of real life.

Jean Ulric Kraus, or Krauſſen, was born at Augſburg A.D. 1645, and died in the ſame city in 1719. He was the diſciple of Melchior Kuſſell, and married Jean Sybille his daughter, and became a cloſe imitator of the works of his contemporary Le Clerc. But all followers are neceſſarily behind. Though Kraus copied Le Clerc's life of Chriſt, (which conſiſts of ſixty ſubjects) it is ſufficiently obvious that they are but copies.

His engravings are numerous, chiefly from his own compoſitions, and the ſubjects of them, for the moſt part, views of buildings, or taken from the Old and New Teſtaments. In imitation of his model Le Clerc, he generally introduced a vaſt multitude of figures into his compoſitions, but they are leſs graceful, and far leſs well drawn. He frequently enriched his back grounds with architecture, which he appears to have well underſtood, and his chiaroſcuro is often judiciouſly diſpoſed, and his general effects good.

The cypher with which Kraus uſually marked his prints will be found in our third plate of German monograms, and the liſt of his principal works is as follows: a ſet of ſixty ſubjects copied from Le Clerc's life of Chriſt, on ſmall folio plates, two ſubjects on each, printed at Augſburg 1705. The hiſtory of the Old and New Teſtaments, in 4to. containing four ſmall ſubjects on each plate, and apparently deſigned to be bound in 8vo. ſo as to have two ſubjects only on a leaf. The number of leaves would then amount to one hundred and eighty-eight, and they are ſo numbered. The four ſeaſons, and the four elements, deſigned for the royal tapeſtries. A ſet of twelve intereſting views of the city of Nuremberg, after Andrea Graf, in folio, and a very large and capital view of St. Peter's church at Rome, after the ſame maſter.

Carl Guſtave d'Amling, or ab Ambling, was born at Nuremberg A.D. 1651, and died at Munich in the year 1702. He ſtudied under F. de Poilly at Paris, and imitated his ſtyle, but with no very great ſucceſs. He was a painter as well as an engraver, but was chiefly engaged in engraving portraits. When he attempted hiſtory, neither his drawing of the naked, nor the expreſſion of his heads is correct, and the general appearance of his prints is cold and metallic.

Yet the race is not always to the ſwift, nor the battle to the ſtrong, and Amling, notwithſtanding theſe defects, obtained court patronage, and became engraver to the duke of Bavaria.

Of his numerous portraits, we ſhall only mention thoſe of Maximilian Emanuel, electoral prince of Bavaria, after T. Macolinus Muſicus, dated 1670, a rare print. Maximilian Emanuel, elector of Bavaria, after J. B. Champagne, both in folio, and the latter eſteemed one of his very beſt performances. An equeſtrian ſtatue, alſo of his patron, and Henrietta Maria Adelaide, ducheſs of Bavaria, after Delamonce, dated 1675, in an oval, and alſo of folio dimenſions.

Of his hiſtorical works the principal are, a ſet of thirteen plates of different ſizes, of the hiſtories of the emperor Otho and Louis of Bavaria, from the tapeſtries in the caſtle of Munich, which were executed after P. Candido. Another ſet of nine in folio, from the ſame tapeſtries, repreſenting perſonifications of the months September, October, and November, the four Seaſons, Morning, and Night.

The family of Meyer flouriſhed as artiſts, and chiefly as engravers, through two centuries. Joachim was born at Straſburg early in the ſixteenth, and diſtinguiſhed himſelf by engraving a ſet of ſixty-two prints of combats with the ſword.

Andrea was a native of Zurich, and engraved ſeveral views of towns, to which he affixed one or the other of the ſingular monograms which will be found in our third plate of thoſe of the German ſchool of engravers.

Dirick was born in the ſame city, and of the ſame family, in the year 1571, and his principal work of engravings is a ſet of portraits of the illuſtrious perſons of Switzerland.

Rodolph, and Conrad, Meyer were the ſons of Dirick. The engravings of the former are chiefly portraits, with ſome few emblematical prints: he was tolerably ſucceſsful, and marked his prints as may be ſeen in our plate of German monograms. He was born in the year 1605, and lived only to the age of thirty-three.

His younger brother Conrad was born in the year 1618, and died at Zurich, the city of his nativity, in 1689. He produced a conſiderable number of prints which were chiefly from his own deſigns, among which are the cuts for an edition of Eraſmus's Praiſe of Folly. A ſet of five, which are termed a compariſon of the preſent times with thoſe of Noah and Lot. "The Deluge;" "The Laſt Judgment," and "Memento Mori." A ſet of fifteen for the Mirror of Chriſtians. A ſet of cuts for a dance of Death, partly invented by himſelf, and partly by his brother Rodolph. And ſeveral ſets of portraits of the burgomaſters, reformers, and artiſts of Zurich.

Jean Meyer reſided about the ſame time, or a little earlier, at Nuremberg, but is preſumed by Strutt to have been of the ſame family as the preceding. He etched, among other plates, a ſet of battles in a ſlight but ſpirited ſtyle, from his own compoſitions.

Felix Meyer was more celebrated. He was born at Winterhour, in Switzerland, in the year 1653, and died at Weyden in 1713; his genius developed itſelf at Nuremberg, whilſt ſtudying under F. Ermels, a celebrated painter of landſcape, to which he afterwards added the ſtudy of nature His etchings are deſervedly held in eſteem among connoiſſeurs, for the freedom and intelligence which they diſplay, combined with effective chiaroſcuro. The moſt important of theſe are, a ſet of twelve, ornamented with ruined edifices and rocks, &c. Another ſet of four of the ſcenery of Switzerland, with ancient monuments and figures, dated 1701. Another ſet of four of the ſame kind of ſubjects, and another ſet of the ſame number, of a more wild, mountainous, and rocky character, all of the 4to. dimenſions.

Joachim Francois Beiſch, or Beich, was born at Munich in the year 1665, and died in the ſame city in 1748. He ſtudied the principles of deſign under his father, who was a painter of Ravenſburg, but domiciliated at Munich. They both painted landſcape and battles, and Joachim travelled to Italy for improvement, where he reſided for ſeveral years, contemplating the ſcenery of that claſſical landſcape country, and the works of Gaſpar Pouſſin and Salvator Roſa.

On his return to Munich, he took up the etching point with ſucceſs, and produced ſeveral ſets of plates of landſcape ſcenery in a grand taſte, among which the principal are, a ſet of eight mountainous landſcapes from his own compoſitions, in 4to. Another ſet of ſix. Another ſet of ſix with rocks, cataracts, and banditti, in the ſtyle of Salvator Roſa, of the folio ſize.

George Philip Rugendas of Augſburg was born in the year 1666. He learned drawing of Iſaac Fiſcher, but afterwards ſtudied with more advantage from the works of Pietro Tempeſta, and Bourgognione. He travelled to Vienna, from thence to Venice, and from thence to Rome, where he remained a long time, and reviſited Augſburg in the year 1695. At this time the war of the Spaniſh ſucceſſion was raging in Germany, and our artiſt had opportunity to contemplate its effects, and draw battles, ſkirmiſhes, and ſieges, from nature. Among theſe the bombardment and taking of his native city by the French and Bavarians, formed an intereſting ſubject for his pencil and etching needle, and he publiſhed in ſix prints, their military operations in that neighbourhood during the years 1703 and 1704.

Rugendas deſervedly holds a diſtinguiſhed rank among battle painters. His deſigns are at once bold and correct, his compoſition orderly, his pencil facile, and his colouring performed on principle; above all, the varied attitudes and graces of his cavalry are juſtly admired.

Beſides the pictures from his hand, which are not uncommon in the galleries and cabinets of Germany, Rugendas has performed a conſiderable number of etchings and plates in mezzotinto, of which the ſubjects are chiefly hunting and battles; ſome by himſelf, and others in conjunction with his ſons, of whom he had three that were educated to the arts.

We begin our liſt with a ſelection from his etchings: a ſet of ſix of "Capricci de Georgio Filippo Rugendas," dated 1698. Three ſets of "Cavaliers Marching, in Action, &c." conſiſting of twenty-two plates, in 8vo. A ſet of ſix very capital etchings, in folio, of "Les Operations militaires des François et des Bavarois à Augſbourg et à ſes Environs," dated 1704.

His beſt mezzotintos are, "A Colonel of Huſſars on Horſeback." A ſet of four, of "Combats between Hungarian and Pruſſian Huſſars." A ſet of four, "Hunting Pieces." A ſet of four, "Battles, &c. in the Turkiſh Campaign." Another ſet of ſix, entitled "Les Operations et les Occupations militaires," &c. all in folio.

The following were produced in conjunction with his ſons: A pair of "Mountainous Landſcapes," in 4to. A pair of "Combats between Cavalry." A ſet of four, of "Marches and Halts." Another ſet of four, of "Camps and Skirmiſhes," all in 4to. A ſet of ſix, of "The Amuſements of the Camp." Two ſets of Battles, conſiſting of ſix in each. A ſet eight, of "Marches, Halts, and Combats of Cavalry," all in folio; and a ſet of twenty of various military ſubjects, in 4to.

Jaques Chriſtophe le Blond, or Blon, an engraver in mezzotinto, was born at Frankfort in 1670. He travelled to Rome in the year 1696, in the ſuite of the imperial ambaſſador, where he ſtudied painting under Carlo Maratti, but his genius being of a mechanical turn, he entered with warmth into various ſpeculations: at length he learned to ſcrape mezzotinto, and diſcovered a method of printing mezzotinto plates in colours. The Dutch painter Overbeek perſuaded him to bring his new diſcovery to Amſterdam, from whence he emigrated to England.

Eagerly bent on the execution of his new project, he executed in London ſeveral large plates in mezzotinto, from pictures by the greateſt maſters, and diſpoſed of the prints by lottery: but thoſe who obtained the prizes appear not to have held them in any very great eſtimation. He made known the manner in which he performed and printed theſe plates, in a book entitled "Coloritto, or the Harmony of Colours in Painting, reduced to mechanical practice, under eaſy precepts and infallible rules," which were printed both in Engliſh and French: but nothing is more common than the failure of *infallible* pretenſions, and the ſpirit of fine art has always evaporated in the various attempts to reduce it to mechanical practice. Le Blond's project did not ſucceed.

He afterward ſet on foot a ſcheme for copying the Cartoons of Raphael in tapeſtry, and made drawings for that purpoſe; but though money was ſubſcribed, houſes built, and looms erected at the Mulberry-ground, near Chelſea, this project alſo failed, and poor le Blond, to the no ſmall

difdiſſatisfaction of thoſe who were engaged with him, was obliged to diſappear. He died at Paris in the year 1740, in an hoſpital.

The mezzotintos which he produced are not without a conſiderable ſhare of merit ; but in his colouring proceſs he was not always equally ſucceſsful. The preſent writer has ſeen ſome, which, in reſpect of colouring, may be called good, and others which can ſcarcely be eſteemed as any thing better than bad. His colours are rarely vivid and freſh, but frequently flat and dirty, and his drawing of the naked is incorrect, eſpecially in the extremities of his figures. On the whole, his portraits will probably be found to be his beſt performances, of which the principal, are thoſe of king George II. in large folio, the ſize of life : his queen, as a companion print. The three children of king Charles I. after Vandyck, in large folio. Carondolet, after Raphael. Sir Peter Paul Rubens, after Vandyck. And a noble Venetian, with a pointed beard, after Titian, all in very large folio, the ſize of life.

The beſt of his hiſtorical works are, “ St. Agnes and St. Cecilia,” after Dominichino. “ A Repoſe during the Flight into Egypt ;” and a “ Venus Couchant,” both after Titian. “ The Triumph of Galatea,” after Carlo Maratti. “ Cupid faſhioning his Bow,” after Corregio. “ The Charity of Joſeph,” after C. Cignani. “ Chriſt on the Mount of Olives,” after Caracchi. “ Chriſt Entombed,” after Titian. And an anonymous, but very fine “ Magdalen,” all of the folio ſize.

Martin Bernigeroth was born at Ramelſburg in the year 1670, and died at Leipſick in 1733. He produced a number of portraits which is ſurpriſing, and which were collected in nine port-folios in the ducal cabinet at Dreſden, many of them being of folio dimenſions. Yet Bernigeroth does not riſe above mediocrity as an engraver.

Jean Martin Bernigeroth was the ſon and pupil of Martin. He was born at Leipſick in the year 1713, and died in the ſame city in 1767. He poſſeſſed about the ſame portion of talent with his father ; his beſt work being a portrait of Jean Adolphus, duke of Saxe Weiſſenfeld, in folio, dated 1745, which ſcarcely riſes above mediocrity.

Antoine Balthaſar Koenig was born at Berlin in the year 1676, and died in the ſame city ſome time about 1740. His prints, of which the following portraits are thoſe which are held in moſt eſteem, are not without a certain portion of merit. Frederick William, king of Pruſſia, after Weidemann. Frederick baron de Derfflinger, general of Pruſſian cavalry. Charles Gottfried Schrader, aulic counſeller to the king of Pruſſia. Alexander Hermann, Cointe de Wartenſleben, after Ant. Peſne, dated 1716. And the monument of Schrader, with a Latin inſcription.

Chriſtian Albert Wortmann was born in Pomerania ſome time about 1680. He went very young to Berlin, where he ſtudied engraving under Wolfgang, and at the age of twenty-five was ſummoned to Caſſel, where he became engraver to the landgrave of Heſſe. From Caſſel he went to Dreſden, where he engraved ſeveral portraits, and among the reſt his celebrated head of Chriſtian Frederick Boetius. In the year 1727, Wortmann was called to the court of Peterſburg, but the time and place of his death have not been recorded.

His principal engravings are the portraits of Erneſt Louis, landgrave of Heſſe Darmſtadt. Chriſtian Frederick Boetius. Joachimus Juſtus Breithaupt, doctor in theology, after J. A. Rudiger. Johan Samuel Drobiſch. Hermann Joachim Hahn. Anna, empreſs of Ruſſia, after L. Caravac. Alexis, ſon of Peter I.

In an age and country of low taſte, an indifferent painter or engraver of portraits will find encouragement, though an artiſt of no other deſcription could find ſubſiſtence. Among the petty courts of the German electors, there was probably at this time very little taſte, yet obſervation enough to diſcriminate between two or more ſet of features ; and perſonal vanity and courtly pomp enough, to catch at the means of attaining a certain ſpecies of periſhable popularity.

We have paſſed lightly over engravers of this inferior deſcription, and ſome we have entirely omitted, as they contributed nothing toward the advancement of art, but rather perhaps retarded its advancement.

From theſe men of mediocrity, attention turns with pleaſure to the contemplation of the extraordinary powers of Jacob, or Giacomo Frey. Frey was born at Lucerne in Switzerland, in the year 1681, and his life preſents a curious inſtance of the indeſtructibility of genius, which it ſhould ſeem that no rigour of adverſe fortune can ſubdue, and no fire of intemperate paſſions can conſume.

He was apprenticed to the trade of a cartwright, and in ſpite of his propenſities towards the fine arts, was obliged to follow that trade till he attained the age of two and twenty, when he ſomehow or other made his way to Rome ; but in quitting the peaceful and placid vale of Lucerne, he ſeems to have broken looſe from all ſober reſtraint, and on his arrival in Italy, his paſſions, which had hitherto been held in check, hurried him into every dangerous exceſs. Yet, as the ſame Po, which roars and riots down the Alps, winds afterward a ſtately river through the plains of Italy, ſo it was with our artiſt : when the ebullition of paſſion was over, he liſtened with delight to the advice of Arnold van Wirtenhout, and the inſtructions of Carlo Maratti, and from that period began to make ſurpriſing progreſs in the art of engraving.

A ſpeech of Maratti to Giacomo Frey, which ſtrongly marks his good ſenſe and obſervation, has been recorded : “ The engravers of hiſtory (ſaid he) make too much uſe of the *burin*, and hence ariſes a certain hardneſs in the contours, from which, however, the beſt prints of Dorigny are comparatively free. I would adviſe *you* to familiariſe yourſelf with the etching point, becauſe it operates in a far more pictureſque manner than the graver.”

Frey followed this advice. Robert van Audenarde was at this time his fellow-diſciple and liberal rival, but the rapid ſtrides of our artiſt ſoon left him at an immenſe diſtance, though a man of ability. He drew with ſuperior taſte ; had a fine eye for the harmony both of colours and chiaroſcuro ; etched with a degree of ſpirit and freedom, which have very rarely been attained ; worked over and finiſhed his etchings with the graver, at once with firmneſs and facility ; incorporating the whole by means of ſuch exquiſite feeling of the merits of his original, that it has been emphatically ſaid of his prints, that they appear rather printed than engraved. He was the Gerard Audran of Italy, and ſeemed only to differ from Audran himſelf, as Raphael, Guido, Dominichino, and Guerchino, (after whom his principal works are engraved,) differ from Le Brun. In ſhort, his feeling for the peculiar excellencies of the firſt maſters of the Italian ſchools was of the higheſt and pureſt kind ; ſo that it may be ſaid, almoſt without a metaphor, that in his engravings their forms appear revivified by the ſpirit of Giacomo Frey. He died at Rome in the year 1752, the admiration of every intelligent artiſt, yet before he had received more than an earneſt of the praiſes that are juſtly his due.

It is to be regretted, that when his plates, which were publiſhed by his ſon Philip, began to wear, they were injudiciouſly retouched, perhaps by Philip himſelf, who deſtroyed all his father's ſweetneſs and harmonious mellowneſs ; ſo that good impreſſions of the prints of Frey, in their original

ginal ſtate, are now become rare, though they have not yet attained their intrinſic value.

We add a liſt of his principal works, almoſt every one of which merit a particular criticiſm, beginning with the hiſtorical ſubjects: "The Holy Family," after Raphael, engraved from the ſame picture as the print by Edelinck, and of the ſame folio ſize. "Aurora, with the Hours, preceding the Chariot of the Sun," a large folio, from Guido, which has alſo been engraven by Audenarde, the fellow-pupil of Frey, and by Paſcalini and others. "Bacchus conſoling Ariadne, after the departure of Theſeus," (companion to the former) after the ſame maſter. "The Communion of St. Jerome," a large upright folio, from Dominichino. "The Adoration of the Shepherds," of the ſame ſize and form, from Sebaſtian Conca. "A Saint kneeling, and an Angel ſhewing him a Picture of the Virgin and Child," after Carlo Maratti, inſcribed "In conſpectu Angelorum pſalmam tibi." "The Virgin giving the Scapular to St. Simon Stock," a large upright, arched at the top, and inſcribed "Ecce ſignum ſalictis," after Sebaſtian Conca. "St. Francis de Paul reſtoring ſight to a Child," a large upright, from B. Lamberti. A large upright, from Andrea Sacchi, wherein Eccleſiaſtics appear to be aſcending to heaven. "St. Charles Borromeo obtaining from Heaven the ceſſation of the Plague," from Pietro da Cortona, both large upright folios. "A Repoſe," from Carlo Maratti, wherein St. Joſeph is offering cherries to the Infant Chriſt. And "The Martyrdom of St. Andrew," from the ſame maſter; both middling ſized uprights. "The Death of St. Petronilla," after Guerchino. "St. Paul and Ananias," after Pietro da Cortona, both in large folio. "The Rape of Europa," and "A Charity," both after Albano, and of the folio ſize. A ſymbolical ſubject, after Bianchi, inſcribed "Congregavit de regionibus liberos." And "The Beatification of the Virgin Mary," after Carrachi, both in large folio. An allegory, in honour of the church, after Carlo Maratti, inſcribed "Cuſtos Clementia mundi." "The Emperor Auguſtus ſhutting the Temple of Janus," after the ſame painter. "The Archangel Michael," and "The Conference of the Fathers of the Church, on the Subject of the Immaculate Conception," both in large folio, after Guido; the latter from the ſame original which has alſo been finely engraved by our own countryman Sharp. "The Death of St. Anna, and St. Romualdo," both after Andrea del Sacchi, and the latter a very favourite print. And the four angles of the Church of St. Charles de Catenarius at Rome, repreſenting the cardinal virtues; (viz. Fortitude, Prudence, Temperance, and Juſtice,) after Dominichino, large upright folios.

Frey alſo engraved portraits, of which the beſt are thoſe of his friend Carlo Maratti, from a picture by himſelf. Pope Innocent XIII. after A. Maſſuccius. Pope Benedict XIII. on horſeback. Pope Gregory XIII. in a chair, after the marble of Camille Ruſconi. Cardinal Hieronimus Picco de Mirandole, after Neilly. And Clementina, M. Brittan. Fr. et Hib. Regina, from a picture by himſelf; all in large folio.

Elie Chriſtopher Heiſs, an engraver of very large, but not very good mezzotintos, was a native of Memmingen, in Suabia. He was educated to the arts by his father Jean Heiſs, a painter of Memmingen, and died at Augſburg in the year 1731.

He produced a conſiderable number of plates, both in hiſtory and portrait, of which "The Salutation of the Virgin" is three feet one inch in height, by two feet two inches wide! and "a Crucifixion," from his hand, is of nearly the ſame dimenſions.

Bernard Vogel was the coadjutor of Heiſs, ſome of theſe very large plates being ſcraped by them in conjunction. He was a native of Nuremberg, born in 1683, but reſided chiefly at Augſburg, where he eſpouſed the daughter of Heiſs. In the earlier part of his career, he produced ſome tolerably good portraits with the graver, but latterly engraved only in mezzotinto. He retired from Augſburg to his native city, probably after the death of his father-in-law, and died there in the year 1737, leaving behind him a ſon, Jean Chriſtophe, who engraved ſeveral plates in mezzotinto, after Kupetzky.

The beſt works of Bernard Vogel are the portraits, performed with the graver, of Johan Michel Weickmann, after L. C. Eichler; Auguſtus Hermann Frankius, profeſſor of theology; and Johannes Michael Welſer, ſenator of Nuremberg, after J. C. Hirſchmann, all in folio.

The chief of his portraits in mezzotinto, are thoſe of Johannes Kupetzky, painter, dated the year of our artiſt's death; Michael Gottfreid Wittber, a celebrated ſurgeon, after Kupetzky; and George Bledinger, the painter, all in folio.

Chriſtopher Vogel engraved, in the ſame manner, the portrait of his father, inſcribed "Chalcographus Norimb."

Jean George Bergmuller was born at Dirkheim, in Bavaria, A. D. 1687, and died at Augſburg in 1762. He learned the rudiments of art under Andrea Wolf, of Munich, but afterwards ſtudied with more advantage under Carlo Maratti. He painted ſucceſsfully, both in oil and in freſco, and etched a great number of plates, in an able and maſterly ſtile, which he afterwards finiſhed with the graver. He was likewiſe the author of two works; one on the growth of man, which he called "Antropometria:" the other on menſuration and architecture, publiſhed 1752, and became director of the Academy of Arts, which was eſtabliſhed at Augſburg. His ſon, Jean Baptiſte, alſo followed the art of engraving with ſome ſucceſs.

The beſt of Bergmuller's prints are thoſe which follow: a ſet of four, of the Baptiſm, Transfiguration, Reſurrection, and Aſcenſion of Jeſus Chriſt. "The Madonna and Child." "The Death of St. Joſeph." "The Saviour on the Mount of Olives." "The Martyrdom of St. Catherine and St. Sebaſtian." "Juſtice, and Peace," inſcribed "Juſtitia et Pax oboculutæ ſunt." A ſet of the four ſeaſons, dated 1730. Another ſet of four of the zodiacal ſigns.

Jean Daniel Herz, draughtſman and engraver in aquafortis, was born at Augſburg A. D. 1693, and died in the ſame city in 1754.

Herz was an artiſt of original powers, rich in compoſition, bold and rough in execution, but deficient in grace and harmony of parts. He was appointed director of the imperial academy of arts at Augſburg, and filled the office with credit; but an hereditary director of an academy, nature, and ſcience, will not endure, and his ſon Daniel, to whom the directorſhip unfortunately devolved, ſoon made himſelf appear ridiculous in this ſituation, though he was a tolerably good knight of the holy Roman empire.

The ſtyle of execution of Herz the elder bears marks of great rapidity, and rapid he muſt have been, for his plates are numerous, and ſome of them of very large dimenſions.

We have ſelected the following, as thoſe which, on the whole, are moſt worthy of the portfolio of the connoiſſeur. "The Annunciation," richly compoſed, and in very large folio. "The Raiſing of the Croſs." "The Aſſumption of the Virgin." "The Adoration of the Kings." "An Ecce Homo." "The Crucifixion." "The Death of Ananias." "The Diſpute between St. Paul and the Philoſophers of Athens." And "The Judgment of Solomon;" all in very large folio. "The Coronation Proceſſion of Queen Maria Thereſa at Preſbourg;" alſo of very large dimenſions.

Jean Elie Ridinger, a very diſtinguiſhed engraver of animals, was born at Ulm in the year 1695, and died at Augſburg in 1787. His father was a reputable drawing maſter, and from him our artiſt received his earlieſt inſtructions in the art. He afterwards ſtudied painting under Chriſtopher Reiſch, but as an engraver ſtudied nature alone, and was one of her ſucceſsful votaries. He formed a ſtyle of engraving animals for himſelf, which conſiſt chiefly of etching, which is performed with characteriſtic freedom and firmneſs, tempered and harmoniſed, without being over laboured, with the graver. He appears to have ſtudied in the wildeſt and moſt unfrequented receſſes of the foreſts of Germany, and the back grounds of his ſavage animals are conceived and executed in a grand and maſterly ſtyle, occaſionally diſplaying all the wild vigour of luxuriant and uncontrolled vegetation, which can only be contemplated in the depths of untrodden foreſts, and occaſionally in his dens of bears, tygers, lynxes, &c. the moſt barren and diſmal rocky ſolitudes, inſomuch that the reflecting ſpectator is led to wonder, either at the bold truths and fertility of a daring imagination, or, if he believes that Ridinger has really viſited ſuch ſcenes, at the dangers he muſt have eſcaped.

Nor are his portraits of wild and ferocious animals, leſs than his landſcape ſcenery, the reſult of vigorous obſervation, and extenſive power over the inſtruments of his art. In tracing their habits and manners, he combined the exactitude of a naturaliſt with the talents of a conſummate artiſt.

Several of Ridinger's prints may be called hiſtorical, being repreſentations of chaſes which really took place in his time, and at which he muſt have been preſent, in the foreſts of Germany, with portraits of the animals that were killed or taken, and beneath theſe engravings there is generally a particular deſcription, or hiſtory, of the chaſe, in the German language.

He did not, however, draw the human figure, nor that of the horſe, with equal ability; and though his chiaroſcuro be often effective, yet in many inſtances his lights are too much ſcattered. He worked from his own compoſitions, and ſometimes painted, as well as engraved, a favourite ſubject, but his pictures are not common. The moſt eſteemed of his numerous engravings are thoſe which follow:

"The Terreſtrial Paradiſe," a ſet of twelve large folio plates, in which are introduced, in an appropriate manner, all the various animals; the ſubjects are connected by means of the hiſtory of Adam and Eve. Theſe are grand compoſitions, finely executed, and in England but rarely ſeen. A ſet of ſixteen fables. A ſet of heads of wolves and foxes, finely executed. A ſet of four large upright folios, which by ſome are eſteemed the maſterpieces of Ridinger, and two of which, repreſenting "Bears feaſting on a Stag," and a haunt of "Wild Boars in a Foreſt," are more eſpecially to be admired. A pair of "Stag-hunting" and "Bear-hunting," in large folio, both deſigned from nature. Another pair of hunting pieces, of "The large Wild Boar with double Tuſks," and "The Stag in Rutting-time," dated 1755, and 1757, taken by the duke and ducheſs of Wirtemberg. A ſet of ſixteen hunting pieces of the larger and ſmaller game, as practiſed in the different ſtates of Germany, with German and French explanations beneath, rich and intereſting compoſitions. A ſet of twelve plates of ſavage and carnivorous animals, all in large folio, and after his own deſigns.

Ridinger alſo engraved, with his uſual ability, a lion-hunt, after Rubens.

The Preiſſers were a numerous family of engravers, whom we ſhall paſs with brief notices, as they rarely roſe above mediocrity..

Jean Daniel Preiſler, an engraver of portraits, was of Nuremberg, and lived at the cloſe of the ſeventeenth and beginning of the eighteenth centuries. His ſon Jean Juſtin was born in the ſame city in the year 1698, aad died there in 1771. He reſided in Italy a conſiderable time, and became director of the Imperial academy of Augſburg. His moſt diſtinguiſhed works are "The Apotheoſis of Æneas." A ſet of the four elements, after Edmond Bouchardon; and another ſet of the four parts of the day, all in folio. A ſet of fifty plates of the antique ſtatues preſerved at Rome, from drawings by Bouchardon; ſmall uprights. The cielings of the Jeſuits' church at Antwerp, after Rubens, conſiſting of twenty ſmall plates, excluſive of the portraits of Rubens and Vandyke.

George Martin Preiſler, a younger brother of Jean Juſtin, was alſo of Nuremberg; he engraved, in the family ſtyle, a conſiderable number of portraits, and a ſet of twenty-one plates of ſtatues, at Rome and at Florence, from drawings by his brother Jean Martin.

The engraving of Valentine Daniel, another ſon of Jean Daniel Preiſler, was chiefly confined to book plates and portraits.

Jean Martin Prieſler, the fourth ſon of Jean Daniel, travelled from Nuremberg to Rome for improvement, and became, on the whole, perhaps, the beſt engraver of the family. He accepted an invitation to Denmark, and was living in good repute at Copenhagen in the year 1770. His ſtyle is clear and neat, but deficient in vigour, and his beſt prints are, "Chriſt bearing his Croſs," a large folio, from Paolo Veroneſe. "Semiramis, placing the Crown of Ninus upon her own Head," from Guido, a large folio, engraved with the former, for the Dreſden gallery. "A Battle," from Parrocel, and a Bacchanalian ſubject, from Pierre, both in large folio.

Jean Alexander Thiele was born at Erfurth in the year 1695, and from the rank of a common ſoldier roſe to be a diſtinguiſhed engraver and painter of landſcapes. A decided taſte for this art, and ſome pictures of Agricola, which it was his good fortune to ſee and copy in diſtemper, introduced him to the notice of that artiſt, by whoſe inſtructions he failed not to profit. He is believed to have been the firſt in Germany who attemped to paint landſcape in crayons, which, though an ineligible mode of art, is a proof of his ingenuity: he afterwards acquired a knowledge of oil-painting under Menyoky, in which he gloried, and in which he excelled. His ſtudy was the romantic part of Saxony, and more eſpecially the banks of the Elbe and the Sala. His etchings, of which the ſubjects of the principal are named below, are rude but maſterly. The celebrated Dietrich ſtudied under him at Dreſden, where he left a ſon, and where he died in the year 1752.

A pair of mountainous landſcapes, adorned with ruins of ancient buildings, dated 1725, in folio, and very rare; a pair of ſmaller landſcapes, of more ruſtic character; a ſet of three mountainous landſcapes; a landſcape of grander character, adorned with ruined monuments of antiquity, in quarto; a pair of "The ancient Port or Mouth of the Elbe," drawn from nature, and dated 1742; a pair of views at Naumburg, all in quarto; a ſet of ſix of ſuperior execution, from nature, including views of Pilnitz, Koningſtein, Muſſen, and Dreſden, dated 1726, in large folio.

Paul Troger was born at Zell, in the biſhopric of Brixen, in the year 1695, and died at Vienna in 1777. He ſtudied the rudiments of his profeſſion in his birth-place, and afterwards travelled for improvement to Fium, in the biſhopric of Trent, in order to avail himſelf of the inſtructions of D. J. Alberti, after which he went to Vienna, and ſoon became known by his prints, and by the pictures with which he adorned ſome of the churches of Auſtria. In etching, the touch of Troger is firm and preciſe, his figures are well deſigned, and his expreſſion juſt. He became director of the Imperial academy of Vienna, and engraved in a good taſte both hiſtorical ſubjects and landſcapes, the latter of which he ornamented with figures, ruins, &c.

His beſt prints are two ſmall Holy Families; "The Virgin and Child;" "St. Joſeph careſſing the Infant Chriſt;" "The Virgin in Grief, comforted by Angels;" in folio. Five ſmall landſcapes. And a pair of landſcapes, in which ancient monuments are introduced, in quarto, dated 1724.

Jacob Maennl was born at Vienna in the year 1695, and died in the ſame city at an advanced age; and, according to the baron Heinnekin, was a mezzotinto engraver of conſiderable ability. He was employed by C. Lauch, inſpector of the Imperial gallery at Vienna, to ſcrape that celebrated collection in mezzotinto, and had executed thirty-one of the plates, when the death of both the engraver and employer prevented the completion of their project.

Of theſe thirty-one prints, only eleven were ever made public; the reſt are preſumed to have been ſold by the heirs of Maennl, and are now miſſing. At the head of the work is a portrait of the emperor Charles VI., and Heinnekin and Strutt have given liſts of the ſubjects engraved.

Antoine Joſeph Prenner, or Von Prenner, after the death of Lauch and Maennl, undertook, in concert with Stampart, Altamonti, Schmutzer and others, to recommence the work from the Imperial gallery, and after a conſiderable lapſe of time produced

"Theatrum Artis pictoriæ, quo tabulæ depictæ quæ in Cæſarea Vindobonenſi Pinacotheca ſervantur," &c. in four folio parts, or volumes, of which part one was publiſhed in 1728, part two in 1729, part three in 1731, and part four in 1733.

Theſe four parts contain one hundred and ſixty prints, which are ſurrounded by borders in a bad taſte, and the work altogether is but of mediocral character. The beſt portraits by this artiſt are thoſe of Jean Gottfried Auerbach, painter to the emperor Charles VI. and count d'Odt, governor of Vienna, both of the folio ſize.

Gaſpar von Prenner, the ſon of Antoine Joſeph, was alſo an engraver, who travelled to Italy for improvement, and was engaged in engraving the "Muſeum Florentinum." He alſo produced a ſet of forty-five etchings, neatly finiſhed with the graver, of hiſtorical ſubjects from Taddeo Zucchero, and other diſtinguiſhed maſters, dated 1746.

G. A. Muller was born at Vienna ſome time about the commencement of the eighteenth century, worked in a delicate ſtyle, and, in concert with the Schmutzers, produced Rubens's ſeries of the hiſtory of Decius, of which Muller engraved two.

His other principal works are the portraits of Phillipe Louis, count de Sintzendorf, after M. Altomonte; Jacob van Schuppen, member of the academies of Paris and Vienna, after a picture by himſelf. "The two Children of Rubens at the age of adoleſcence," from a celebrated picture by that maſter, in the Lichtenſtein gallery.

The brothers, Jean Adam, Joſeph, and Andrea Schmutzer, were natives of Vienna, and born about the cloſe of the ſeventeenth, and beginning of the eighteenth centuries. They died, the former in the year 1739, the two latter in 1742.

Their grandfather, a general in the Imperial ſervice, loſt much of his property by the accidents of war; and the infidelity of the tutor to whom he had entruſted the education of his ſon, reduced that ſon to grievous extremities, but his ſufferings ſtruck out a talent with which it now appeared that nature had endowed him. He acquired the art of engraving on iron and ſteel, and ornamented locks and fire-arms with much taſte.

He brought up his ſons, the brothers of whom we treat, to the profeſſion of gun-engraving, which they quitted for the more elegant art of engraving on copper. Jean Adam was the eldeſt, but, in ſpite of application, could never attain to the eminence of Joſeph and Andrea. He engraved, however, for the gallery of Vienna under Altomonte, and his beſt prints are the portraits of the three empreſſes Eleonora, Amelia, and Elizabeth.

Joſeph and Andrea generally, if not always, worked in concert, and affixed their names, ſometimes Joſeph and Andrea, and at others Andrea and Joſeph, Schmutzer, with brotherly alternation. Joſeph poſſeſſed dexterity both in etching and re-entering with the graver, and Andrea poſſeſſed great facility in managing the tool, which was the neceſſary reſult of his being educated to engrave on ſteel, and to which he added a careful ſtudy of the works of Bolſwert, and Van Dalen. The beſt prints from the gravers of theſe brothers are the portraits of the emperor Charles VI. on foot, after M. de Meytens; the empreſs Elizabeth Chriſtina, after J. G. Auerbach; Guſtavus Adolphus, baron de Gotter, Pruſſian miniſter of ſtate; and Leymann, a librarian, or bookſeller, of Vienna, all in folio, and the two latter, alſo after Auerbach. A pair of ancient temples, in large folio, decorated with ſtatues and trophies, after Joſeph Galli Bibiena.

But their moſt diſtinguiſhed work is three folio plates, from Rubens's life of Decius, in the gallery of the prince of Lichtenſtein.

Jacques Schmutzer was the ſon of Andrea, and had the misfortune to loſe his father when he was ſeventeen years of age. By what further misfortune he came now to be ſo very poor as to be employed partly as a butcher and partly as a ſhepherd is not known, but he was employed to watch ſheep, ſometimes in the fields, but more frequently when penned up for ſlaughter. The public drawing-ſchool, however, was in the neighbourhoood of the ſheep-penns, and his love for art often induced him to confide his flock to ſome indolent comrade, whilſt he ſtole away to draw with the ſtudents of the academy.

The celebrated medaliſt Matthew Donner, apprized of theſe circumſtances, took ſome notice of the lad, and invited him home, but by ſome new accident or impulſe, he now began to ſtudy architecture; which purſuit he did not afterwards renounce for the arts of deſign. He was employed for three years as an architect in Hungary, during which time he deſigned and painted and engraved hiſtorical ſubjects at his leiſure hours, and on his return to Vienna, continued occaſionally to practice architecture.

He had now the good fortune to become known to the baron de Kettler, a great patron and protector of art and artiſts, who, charmed with his eſſays in engraving, ſolicited the prince Kaunitz, and the empreſs queen, to ſend the young Schmutzer to Paris; his ſolicitations were attended to, and our young engraver was placed under the guidance of Wille; here he perfected himſelf in the art, and in the courſe of the four years he remained in that celebrated metropolis, learned to uſe the graver with maſterly intelligence.

He was now recalled to Vienna, with high rank in his profeſſion, and was named by Maria Thereſa a Director of the academy. He ſuperintended the education of a great number of ſtudents in his mature age, and at the cloſe of the laſt century, was as great at Vienna, as Wille in Paris.

The beſt of Schmutzer's engravings are the portraits of Don Emanuel, of the illuſtrious family of Deſvails, and Joſeph von Sonnenfels, both ſmall; Martin de Meytens, the celebrated painter, after a picture by himſelf, dated 1756; C. G. E. Deitricy, another celebrated artiſt, after the ſame, dated 1765; Joſeph Wenceſlaus, prince of Lichtenſtein, after V. Fanti; the emperor Francis I., after von Liotard, dated 1769; the companion to which is the empreſs Maria Thereſa; and two portraits of prince Kaunitz, one after J. Steiner, and the other after Hagenauer, dated 1786, in a circle; a much eſteemed and rare piece of engraving.

The above are all in folio. We now proceed to ſelect from his hiſtorical engravings, "Ulyſſes diſcovering Aſtyanax and Andromache," after the prince of Saxe Teſchen, dedicated to madame the archducheſs; "Mutius Scævola before Porſenna," from a picture by Rubens in the cabinet of the prince Kaunitz, dated 1778; "St. Gregory refuſing to admit the emperor Theodoſius into the Church," after the ſame maſter, both plates in folio, and of learned execution; "Venus riſing from the Sea," from a picture by Rubens, in the gallery of count Schoenborn at Vienna, beautifully finiſhed, and four large and intereſting landſcape views at Neuwaldeck and Dornbach, in which occurs the tomb of Rouſſeau, and the ſtatues of the Gladiator and the god Mars.

George Frederic Schmidt was born at Berlin A. D. 1712, and died in the ſame city in 1775. Schmidt was deſtined by Fortune to be a tradeſman, but the voice of Taſte, (ſays Huber,) proclaimed him an artiſt. His perſeverance, after various ſtruggles, at length, ſurmounted the obſtacles that oppoſed themſelves to the gratification of his natural propenſities, and he was admitted a ſtudent in the ſchool of George Patel Buſch at Berlin, from whence his ambition, rather than his purſe, in the year 1736, carried him to Paris, where he frequented the ſchool of Nicholas de Larmeſſin, who honeſtly and earneſtly ſeconded the profeſſional wiſhes of Schmidt, by imparting to his diſciple all that it was poſſible to communicate of his knowledge of the art of engraving.

In the year 1742 he was admitted a member of the French academy of Arts, although (which at that time was an important exception) he was of the Proteſtant religion. At this time Schmidt, Prieſler, and Wille (of whom the reader will find an account under FRENCH *School of Engravers*) were diſtinguiſhed at Paris by their ſuperior merit in engraving, and were bound together by the ties of friendſhip, while there reigned between them a noble profeſſional emulation. Schmidt had recommended himſelf to the friendly regard of the celebrated Rigaud by the very fine portrait of P. Mignard, which he engraved for his reception into the Royal Academy, and Rigaud contributed to his ſpreading reputation, by ſeeking and obtaining for him ſuch engagements as were analogous to his wiſhes and talents.

In two years, however, or a little more, he was ſummoned to Berlin, and nominated engraver royal, and in the year 1757 he was ſent for to Peterſburg by the empreſs Elizabeth, to engrave her portrait, which he executed (with many others, while he remained in Ruſſia) to the great ſatisfaction, not only of the connoiſſeurs of the court, but of the beſt judges throughout the Ruſſian empire.

On his return to Berlin, in 1762, he began to diſtinguiſh himſelf in a new career of engraving, by etching in a pictureſque ſtyle after the works of Rembrandt, in which he imitated Rembrandt's own mode of execution, but generally bit-in his plates to deeper tones.

The engravings of Schmidt amount in number to nearly two-hundred, beſide the vignettes which he did for the works of the king of Pruſſia. Count Crayen publiſhed a catalogue raiſonnée of the whole, from which we have thought the following moſt worthy of ſelection, as ſpecimens of the various powers of our artiſt.

Portraits performed chiefly with the Graver, and of folio dimenſions.—Conſtantine Scarlatti, prince of Moldavia, a rare and fine print, dated 1738; Charles Gabriel de Tubieres de Caylus, biſhop of Auxerre, after Fontaine; Louis de la Tour d'Auvergne comte d'Evreux, after H. Rigaud, dated 1742; Johannes Baptiſta Roſſeau, after J. Aved, dated 1740; Charles de St. Alvin, archbiſhop of Cambray, after H. Rigaud, dated 1742; Maurice Quinten de la Tour, from a picture by himſelf, dated 1742; Jean Baptiſte Silva, a celebrated phyſician, after Rigaud, dated 1742; Pierre Mignard, firſt painter to the French king, after his friend Hyacinthe Rigaud, engraved in 1744, for Schmidt's reception into the academy, a piece regarded by connoiſſeurs as a chef d'ouvre of the maſters, and the fleſh of which is engraved in a ſtyle ſo ſoft and mellow, that it has been emphatically ſaid to be rather painted than engraved. The four laſt are in large folio.

After his return from Paris to his native city, Schmidt engraved the portraits of Antony Peſne, firſt painter to the king of Pruſſia, and Samuel Baro liber de Cocceii, both in folio, dated 1751 and 1752, and reckoned among the beſt portraits from the graver of Schmidt.

Johannes Theodore Eller, aulic-counſellor, &c. after Peſne; and Louis Albertene de Brandt baron de Grapendorf, after le Sueur, are a very rare and beautiful pair of portraits of the folio ſize.

Among the beſt portraits which our artiſt engraved at Peterſburg, are thoſe of Michel de Woronzow, count of the Holy Roman empire, and Nicholas Eſterhazy de Galantha, both in large folio, after L. Tocque, and dated 1758; Pierre Comte de Schuallow, grand-maſter of the Pruſſian artillery, from the life, and dated 1760; the empreſs Elizabeth of Ruſſia, a whole length figure, with accompaniments of the imperial coſtume, after L. Tocque, which Huber calls a ſuperb print, more eſpecially for the execution of the acceſſory parts, it is dated in 1758; count Cyrillus de Raſumowſky, after L. Tocque, and Jacobus Mounſey, from a picture by Schmidt himſelf, dated 1762, are rare and beautiful, and M. de Katt, field marſhal and miniſter of ſtate to the king of Pruſſia; the laſt portrait from the graver of Schmidt, the head in which is by himſelf, but the reſt finiſhed by Bergere the elder.

Among his hiſtorical and fancy works, may be diſtinguiſhed a pair of "The fair Greek," and "The amorous Turk," the two firſt plates which Schmidt engraved under Larmeſſin at Paris; "Tabagee Flamande," &c. in folio, after Oſtade, engraved in a ſtyle reſembling that of Viſſcher, and dated 1757; "The Virgin Mary ſitting with the Infants Chriſt and St. John," after Vandyke, dated 1773; "The Virgin at Prayers," after S. Ferrata; "The Preſentation in the Temple," after Pietro Teſta, for the Imperial gallery at Peterſburg; "Alexander and Philip the Phyſician," after Annibal Carracci, engraved in imitation of the hiſtorical ſtyle of Gerard Audran, at Berlin 1769, and "Timocles juſtified by Alexander," companion to the above, and after the ſame painter; both in large folio.

In imitation of the Taſte of Rembrandt.—A half length of a bearded old man with a feathered bonnet, deſigned by the engraver, and an old woman in profile, after Rembrandt, companion to the above; buſt of an Oriental in the ſtyle of Caſtiglione, dated 1750; buſt of a young man in a Rembrandt head-dreſs ; an old man habited as a Perſian, after Rembrandt ; portrait of a young female, and portrait of a young ſigneur, from the ſame maſter ; the Jewiſh bride, and the father of the Jewiſh bride, both after Rembrandt, and from the collection of the count de Kamki ; the profiles of Salimbeni, and count Algarotti ; the portrait of the engraver himſelf, inſcribed "Georg Fridrick Schmidt ; Konigll Preuſſ. Hof. Kupfertecher Mitglud der Maler Academien zu Berlin & Paris," dated 1752.

His beſt hiſtorical works, in the taſte of Rembrandt, are, "Jeſus Chriſt preſented to the People, and buffetted by the Soldiers," after Rembrandt, dated 1756. "The Reſuſcitation of the Daughter of Jairus," after Rembrandt, with a very fine chiaroſcuro, dated 1767. "The preſentation in the Temple," after Dietrich, companion to the above. "The Philoſopher in his Grot," by ſome called Anchiſes taking refuge in his grotto during the ſack of Troy, in the back-ground of which is a city in flames, after Rembrandt, and dated 1768. "The Repentance of St. Peter," after F. Bol. "Lot and his Daughters," after Rembrandt, from a picture in the poſſeſſion of prince Henry of Pruſſia, to whom the print is dedicated, and the funeral monument of Sir Andrew Mitchell, knight of the Bath, and ambaſſador from the king of Great Britain, who died at Berlin in 1771 ; the two laſt are of folio dimenſions.

Joſeph Wagner was born A. D. 1706, at Thalendorf, on the lake of Conſtance, and died at Venice ſome time about the year 1780. He learned the art of deſign under J. Amiconi, whom he accompanied to England and to Italy, and, obedient to the advice of this maſter, he afterwards travelled to Paris, and ſtudied engraving with very conſiderable ſucceſs under Laurent Cars. In the year 1756 he ſettled at Venice ; began to publiſh there the engravings of himſelf and pupils, and finally eſtabliſhed a beneficial commerce with ſeveral parts of Europe. Among his diſciples were Flipart, Berardi, and, above all, Bartolozzi, whoſe talents have done honour to his maſter, to himſelf, to Italy, and to England, and who ſtill lives engraving in Portugal amid the din of arms.

The ſtyle of Wagner's engraving is particularly eaſy and engaging, and is in fine art, what in manners we term amiable. It is built on the firm foundation of ſound drawing ; and partakes highly of the merits of Gerard Audran and Giacomo Frey. Like them he harmoniouſly mingled etching with the work of the graver and dry needle, and, like them, he evinced a high feeling of the merits of thoſe maſters after whom it was his fortune to engrave.

The elements of his ſtyle are, vigour tempered with mildneſs and ſuavity ; hence he is delicately bold, and, without the leaſt appearance of labour, produces, in his beſt works, an effect of finiſhing, which others labour after in vain, and which is more particularly obſervable and appropriate in infantile ſubjects, or where he has to touch the imagination with indefinite grace. In his figures of the Infant Saviour and St. John, where the characters in his original allowed him to be ſo, he is, indeed, the Fiamingo of his art ; though if living artiſts had found a place in our Cyclopædia, that honour muſt rather have been awarded to the moſt diſtinguiſhed of his pupils.

Wagner's firſt attempts in engraving are ſaid to have been the portraits of the Engliſh princeſſes Anne, Amelia, and Caroline, daughters of George II. Of his other portraits, the moſt remarkable are, a pair in folio, whole length figures of the empreſs Anne of Ruſſia, and Peter the Great, conducted by Minerva. The empreſs Elizabeth Petrowna, with a Ruſſian inſcription, and Farinelli crowned by the Muſe of Harmony ; all in folio, and after his firſt maſter, Amiconi.

Among the moſt eſteemed of his hiſtorical works are, "The Infant Chriſt aſleep in a Landſcape," a beautiful print. "The Education of the Virgin." "The Prophet Tireſias," inſcribed "Tireſias triplex modo vix modo fœmina vates ;" all of the folio ſize, and after Amiconi. "The Holy Family," elevated on a pedeſtal, at the foot of which are other ſaints, after Paolo Veroneſe. "The Interview of Jacob and Rachel," after Lucca Giordano, engraved for the Dreſden gallery. "Rebecca receiving the Preſents," after the ſame maſter, and for the ſame work. "The Death of Abel," after B. Luti, in large folio. "St. Mary Magdalen," from the ſame maſter, and of the ſame dimenſions. "The Virgin and Infant Chriſt," after Solimena. "The Aſſumption of the Virgin Mary," after Piazetta. "St. John in the Deſart," after Carlo Vanloo ; all in large folio.

A ſet of large landſcapes, ornamented with Italian paſtoral figures, after Zucarelli, and executed with much taſte, are by Wagner, in conjunction with Bartolozzi.

GERMAN *School of Muſic.* Though the language and national ſtyle of ſinging in Germany are much inferior to thoſe of Italy, the inſtrumental muſic of that country is indiſputably the firſt in the world. It is true that the violin is infinitely obliged to Corelli, Geminiani, Samis, Tartini, and Boccherini ; but for ſymphonies, and the union of wind-inſtruments with thoſe of the bow, the Italians have nothing at preſent, equal to the full pieces of the elder Stamitz, Vanhal, Haydn, and Mozart ; nor on keyed-inſtruments have they any compoſitions equal to thoſe of Emanuel Bach, Haydn, Mozart, and ſeveral other great claveciniſtes. And though the beſt German ſingers are, in general, inferior to the *piazza*, or ſtreet ſingers of Italy ; yet Germany has, now and then, furniſhed a vocal performer equal to the beſt of Italy : ſuch as Raaf, the Mingotti, the Taiber, the Toſi, Mara, &c.

M. Suard, ci-devant member de l'Academie Françoiſe, an extremely ſevere and faſtidious critic of the dramatic muſic of Italy, and a determined Gluckiſt, begins a long article in the Encyclopédie Methodique on the hiſtory of muſic in Germany ; but though the article conſiſts of twelve quarto pages, only four or five of them are beſtowed on German muſic in general, before the author haſtens to his hero Gluck, whoſe life he gives, and an ample liſt of his works, ſince he quitted the Italian ſtyle of compoſition for that of France. All this is minutely and ably done, and would be ſatisfactory to all muſical readers, if the author's zeal for Gluck, and his ſtyle were not *excluſive*, and his cenſures ſo ſevere, of all that has been admired in Italy, both in compoſition and performance, by all the reſt of Europe, except France. No vocal compoſitions but thoſe of Gluck eſcape condemnation. Metaſtaſio's dramas are not written to his mind. The compoſers are too florid, and the ſinging too important.

If M. Suard had confeſſed that the ſtyle of ſinging in France was bad, and that its native public ſingers were unable to execute ſuch ſongs as the great Italian maſters have compoſed ; and therefore that it was moſt prudent to have as little ſinging as poſſible ; the airs very ſhort and ſimple no introductory ſymphonies, or ritornels to impede the progreſs of the drama ; to ſet the poet above the compoſer, and the actor above the ſinger : with theſe conceſſions all Europe would have admitted his reaſoning to be juſt ; but when M. Suard inſiſts on all Europe implicitly following the French model in muſical dramas ; that where great opera compoſers and refined ſingers abound, they are not to be employed,

ployed, but that the melo-drama, to render it intereſting, ſhould never admit an air ſuperior to an elegant ballad, is what lovers of dramatic muſic, and judges of good compoſition and good ſinging, will never ſubſcribe to.

But though M. Suard is ſo determined a foe to all opera muſic but that of Gluck, and ſinging, except that of the natives of his own country, when he ſpeaks of the inſtrumental muſic of Germany, he is very juſt, and celebrates the ſchools of Vienna, Coblentz, Manheim, Munich, and Stutgard; which have produced the Stamitzes, the Touchis, Canabichs, Schroeters, Haydns, and innumerable other ſymphoniſts, whoſe compoſitions are known to all lovers of muſic. All theſe different ſymphoniſts (ſays with great truth M. Suard) have a peculiar character and ſtyle of their own; yet, continues he, "it muſt be allowed that all give way to the inexhauſtible Haydn for invention and originality. He unites all the reſources of ſcience to the charms of good taſte: he is noble and gay, full of grace and force; ſimple with infinite variety; and unites to movements the moſt ſweet and captivating in melody, the greateſt orcheſtral effects."

This character is written with ſuch truth, intelligence, and feeling, that we forgive the elegant and refined writer much of his bigotry for Gluck, and intolerance for all dramatic muſic, except that of France.

No praiſe is too ſtrong for the inſtrumental muſic of Germany in general by the compoſers ſo juſtly celebrated by M. Suard; but when to theſe we join Emanuel Bach, and the admirable Mozart, and his ſcholar Beethoven, it ſeems as if inſtrumental muſic, at leaſt, was arrived at its acme of perfection. This extenſive empire has likewiſe produced maſters who have even equalled the moſt eminent Italian dramatic compoſers of the laſt century; ſuch as Handel, Haſſe, Graun, J. C. Bach, Miſtewecce, Gluck, Naumann, &c., without mentioning the operas, oratories, and maſſes of Haydn, and the dramatic muſic of Mozart, perhaps the beſt of its kind. So that Germany may be ſaid frequently to vie with Italy itſelf in its own beſt ſtyle of compoſition.

GERMAN, in *Geography*, a townſhip of America, in Fayette county, Pennſylvania; containing 1835 inhabitants.

GERMAN *Flats*, the chief and poſt-town of Herkemer county, in the ſtate of New York, ſituated on the N. ſide of Mohawk river, oppoſite to Herkemer, and 24 miles E. of Whiteſtown; and containing 1637 inhabitants.

GERMAN *Town*, a town of New York, in Columbia county, containing 516 inhabitants.—Alſo, a town of Philadelphia county, in the ſtate of Pennſylvania, ſeven miles N. of the city of Philadelphia. It is a corporation, conſiſting chiefly of High and Low Dutch, and contains about 350 houſes, chiefly of ſtone, ſome of which are large and elegant, forming one ſtreet about two miles in length. The public buildings are a Preſbyterian, German-Calviniſt and Lutheran church, a Friends' meeting-houſe, and an academy. Here is a conſiderable manufacture of ſtockings, made of cotton, thread, and worſted. This is an ancient town, pleaſantly ſituated, and by its vicinity to the metropolis, well adapted for manufactures. The principal congregation of the Mennoniſts, and the parent of that ſect in America, ſubſiſts in this place. A ſevere battle was fought here between the Engliſh and Americans in October 1777.—Alſo, a poſt-town, and capital of Stokes county, N. Carolina, ſituated near the town fork of Dan river, and containing a court-houſe, gaol, and about 30 houſes; 528 miles S.W. by S. of Philadelphia.—Alſo, the chief town of Hyde county, in Newbern diſtrict, N. Carolina.—Alſo, a town of Bracken county, in Kentucky, containing 81 inhabitants.—Alſo, a town of the ſtate of New Jerſey; 17 miles W.S.W. of Morriſtown.

GERMANDER, in *Botany*. See TEUCRIUM.

GERMANDER, in the *Materia Medica*. The *common* germander, *teucrium chamædrys*, *chamædrys minor repens*, is a native of England, and flowers in June and July. The leaves and tops have a moderately bitter taſte, accompanied with a weak aromatic flavour, diminiſhed by drying the plant. They give out their virtues both to watery and ſpirituous menſtrua. The chamædrys has been chiefly eſteemed in the character of a mild aperient and corroborant; it is recommended in uterine obſtructions, intermitting fevers, and in the rheumatiſm and gout. The good effects of the chamædrys in the latter diſorder are recorded by different authors who have employed it in various forms and combinations, of which the celebrated antiarthritic, or Portland powder, is an inſtance. According to Murray the virtues of this plant ſhould be nearly allied to thoſe of Marrubium; and therefore it promiſes to be uſeful in aſthmatic affections, coughs, and infarctions of the lungs. Theſe virtues, however, are ſomewhat problematical.

The *Marum* germander, or Syrian herb maſtich, *teucrium marum*, flowers from July till September. It is a native of Spain, and is ſaid to grow plentifully alſo in Greece, Egypt, Crete, and Syria. It was firſt cultivated in England by Parkinſon in 1640, and is now to be found in many of our gardens. The leaves and younger branches of *marum*, when recent, emit, on being rubbed between the fingers, a volatile aromatic ſmell, which excites ſneezing, but to the taſte they are bitteriſh, with a ſenſation of heat and acrimony. According to Lewis (Mat. Med.) it loſes but little of its pungency by being dried; and gives out its active matter partially to water, and completely to rectified ſpirit. Diſtilled with the former, it yields a highly pungent, ſubtile, volatile, eſſential oil, ſimilar to that of ſcurvy-graſs, but ſtronger and of leſs periſhable pungency. Rectified ſpirit carries off, in the inſpiſſation of the ſpirituous tincture, a conſiderable ſhare of the ſmell and pungency of the marum, but leaves much the greateſt part concentrated in the extract; which, on being taſted, fills the mouth with a durable, penetrating, glowing warmth. Wedelius ſtrongly recommends this plant as an important remedy in many diſeaſes requiring medicines of a ſtimulant, aromatic, and deobſtruent quality; and inſtances of its efficacious uſe have been adduced by Linnæus, Roſenſtein, and Bergius. At preſent, however, marum is here chiefly uſed as an errhine, and is an ingredient in the "pulvis aſari compoſitus" of the London Pharmacopœia. The doſe of the powdered leaves is from a ſcruple to half a dram, which Murray adviſes to be given in wine.

The *water* germander, *teucrium ſcordium*, is a native of England, in marſhy ſituations, and flowers in July and Auguſt. The leaves of *ſcordium* have a ſmell reſembling that of garlick, whence its name; and to the taſte they are bitteriſh, and ſlightly pungent. When moderately and newly dried, they give out, ſays Lewis, (Mat. Med.) their ſmell and taſte both to water and to rectified ſpirit. In diſtillation their peculiar flavour ariſes with water, but the impregnation of the diſtilled fluid is not ſtrong, nor could any eſſential oil be obtained on ſubmitting to the operation ſeveral pounds of the herb. The ancients attributed to *ſcordium* a peculiar antiſeptic and alexipharmic power, and it had for many ages the character of being remarkably efficacious in all peſtilential and putrid diſeaſes. With this view it entered into the compoſition of ſeveral officinal medicines, that were ſuppoſed to be antidotes to various kinds of poiſons and infections. But, notwithſtanding this celebrity, it appears to be a very inſignificant article of the Materia Medica, and is therefore very juſtly fallen into diſuſe. Bergius, however, ſtates its virtue to be "antiputredinoſa, tonica, diaphoretica, diuretica, reſolvens;" and ſome others recommend it to be employed externally in antiſeptic cataplaſms and fomentations. Woodville Mat. Bot.

Germander, *Rock.* See Veronica.

GERMANEA, in *Botany*, named by Lamarck after Monſ. de Saint-Germain, a great admirer and cultivator of plants. Lamarck Dict. v. 2. 690. Illuſtr. t. 514. Juſſ. 116. 449. See Plectranthus, which latter appellation, given by L'Heritier, who was partial neither to M. de Saint-Germain nor his admirers, has been univerſally adopted.

GERMANIA, in *Geography*, a poſt-town of Culpepper county, in Virginia; 82 miles from Waſhington.

GERMANICIA, in *Ancient Geography*, a town of Aſia, ſituated on a plain between mount Taurus and mount Amanus, on the bank of a ſmall river which ran into the Pyramus, W. of the town.

GERMANICOPOLIS, a town of Bithynia, near the Propontide, called by Pliny Helgas and Boos-Cæte.—Alſo, a town of Paphlagonia, called *Gangra.*—Alſo, a town of Iſauria.

GERMANICUS, Cæsar, in *Biography*, grand-nephew of Auguſtus, nephew of Tiberius, and grandſon of Livia. When Auguſtus adopted Tiberius, he obliged him to adopt Germanicus, who thus, according to the Roman law, ſtood in the filial relation to them both. Germanicus married Agrippina, grand-daughter of Auguſtus, a lady not more illuſtrious for her rank than her virtues, and he himſelf grew up in the general affection of the public, on account of the excellence of his temper, and the mildneſs of his diſpoſition, and was denominated the "delight of the Roman people." Germanicus was very learned and eloquent, and, at an early age, he became illuſtrious in warfare, and was raiſed to the moſt important offices of the ſtate. When Auguſtus died, he was engaged in a war in Germany, and the affection of the ſoldiers unanimouſly ſaluted him emperor. He refuſed the honour, and then appeaſed the tumult which his indifference to the rank had occaſioned. He continued his exploits in Germany, and defeated the celebrated Arminius, and upon his return was rewarded with a triumph. The Germans fought with the greateſt bravery, but were at length obliged to yield to ſuperior diſcipline and generalſhip. The concluding battle was attended with great ſlaughter to the Germans, and gave the Roman commander occaſion to raiſe a trophy with this inſcription, "The nations between the Rhine and the Elbe ſubdued by the army of Tiberius Cæſar;" but this ſubjugation was only a temporary ceſſation of the conteſt, and, upon ſome diſaſter experienced by the Romans from the elements, the Germans renewed their attack, which afforded Germanicus an opportunity of acquiring new laurels, and he expected to have made an entire conqueſt of Germany, but the emperor, jealous of his ſucceſſes, recalled him, with many compliments upon his paſt conduct, and the proſpect of a ſecond conſulate. On his return he was honoured with another triumph, which was celebrated with extraordinary magnificence. That part of the ſpectacle which was moſt affecting to the Roman people, was the chariot of the victor, filled with his three ſons and two daughters. Germanicus was ſoon ſent into the Eaſt to quell ſome diſturbances there: the powers entruſted to him on this occaſion were very extenſive, but the ſuſpicious Tiberius had placed Piſo as a ſpy and check on the illuſtrious general. Germanicus entered upon his ſecond conſulſhip, having the emperor for his colleague; he viſited Athens, and was received in that city with all the adulation uſually practiſed by the inhabitants. He then ſailed to Eubœa and Leſbos, thence he touched upon Thrace, and croſſing into Aſia, viewed the ruins of Troy, and conſulted the oracle at Colophon. Piſo haſtily followed him, and after terrifying the Athenians with a ſevere harangue, and throwing out inſinuations againſt Germanicus, embarked for Rhodes, where he would have periſhed had he not have been ſaved by the humane aſſiſtance of the prince, whom he overtook there. Germanicus now proceeded to execute his commiſſion. He placed the crown on the head of Zeno, ſon of the king of Pontus, an ally of the Romans. He then reduced Cappadocia and other places to the ſtate of Roman provinces, and in the enſuing year he made a progreſs into Egypt, and viewed every thing that was deſerving of notice in the country, at the ſame time opening the public granaries to the people, who were ſuffering under a ſcarcity. Upon his return from Egypt to Syria, he found that Piſo had abrogated every regulation which he had eſtabliſhed among the legions, and in the cities, and his indignation at this behaviour widened the breach between them. At this time Germanicus was attacked with a diſeaſe which afterwards proved fatal, and which was imputed to the effects of poiſon, but ſome of our beſt hiſtorians, having impartially examined the collateral facts, do not think the evidence ſufficient to juſtify the aſſertion. Germanicus himſelf had no doubt that he was the victim of the malignity of Piſo, and, in his laſt moments, conjured his friends to proſecute with the utmoſt vigour the authors of his death. He died at Epidaphne, near Antioch, in the year 19, in the thirty-fourth year of his age. His death was the ſubject of univerſal lamentation at Rome. Every other concern was forgotten, and the people, without waiting for an order from the magiſtrates, forſook the forum, ſhut up their houſes, and aſſumed every token of univerſal ſorrow. A profuſion of honours was decreed to his memory, and even foreign princes and nations joined their teſtimonies of eſteem and regret. He had been highly eſteemed not only for his military accompliſhments, but alſo for his learning, humanity, and extenſive benevolence. In the midſt of war he devoted ſome moments to ſtudy, and he favoured the world with two Greek comedies, ſome epigrams, and a tranſlation of Aratus in Latin verſe. Tacitus, Suetonius, and Univer. Hiſt.

GERMANO, in *Geography*, a town of Naples, in Lavora, containing four pariſhes, four convents, and about 800 perſons. Near this place are the ruins of "Caſſinum," deſtroyed by Theodoric, king of the Goths The town is ſituated 43 miles N. N. W. of Naples. N. lat. 41° 33'. E. long. 13° 45'.—Alſo, a town of the duchy of Urbino; 13 miles E. N. E. of Urbino.—Alſo, a town of France, in the department of the Seſia, late in the lordſhip of Vercelli; four miles E. of St. Ja.—Alſo, a town on the W. coaſt of the iſland of Porto Rico. N. lat. 18° 20'. W. long. 67° 40'.

GERMANS, ſo called from the name of their country, in *Eccleſiaſtical Hiſtory*, one of the ſects of rigid anabaptiſts into which the Flemingians were divided; the other two being denominated Flandrians and Frieſlanders. See Flemingians.

Germans, *St.* or *Germains*, in *Geography*, a borough town of Cornwall, England, was, during the Anglo-Saxon era, a biſhop's ſee In 981, the Corniſh biſhop removed his ſee from Bodmin to this place; but biſhop Levinus tranſlated it to Crediton, in Devonſhire, in 1049. King Athelſtan founded a priory for ſecular canons here; to which the cathedral buildings were annexed. Of theſe nothing remains but the church, which is a curious and intereſting ſpecimen of ancient architecture. It conſiſts of a nave, two aiſles, and two towers at the weſtern end. Between the latter is a large entrance door-way, with a ſemi-circular arch, conſiſting of ſeveral ornamented mouldings. Contiguous to the church is Port-Eliot, the ſeat of lord Eliot. St. Germans, as a borough, ſends two members to parliament, both of whom are nominated and influenced by lord Eliot. A ſmall market is held here weekly; and two fairs annually. The living is a curacy in the gift of the dean and canons of Windſor. The Rev. John Whitaker, author of "The Hiſtory of Mancheſter," &c. has publiſhed two volumes, quarto, entitled "The ancient Cathedral of Cornwall, hiſtorically ſurveyed." This work contains many curious particulars reſpecting St. Germans; but the greater part is occupied by theoretical diſſertations.

GERMANUS I. in *Biography*, was patriarch of Conſtantinople in the beginning of the eighth century. His father was baſely murdered by the emperor Conſtantine Pagonatus, and himſelf, by the ſame authority, was deprived of his manhood. In 715, he was appointed to the biſhopric of Cyzicum, and from that honour he was tranſlated to the patriarchate of Conſtantinople. He was the chief oppoſer of the emperor Leo, when he iſſued his edict for prohibiting the worſhip of images; during four years the emperor bore with patience all the reſiſtance made to his decree, till at length the people, irritated by his diſcourſe, broke out in acts of rebellion; to quell theſe, Leo aſſembled a council at Conſtantinople in 730, by which the patriarch was degraded from his dignity, but permitted to retire to his paternal ſeat, where he ſpent the remainder of his days in peace and quietneſs. He died in 740, and was immediately elevated as a ſaint in the Greek and Latin churches, on account of his zeal and ſufferings in defence of image worſhip. He was author of ſeveral treatiſes; one, entitled "De ſex Synodis Oecumenicis," &c. has gone through many editions, but that by Le Moyne in his "Varia Sacra," in 1685, is by much the beſt. He wrote "An Apology for St. Gregory Nyſſen, in oppoſition to thoſe who accuſed him of falling into the errors of Origen;" and divers others miſcellaneous pieces which are inſerted in the Collect. Concil. and in the Biblioth. Patr. Moreri.

GERMANUS II. was patriarch of Conſtantinople in the thirteenth century, to which honour he was appointed about the year 1222. In 1233, he held a ſynod at the city of Nice, where he had fixed the patriarchal reſidence. He was, on account of ſome miſunderſtanding, depoſed from his dignity in the year 1240, but reſtored again juſt before his death, which happened in 1254. He was author of a work intended to illuſtrate the liturgy, and entitled "Rerum Eccleſiaſticarum Theoria," and of numerous homilies, orations, ſermons, epiſtles, decrees, &c.—There was a third Germanus, who was tranſlated to the patriarchate of Conſtantinople, from the ſee of Adrianople in the year 1267, but who reſigned his dignity within a few months after his election. Moreri.

GERMANY, in *Geography*, an extenſive country of Europe, ſituated between 45° 4′ and 54° 40′ N. lat. and between 6° 30′ and 19° 52′ E. long. compriſes chiefly the preſent empire of Auſtria, except Hungary, the greateſt part of the Pruſſian dominions, a part of Pomerania belonging to Sweden, the duchy of Holſtein, belonging to Denmark, ſome parts of Holland, ſome of the French departments on the Rhine, and all the ſtates of the new confederacy of the Rhine, with the formation of which it loſt its exiſtence as an empire.

In ancient times Germany was inhabited by various nations, which the Romans, with whom they waged war for ſome centuries, conſidered as Gauls. Of theſe the Helvetii, Boji, Tectoſagi, and Gothi (ſee GOTHS, &c.), and the Teutones, who dwelt in the Sinus Godanus near the Cimbri, were among the firſt that croſſed the Rhine, and applied to themſelves the name of Germani, probably from the Teutonic word *Geier* or *Guer*, a ſword, aſſerting, as it were, their quality of warriors. The word *Guerra*, *Guerre* in the Italian and French, which is not of Latin origin, appears to confirm this etymology. (See the hiſtory of the ancient Germans in the ſequel of this article.) It is alſo from the Teutones that, in the German language, the country is called *Teutſchland*, and latterly *Deutſchland*. (See TEUTONES.) The French gave it the name of *Allemagne* from the *Alemanni*, one of the German nations. (See ALEMANNI.) In the middle age the northern and north-eaſtern regions of Germany got an acceſſion of population from the Vandals and Slavonians; and towards the end of the ſeventeenth century, ſome parts of Germany received an inconſiderable increaſe of inhabitants, by ſome thouſands of French proteſtant refugees, who left France after the revocation of the edict of Nantes.

Buſching ſtated the extent of Germany at 11,124 German ſquare miles, 15 to a degree; but profeſſor Crome of Gieſſen, including Sileſia, ſtates it at 12,796 German ſquare miles, and its circumference at 500 German miles.

Germany is bounded on the north by the river Eider, and the canal of Holſtein, which ſeparate it from Denmark, and by the Baltic ſea; on the eaſt by Pruſſia, Poland, Hungary, Slavonia, and Croatia; on the ſouth by the gulf of Venice, Italy, and Switzerland; and on the weſt by the Rhine and the North ſea.

Maximilian, grandfather to Charles V., divided Germany into ten circles, and this diviſion was confirmed in the diet of Nuremberg in 1552; but the circle of Burgundy, which contained the ſeventeen provinces of the Low Countries, having been detached from the empire, it latterly contained only nine circles, *viz.*

I. The *Circle of Auſtria*, which compriſed, 1, the archduchy of Auſtria proper; 2, the duchy of Stiria; 3, the duchy of Carinthia; 4, the duchy of Carniola; 5, the Auſtrian Frioul; 6, the Littorale, or the territories of Trieſt and Fiume; 7, the county of Tyrol; 8, Upper Auſtria; 9, the biſhopric of Trent; 10, the biſhopric of Brixen; 11, the commanderies of the Teutonic order in Auſtria, and on the Etſch; and 12, the lordſhip Traſp, belonging to the prince of Dietrichſtein.

II. The *Circle of Weſtphalia*, which compriſed, 1, the biſhopric of Munſter; 2, the biſhopric of Oſnabruck; 3, the biſhopric of Paderborn; 4, the biſhopric of Liege; 5, the abbey of Corvey; 6, that of Stablo and Malmedy; 7, that of Werden; 8, that of Cornelius Munſter; 9, that of Eſſen; 10, that of Thorn; 11, that of Hervorden; 12, the duchy of Cleves; 13, the duchy of Juliers; 14, the duchy of Berg; 15, the principality of Minden; 16, the principality of Verden; 17, the principality of Naſſau; 18, the principality of Eaſt Frieſland; 19, the principality of Moers; 20, the duchy of Oldenburg; 21, the county of Mark; 22, the county of Ravenſberg; 23, the county of Schauenburg, 24, the county of Lippe; 25, the county of Sternberg, which now belongs to Lippe; 26, the county of Bentheim; 27, the county of Steinfurt; 28, the counties of Tecklenburg and Lingen; 29, the county of Hoya; 30, the county of Diepholtz; 31, the county of Wied;

32, the county of Sayn; 33, that of Rietberg; 34, that of Pyrmont; 35, that of Gronsfeld; 36, that of Reckheim; 37, the county of Anholt; 38, that of Holtzapfel; 39, that of Limburg in the county of Mark; 40, that of Blankenheim and Gerolſtein; 41, the counties of Kerpen and Lommerſum; 42, that of Schleiden; 43, the county of Hallermund; 44, that of Virnenburg; 45, that of Spiegelberg; 46, the county of Fagnolles or Ligne; 47, the lordſhips of Gimborn and Neuſtadt, Winnenburg and Beilſtein, Wittem, Eyſs and Schlenacken, Gehmen, Wickerad, Mylendonk and Reichenſtein; 48, the free imperial cities of Cologne, Aix-la-Chapelle, and Dortmund.

III. The *Circle of the Lower Rhine*, or the electoral circle of the Rhine, which compriſed, 1, the electorate of Mayence or Mentz; 2, the electorate of Treves; 3, the electorate of Cologne; 4, the palatinate of the Rhine; 5, the principality of Aremberg; 6, the county of Lower Iſenburg; 7, the burggraviate of Reineck; 8, the county or lordſhip of Beilſtein; 9, the commandery of the Teutonic order Coblence. The prince of Thurn and Taxis was a member of this circle, without having any territorial poſſeſſions in it.

IV. The *Circle of the Upper Rhine*, which compriſed, 1, the biſhopric of Worms; 2, the biſhopric of Spire; 3, that of Straſbourg; 4, that of Bale or Baſel; 5, that of Fulda; 6, the principality of Heiterſheim; 7, the abbey of Prüm; 8, the abbey of Weiſſenburg; 9, that of Odenheim; 10, the landgraviate of Heſſe; 11, the principality of Hersfeld; 12, the county of Katzenellenbogen; 13, the county of Hanau-Müntzenberg; 14, that of Hanau Lichtenberg; 15, the principality of Simmern; 16, the principality of Lautern; 17, that of Veldentz; 18, the principality of Deux Ponts; 19, the county of Sponheim; 20, the principality of Salm; 21, the principality of Naſſau; 22, the principality of Waldeck; 23, the county of Solms; 24, the county of Köenigſtein; 25, the county of Upper Iſenburg; 26, the poſſeſſions of the Wald or Wild, or Rau Graves and Rhine. Graves, (in Latin, Comites Saltuarii, Foreſtarii, Silveſtres and Hirſuti,) counts of Grumbach, Stein, and Dhaun; 27, the county of Leiningen; 28, the county of Witgenſtein; 29, the county of Falkenſtein; 30, that of Krichingen; 31, that of Wartenberg; 32, the lordſhips of Bretzenheim, Dachſtul, and Ollbrück; 33, the free imperial cities of Worms, Spire, Frankfort on the Maine, Friedberg, and Wetzlar; 34, the imperial borough of Friedberg; 35, the imperial villages of Müntzfelden, Sultzbach, and Soden.

V. The *Circle of Suabia*, which compriſed, 1, the biſhopric of Conſtance; 2, the biſhopric of Augſburg; 3, the abbey of Elwangen; 4, the abbey of Kempten; 5, the duchy of Wirtemberg and Teck; 6, the marggraviate of Baden; 7, the principality of Hohenzollern; 8, the abbey of Lindau; 9, that of Buchau; 10, the principality of Furſtenberg; 11, the county of Oettingen; 12, the principality of Klettgau; 13, the principality of Lichtenſtein; 14, that of Friedberg-Scheer; 15, the abbey of Salmanſweiler; 16, the abbey of Weingarten; 17, that of Ochſenhauſen; 18, that of Elchingen; 19, that of Yrſee; 20, that of Urſperg; 21, that of Kayſerſheim; 22, that of Roggenburg; 23, that of Roth; 24, the abbey of Weiſſenau; 25, that of Schuſſenried; 26, that of Marchthal; 27, the abbey of Peterſhauſen; 28, the abbey of Wettenhauſen; 29, that of Zwiefalten; 30, that of Gengenbach; 31, the abbey of Heggbach; 32, that of Gutenzell; 33, that of Rothmünſter; 34, the abbey of Baindt; 35, that of Nereſheim; 36, the commandery of Alſchhauſen; 37, the landgraviate of Stühlingen; 38, the landgraviate of Baar; 39, the county of Truchſeſs-Waldburg; 40, the county of Köenigſegg; 41, that of Eberſtein; 42, that of Fugger; 43, that of Hohen-embs; 44, that of Hohen-Geroldſeck; 45, the county of Neipperg; 46, the county of Bondorf; 47, the lordſhips of Wieſenſteig, Hauſen, Moeſkirch, Tettnang and Argen, Mindelheim and Schwabeck, Gundelfingen, Juſtingen, Eglof, Thannhauſen, Egglingen; 48, the free imperial cities of Augſburg, Ulm, Eſlingen, Reutlingen, Nördlingen, Halle, Ueberlingen, Rothweil, Heilbronn, Gmünd, Memmingen, Lindau, Dünkelſbühl, Biberach, Ravenſburg, Kempten, Kaufbeuren, Weil, Wangen, Yſni, Leutkirch, Wimpfen, Giengen, Pfullendorf, Buchhorn, Aalen, Bopfingen, Buchau, Offenburg, Gengenbach, Zell on the Hammerſbach; 49, the imperial village of Alochhauſen.

VI. The *Circle of Bavaria*, which compriſed, 1, the archbiſhopric of Saltzburg; 2, the biſhopric of Freyſingen; 3, the biſhopric of Ratiſbon; 4, the biſhopric of Paſſau; 5, the principality of Berchteſgaden; 6, the abbey of St. Emmeram in Ratiſbon; 7, and thoſe of Lower; and 8, of Upper Münſter in the ſame place; 9, the duchy of Bavaria; 10, the Upper Palatinate; 11, the principality of Neuburg; 12, the principality of Sultzbach; 13, the landgraviate of Leuchtenberg; 14, the principality of Sternſtein; 15, the county of Haag; 16, the county of Ortenburg; 17, the lordſhips of Ehrenfels, Sulzburg, Pyrbaum, Hohenwaldek and Breitenek; 18, the free imperial city of Ratiſbon.

VII. The *Circle of Franconia*, which compriſed, 1, the biſhopric of Bamberg; 2, the biſhopric of Würtzburg; 3, the biſhopric of Eichſtaedt; 4, the commandery of the Teutonic order of Mergentheim; 5, the principality of Culmbach, or Bayreuth; 6, the principality of Onolſbach, or Anſpach; 7, the principality of Henneberg; 8, that of Schwartzenberg; 9, the principality of Hohenlohe; 10, the county of Caſtell; 11, the county of Wertheim; 12, that of Rieneck; 13, that of Erbach; 14, the lordſhips of Limburg, Seinſheim, Reichelſberg, Wieſentheid, Welzheim, and Hauſen; 15, the free imperial cities of Nuremberg, Rothenburg, Windſheim, Schweinfurt, and Weiſſenburg; 16, the imperial villages of Gochſheim and Sennfeld.

VIII. The *Circle of Upper Saxony*, which compriſed, 1, the duchy of Pomerania; 2, the electorate of Brandenburg; 3, the electorate of Saxony; 4, the duchy of Saxe-Weimar; 5, the duchy of Saxe-Gotha; 6, that of Saxe-Cobourg; 7, that of Saxe-Meinungen; 8, that of Saxe-Hildburghauſen; 9, the abbey of Merſeburg; 10, the abbey of Naumburg-Zeitz; 11, the principality of Altenburg; 12, the principality of Querfurt; 13, the principality of Anhalt; 14, the abbey of Quedlinburg; 15, the abbey of Walkenried; 16, the principality of Schwartzburg; 17, the county of Mansfeld; 18, the county of Stollberg and Wernigerode; 19, the county of Barby; 20, that of Hohnſtein; 21, the principality of Hatzfeld; 22, the county of Reuſs; 23, the county of Schoenburg.

IX. The *Circle of Lower Saxony*, which compriſed, 1, the biſhopric of Hildeſheim; 2, that of Lubeck; 3, the abbey of Ganderſheim; 4, the duchy of Magdeburg; 5, the principality of Halberſtadt; 6, the duchy of Bremen; 7, the principality of Celle; 8, the principality of Grubenhagen; 9, the principality of Calenberg; 10, the duchy of Saxe-Lauenburg; 11, the duchy of Wolfenbüttel; 12, the principality of Blankenburg; 13, the duchy of Holſtein; 14, the duchy of Mecklenburg; 15, the

the principality of Schwerin; 16, the principality of Ratzeburg; 17, the county of Ranzau; 18, the free imperial cities of Lubeck, Goſlar, Muhlhauſen, Nordhauſen, Hamburg, and Bremen.

The following countries, without forming part of any of the nine circles, were likewiſe conſidered as belonging to the German empire; *viz.* 1, the kingdom of Bohemia; 2, the marggraviate of Moravia; 3, the marggraviate of Upper Luſatia; 4, that of Lower Luſatia; 5, the duchy of Sileſia; 6, the county of Montbelliard; 7, the three circles of the immediate Knights of the Empire, in Suabia, Franconia, and on the Rhine; 8, the lordſhips of Aſch and Waſſerburg, the convent of Schonthal, the burggraviate of Freudenberg, the barony of Horſtgen, the abbey of Cappenberg, that of Elten, the lordſhip of Rheda, the abbey of Burſcheid, the lordſhip of Jever, the barony of Kniphauſen, the lordſhips of Dyk, Mechernich, Schonau, Wylre, Richold, Stein, Dreyſs, Landſkron, Rhade, Saffenberg, Schaumburg, Oberſtein, the county of Homburgh, and the barony of Schauen. The German empire had alſo ſeveral fiefs in Italy.

The climate and temperature of Germany muſt in general be acknowledged to be temperate, yet it is conſiderably milder in the ſouthern than in the northern parts, where the winter is ſometimes extremely ſevere, and of long duration. The air, however, is every where ſerene and healthy, except in a few low marſhy places towards the North ſea. The vine thrives, and yields excellent wine, in all the ſouth-weſtern parts. The ſalubrity of the climate may likewiſe be inferred from the longevity of the inhabitants, ſome of whom arrive to a very great age.

There is perhaps no country in Europe in which the ſoil varies more than in Germany. Sandy plains and barren heaths predominate in the north-eaſt, and ſwamps and marſhes in the north-weſt: but ſome of the interior and ſouth-weſtern parts have an uncommonly fertile ſoil, and great attention is generally paid to its improvement. The ſouth and the ſouth-eaſt ſide is the moſt mountainous. Bohemia is ſeparated from Sileſia by the Rieſen Geburge, or the Giants' mountains. Towards Hungary are the Carpathian mountains; towards Italy the Alps. In the interior parts are the Schwarzwald, (black foreſt,) the Rauhe Alb, the Ertzgeburge, the Fichtelberg, the Harz, or Hercynian foreſt, whoſe higheſt ſummit, the Broeken, is only 3580 feet above the level of the Mediterranean ſea. In ancient times Germany was covered with foreſts, chiefly of oak, birch, pine, fir, larch, and aſh trees. Though they have been conſiderably thinned, and immenſe tracts of them converted into tillage, there are yet ſome very large woods, as the Speſſart, the Schwartzwald, the Hartzwald, and the Thuringerwald.

The extent of ſea-coaſt on the North ſea is not much above 150 Engliſh miles, and on the Baltic about 500 Engliſh miles. The principal lakes are the Boden ſee, or lake of Conſtance, in Swabia, which forms one of the boundaries towards Switzerland; the Chiem ſee, in Bavaria; the Girnitzer ſee, in Auſtria; the lakes of Damm, Neuwarp, Madue, and Wilm, in Pomerania; thoſe of Werbellin, Uckerſee, Parſtein, Schwieluch and Ruppin, in Brandenburg; the Dammer ſee, in the county of Diepholtz, beſides ſeveral ſmaller ones in Mecklenburg and other parts of the country.

But it is chiefly the great number of rivers, by which Germany is interſected in various directions, that give it immenſe advantages for trade. It counts five hundred and twenty rivers in all; ſixty navigable to a great length, and ſix, *viz.* the Danube, the Rhine, the Mayne, the Weſer, the Elbe, and the Oder, ranking among the largeſt and moſt noble rivers of Europe.

The number of mineral ſprings and baths exceeds one thouſand; the moſt famous are Carlſbad and Egra, in Bohemia; Warmbrunn, in Sileſia; Toplitz, in Auſtria; Heilbronn, in Bavaria; Wiſbaden and Seltzer, in the circle of the Upper Rhine; Freyenwalde, in Brandenburg; Dobberan, in Mecklenburg; Lauchſtedt, in Saxony; and Pyrmont, in Weſtphalia.

As almoſt all climates, or at leaſt all temperatures and ſoils, are to be met with in Germany, it abounds in almoſt all productions of nature and their varieties, and chiefly in all kinds of corn: flax of excellent quality, hemp, hops, tobacco, madders, ſaffron, rape-ſeed, rhubarb, excellent garden vegetables and orchard fruits; wine, in greateſt perfection on the banks of the Rhine, Mayne, Moſelle, and Neckar. The agriculture of Germany has been conſiderably improved of late by the efforts of Mr. Thaër and other patriotic writers. In the rearing of cattle and ſheep Germany is, however, greatly deficient. The breed of horſes, except in Mecklenburg, Eaſt Frieſland, Oldenburg, Holſtein, and ſome parts of Hanover and Wirtemberg, is very indifferent. The number of oxen is not ſufficient either for agricultural purpoſes or for conſumption. The beſt breed is in Eaſt Frieſland, Oldenburg, and Holſtein. The number of ſheep does not exceed thirteen or fourteen millions. The Spaniſh breed has been naturalized in ſome parts of the Pruſſian and Saxon dominions. The breed of hogs is much neglected; that of goats is encouraged in the mountainous parts, where they alſo rear aſſes and mules. The foreſts are ſtocked with wild boars, ſtags, deer, and hares. Poultry is abundant. Salted and ſmoked geeſe, and gooſe quills, are exported from Mecklenburg and Pomerania. Some parts of Germany are remarkable for fine larks and thruſhes, of a delicious flavour. Others abound with ſinging birds, particularly Canary birds and goldfinches, which are exported to almoſt every country of Europe. Bees are leſs attended to than in ancient times. Silkworms are reared with particular care in ſome of the ſouthern, and even northern diſtricts.

Of the mineral productions of Germany, gold forms the moſt inconſiderable part, ſmall particles of it are found in the Rhine, the Danube, the Elbe, and the Saale. Silver is more plentiful; its annual produce exceeds 200,000 marks, that of copper amounts to 100,000 cwts. The ſupply of tin from the mines is ſufficient for home conſumption. Iron of a very good quality, lead, quickſilver, cobalt, arſenic, and zinc are in great abundance. Beſides topazes, amethyſts, cornelians, agate, ſerpentine, and other rare ſtones, Germany has large quarries of curious marble, and capital mill and burr ſtones. It abounds with various ſorts of fine earth, ſuch as tripoli and porcelain earth, chiefly in the circle of Miſnia in the kingdom of Saxony; terra ſigillata, potters' clay, fullers' earth, and others. There are ſome coal mines, particularly in Weſtphalia, and abundance of peat moſs. Salt is obtained in ſeventy-ſix ſalt works, of which thoſe near Halle, in the former duchy of Magdeburg, produce the greateſt quantity. There is no rock ſalt in Germany.

The principal manufactures of Germany are thoſe of linen and woollen cloth, cotton, thread lace, china, hardware inferior to none but the Engliſh, glâſs, tobacco and ſnuff, writing paper, ſoap, wax, toys and trinkets, and ſilks, but not equal to the French. Manufactures flouriſh moſt in the Auſtrian and Pruſſian dominions, in Saxony, in the preſent kingdom of Weſtphalia, in the grand duchy of Berg, &c. The towns moſt remarkable for extenſive manufactures are Altona, Augſburg, Berlin, Bronſvick, Bremen, Caſſel, Chemnitz, Deſſau, Dreſden, Eiſenach, Erfurt, Erlangen, Francfort on the Mayne, Gorlitz, Gottingen, Gotha, Hamburgh, Hanau, Hanover, Herrnhuth, Hof, Leipzick, Lubeck, Manheim, Meiſſen, Neuſtadt on the Doſſe, Neuwied, Nurnberg, Offenbach, Plauen, Quedlinburgh, Stutgard, Ulm, and Zwickau.

Situated almoſt in the centre of Europe, bounded by the Baltic and North ſea, and interſected by many large rivers, Germany has enjoyed, till very lately, a moſt extenſive commerce. Its principal ſea ports are Hamburgh, Altona, Kiel, Lubeck, Wiſmar, Roſtock, Stralſund, Stettin, Emden, Bremen. Inland towns of great trade are Bronſvick, Magdeburg, Leipzick, Naumburg, Francfort on the Mayne, and Francfort on the Oder, Vienna, Augſburg, Nurnberg, Breſlau, and Ulm. The principal articles of exportation are timber, corn, fruit, wine, tobacco, madders, cobalt, ſmalts, potaſh, horſes, oxen, ſalt and ſmoaked meat, butter, cheeſe, honey, wax, leather, wool, cotton yarn, linen cloth to the amount of ſix millions ſterling, linen yarn, thread lace, cotton ſtuffs, hardware, lead, copper, braſs, quickſilver, china, earthen-ware, mirrors, glaſs, wooden toys and trinkets, &c. Germany imports corn, oxen, and horſes chiefly from Hungary, Poland, and Denmark, hogs from Hungary, butter from Ireland and Holland, ſilk and cotton, all ſorts of colonial produce, wine and fruit, ſilk and cotton ſtuffs, paper, jewellery and trinkets. It carries on a moſt important trade with European Turkey, from whence it gets by land as far as Semlin, and from thence upon the Danube by way of Vienna, an immenſe quantity of raw cotton, which is diſtributed all over the north of Europe, Germany and Switzerland. As it has to pay annually from three to four millions of piaſters in hard caſh to the Turks, theſe money tranſactions are carried on by means of the bankers of Vienna. The principal inſurance companies are at Hamburgh, Lubeck, and Bremen. Weights, meaſures, and coins differed in every petty principality of Germany, and this circumſtance was one of the diſadvantages which travellers at leaſt experienced from that number of free cities and ſmall ſtates for which Germany was particularly remarkable. It is true, as has been juſtly obſerved by the intelligent author of an eſſay on the Reformation of Luther, that all theſe cities snd principalities of moderate extent had their principle of life active, peculiar, and independent. Each prided itſelf on making induſtry, ſciences and arts flouriſh in its little capital.

By the treaties of Paſſau in 1552, of Augſburgh in 1555, and of Munſter in 1648, the Roman Catholic, Lutheran, and reformed religion, were acknowledged as dominant in Germany: but all other ſects enjoyed a complete toleration, and the number of Jews in ſome parts is very conſiderable.

According to Mr. Charles Villier's view of the preſent ſtate of ancient literature and hiſtory in Germany, in his report to the third claſs of the French inſtitute, the German literati poſſeſs a great facility in entering into the ſpirit of nations and of ages, different from thoſe of the preſent day, and are eminently ſucceſsful in archeological reſearches, and in the interpretation and tranſlation of the ancients, particularly of the Greeks, perhaps on account of ſome ſecret affinity between the two nations, as the analogy of the two languages ſeems to indicate. But if any ſpecies of literary production can be ſaid to belong to Germany, almoſt excluſively, it is the hiſtory of literature. The German literary and critical journals, eſpecially thoſe publiſhed at Jena, Halle, Leipſick, and Gottingen, rank among the beſt in Europe. Before the revolutionary wars, the number of authors exceeded 7000. Their literary productions found a ready market at the two fairs of Leipſick in the ſpring and autumn of every year. The number of new books publiſhed at thoſe fairs was rarely under 4000: but ſince the fall of Pruſſia, in 1807, it has never exceeded 1500. Two hundred German, and about thirty foreign bookſellers, uſed to meet at Leipſick, to barter their reſpective publications; the amount of theſe exchanges was generally above 200,000*l.* ſterling. Anciently German authors wrote moſt of their works in Latin. In the beginning of the ſeventeenth century, there were at leaſt 400 out of 700 written in that language; towards the end of the eighteenth century the proportion was only 200 in 2000. Before that period the literary labours of the Germans were confined to theology, juriſprudence, and biblical and claſſical criticiſm: but during the latter half of the laſt century they have been extended to every branch of ſcience and literature; mineralogy, natural hiſtory in general, chemiſtry, aſtronomy, and geometry have been cultivated with an intelligent ardour and perſeverance that have been rewarded with many brilliant diſcoveries. Statiſtics, which elucidates the theoretical tenets of political economy, and furniſhes important materials to the hiſtorian and the geographer, is indebted alike for its origin and its improvement to the literary induſtry of the Germans. In metaphyſics they have incurred the reproach of dogmatical obſcurity, and in their dramas and novels they are juſtly accuſed of a diſguſting affectation of morbid ſentimentality. But their epic and tragic poets, and their moral philoſophers, have immortalized themſelves by works, which have been eagerly tranſlated into all the idioms of modern Europe. To the great names of Luther, Kepler, Leibnitz, Haller, Euler, Moſheim, Puffendorff, Pott, Margraff, Hagedorn, Leſſing, Gleim, Kleiſt, Heyne, Rabener, Klopſtock, Ramler, Geſſner, who live in the records of literary fame, muſt be added thoſe of Bernouilli, Lambert, Kæſtner, Wieland, Schiller, Göthe, Herder, Zollikoffer, Spalding, Bloch, Moſes Mendelſohn, Klaproth, von Humboldt, Voſs, Hölty, Michaelis, J. A. Eberhard, Von Zach, and many others, whoſe merits are as conſpicuous as they are generally acknowledged.

The German lauguage is of Teutonic origin, and may be regarded as a primitive one, as it is the mother tongue of the Dutch, Flemiſh, Daniſh, Swediſh, and Engliſh languages. Its dominion extends from the boundaries of Lapland and Finland, to thoſe of France and Italy. In the middle ages, the ſimilarity between the idioms derived from the German was ſo great, that the German and Engliſh miſſionaries that went to Sweden, Denmark, and Norway, had no difficulty in making themſelves underſtood in thoſe countries. The learned Ihre, in his introduction to his Sueo-Gothic Gloſſary, has alſo diſcovered a ſtriking conformity between the old Teutonic and Perſian languages. That which it bears to the Greek in its conſtruction is not leſs ſtriking. The dialect known by the name of Low German, or Low Dutch, is now diſuſed in writing, and wholly confined to the vulgar in the kingdom of Weſtphalia, in the duchies of Mecklenburgh and Holſtein, and in Pomerania; it comes very near the Dutch. The High German, or High Dutch, has been conſiderably improved ſince Luther's time; it is remarkable for ſtrength, richneſs, bold inverſions, and compound words, which render it admirably fit for the higher ſtrains of epic poetry. The learned dictionaries of Adelung, Eberhard, and Campe, have ſerved to elucidate the meaning of every one of its terms, ſo that it may now be conſidered as fixed. It is ſpoken in its greateſt purity in Upper Saxony, part of Lower Saxony, and on the banks of the Necker and the Mayne. There are ſtill ſome traces of the Slavonian language left on the ſhores of the Baltic, in ſome diſtricts of Pomerania, in Sileſia, Bohemia, and Moravia: but it is diſappearing very faſt.

No country can boaſt of more and better inſtitutions for the acquiſition of knowledge and ſcience than Germany. Notwithſtanding the great extent of territory ceded to France, there are ſtill 30 univerſities, of which 17 are Proteſtant, 11 Catholic, and two mixed, *viz.*; Griefswalde, Jena, Leipſick, Wittenberg, Gottingen, Halle, Helmſtädt, Kiel, Roſtock, Altdorf, Erlangen, Rinteln, Gieſſen, Marburg, Stuttgard, Tubingen, Frankfort on the Oder, are Proteſtant univerſities; Bamberg, Wiëtzburgh, Paderborn, Fulda, Dillingen, Freyburg, Inſpruck, Vienna, Ingolſtadt, Saltzburgh, and Prague, are Catholic univerſities; and the two mixed ones are Erfurt and Heidelberg. The oldeſt of them is that of Prague, which was founded in 1348, and the moſt modern that of Erlangen, founded in 1743. Moſt of theſe learned ſeminaries, which have furniſhed the northern regions of Europe with able teachers, are provided with extenſive libraries, anatomical theatres, muſeums of natural hiſtory, botanic gardens, and aſtronomical obſervatories. The profeſſors are animated with the noble ambition of extending the fame of the univerſity in which they teach by their writings, and as the ſtudents pay a liberal fee for their lectures, this opens an honourable and uſeful competition among the teachers. Every ſtudent is at liberty to ſelect what lectures he chuſes to hear, and may employ his time as he likes. He has only a ſevere examination to undergo when he offers himſelf as a candidate for any ſituation in the law, adminiſtration, or church, or when he wants to take his degree as a doctor in medicine, without which degree he cannot be admitted into any college of phyſicians. All the other uſeleſs ſcholaſtic formalities have long ſince been abrogated.

Beſides theſe univerſities there is a great number of public or free grammar ſchools, lyceums, and other learned ſchools in Germany. The methods of teaching have been conſiderably improved within the latter half of the eighteenth century, when Baſedow, profiting by the hints thrown out by J. J. Rouſſeau, opened the Philantropinum at Deſſau, and ſet an example of liberal and ſcientific education, which was ſoon imitated by men of enlightened views and extenſive information. Campe, Villaume, Saltzmann, Trapp, and latterly Peſtalozzi, have eminently contributed to introduce better modes of inſtruction. There are alſo many eſtabliſhments deſtined to train young men for particular employments, ſuch as military, mineral, commercial, and even agricultural ſchools. Females are moſtly educated at home under the eyes of their mothers, who are particularly anxious to guard their daughters againſt the baneful influence of ladies boarding ſchools.

The numerous literary ſocieties of all kinds, public libraries, reading clubs, circulating libraries, critical journals, and other means of diſſeminating and preſerving knowledge, afford another proof of the high ſtate of civilization to which moſt countries of Germany are arrived. The moſt diſtinguiſhed of its learned ſocieties are the imperial academy of natural philoſophy at Vienna, the royal academy at Berlin, the academies at Caſſel, Erfurt, Gottingen, Manheim, München; the agricultural ſocieties at Heidelberg, Leipſick and Zelle. The beſt public libraries are thoſe of Berlin, Dreſden, Gottingen, Gotha, Hanover, Leipſick, Manheim, Stuttgard, Weimar, Vienna, and Wolfenbuttel. Though Germany may boaſt of being the cradle of the art of printing, England and France bear the palm. The generality of German books are printed without taſte, with had types, and on bad paper. A few ſplendid editions have, however, been attempted at Leipſick, and met with merited ſucceſs. The liberty of the preſs, which was never general all over Germany, has received its death-blow from the ſway which the French government exerciſes in every one of its counties, ſince the peace of Tilſit.

Of the fine arts, muſic is that in which the Germans excel. They vie with the Italians, and the names of Handel, Bach, Haydn, and Mozart are reverenced by their rivals. Germany has alſo produced ſome good painters and engravers, but few ſtatuaries and architects. With reſpect to dancing, it is far behind Italy and France. The principal academies for the encouragement of the fine arts are at Berlin, Dreſden, Leipſick, Manheim, and Vienna. The moſt celebrated galleries of pictures are at Dreſden, Vienna, Sans Souci, near Potſdam, Duſſeldorff, Manheim, and Caſſel.

The influence of the arts on the manners of a people is no where more ſtriking than in Germany, where concerts and muſical parties, together with dancing, form the chief amuſement; and the manners of the middle orders are polite and affable.

Before the peace of Luneville in 1801, the population of Germany was rated at 27 millions of inhabitants; but as it loſt 3,700,000 individuals, through the ceſſion of the countries ſituated on the left ſhore of the Rhine, its preſent population is very little above 23 millions.

The hiſtory of Germany in its ancient ſtate, its gradual advancement towards extent of territory and dominion, and its recent decline and fall, preſents to our notice a ſubject that is in a variety of reſpects peculiarly intereſting. The weſtern monarchy of Rome was firſt reſiſted, then invaded, and at length overturned by the warlike inhabitants of Germany; and it was from the woods of this country that the moſt civilized nations of Europe iſſued; and we may ſtill diſtinguiſh in the rude inſtitutions of theſe barbarians the original principles of our laws and manners. Ancient Germany, excluding from its independent limits the provinces weſtward of the Rhine which had ſubmitted to the Roman yoke, extended itſelf over a third part of Europe. Almoſt the whole of modern Germany, Denmark, Norway, Sweden, Frieſland, Livonia, Pruſſia, and the greater part of Poland, were peopled by the various tribes of one great nation, whoſe complexion, manners, and language denoted a common origin, and preſerved a ſtriking reſemblance. On the weſt, ancient Germany was divided by the Rhine from the Gallic, and on the ſouth by the Danube, from the Illyrian provinces of the empire. A ridge of hills, riſing from the Danube, and called the Carpathian mountains, covered Germany on the ſide of Dacia or Hungary. The eaſtern frontier was faintly marked by the mutual fears of the Germans and the Sarmatians, and was often confounded by the mixture of warriors, and confederating tribes of the two nations. Such was alſo the caſe with reſpect to the Gauls on the weſt, where it is ſtill more difficult to fix their boundaries on account of their conſtant fluctuation. In the remote darkneſs of the north, the ancients imperfectly deſcried a frozen ocean, that lay beyond the Baltic ſea, and beyond the peninſula, or iſlands of Sarmatia. But their neareſt northern limit was the Hercynian foreſt, at that time ſuppoſed to be impenetrable. It appears from authentic documents that the climate of ancient Germany was much colder than that of the country in its more modern ſtate. For the evidence of the fact, and the explication of it, we refer to the article CLIMATE, where the reader will alſo find ſome reflections on the influence which variety of climates is ſuppoſed to have on the minds and bodies of the different inhabitants of the globe. The keen air of Germany contributed, without doubt, towards forming the large and maſculine limbs of the natives, who were, in general, of a more lofty ſtature than the people of the ſouth, gave them a kind of ſtrength better adapted to violent exertions than to patient labour, and inſpired them with conſtitutional bravery, which is the reſult of nerves and ſpirits. "In hos artus, (ſays Tacitus, Germania, iii. 20.) in hæc corpora, quæ miramur, excreſcunt." The ſeverity of a winter campaign, that chilled the courage of the Roman troops, was ſcarcely felt by thoſe hardy children of the north, who, in their turn, were unable to reſiſt the ſummer heats, and diſſolved away in languor and ſickneſs, under the beams of an Italian ſun.

As to the origin of the Germans, although we cannot allow with Tacitus, that they were "Indigenæ," or natives of the ſoil, yet we muſt admit that ancient Germany was not peopled by any foreign colonies, already formed into a political ſociety; but the name and nation received their exiſtence, as we have already obſerved in the beginning of this article, from the gradual union of ſome wandering barbarians, probably of the ſame nation with the Celtæ and Gauls, and both, perhaps, deſcended from the ancient Gomerians, or deſcendants of Gomer, the eldeſt ſon of Japhet. (See DISPERSION *of Mankind.*) The Germans, however, were very much intermixed with the old Scythians and Sarmatians, on that ſide which joined their territories, and particularly between the two great rivers, Rhine and Danube; and they, without doubt, had adopted many of their cuſtoms, as well as intermingled ſome portion of their language with their own; but in all other parts of Germany, we find ſuch an exact conformity in their religion, laws, cuſtoms and language, as affords a very ſtrong preſumption that they were deſcended from the ſame ancient ſtock with the Celtæ or Gauls, and that they came by gradual and ſucceſſive migrations from Aſia. (See CELTÆ.) How this country came to be denominated Germany, and whence its inhabitants derived the appellation of Germans, it is not eaſy to determine. The moſt probable conjecture is, that they were ſo called, either from their affinity to the Celtes, or from the Celtic words "ghar man," a warlike man; but this was not their original name, any more than the appellations of "Teutones" or "Allemanni," by which, as we have already obſerved, they were occaſionally denominated. This name was of a more modern date, and ſeems to have had its riſe on the other ſide of the Rhine, when the Condruſi, Eburones, Cæraſi, and Pæmani croſſed that river, after the example of ſome others of their countrymen, and ſettled in Gaul. Theſe, it ſeems, were the firſt to whom the appellation of Germans was given, and which, therefore, extended no farther than the Rheniſh ſhore on the Gallic ſide, but ſoon after paſſed over to the other, and became common to other people of the ſame language and cuſtoms, till at length it became the general name of the whole nation, and the country was called from them Germania or Germany.

Whatever may be ſuppoſed to be the remote origin of the Germans, they appear to have been in a ſavage and uncivilized ſtate on their firſt ſettlement in this country. The account given of the country itſelf by Cæſar and Tacitus is ſo unfavourable, that it ſeems to be almoſt incredible, that a brave nation, for ſuch we muſt allow the ancient Germans to have been, would have been contented to remain in it, when they were deſtitute of neither ſtrength nor courage to have forced their way into others more pleaſant and fruitful. Theſe ancient hiſtorians deſcribe it as wholly barren and uncultivated; and even its variety of ſoil and climate added to the horror of it, from the dreadful foreſts, putrid and inſalubrious bogs, the inclemency of its winds, dampneſs of its ſeas, lakes, and rivers, and ſterility of its ſoil. The uncivilized ſtate of the ancient Germans may be inferred from the account given of them by Tacitus; for in his time they were unacquainted with the uſe of letters (German. ii. 19); and the uſe of letters is the principal circumſtance that diſtinguiſhes a civilized people from a herd of ſavages incapable of knowledge or reflection.

Of the uſeful and agreeable arts of life the ancient Germans were wretchedly deſtitute. Modern Germany is ſaid to contain about 2,300 walled towns, whereas, in a much wider extent of country, the geographer Ptolemy could diſcover no more than ninety places, which he decorates with the name of cities, though, according to our ideas, they would not deſerve that ſplendid title. We can only ſuppoſe them to have been rude fortifications, conſtructed in the centre of the woods, and deſigned to ſecure the women, children, and cattle, whilſt the warriors of the tribe marched out to repel a ſudden invaſion. Such is the account given of them by Cæſar; and Tacitus aſſerts that the ancient Germans had no cities. Even in their hamlets or villages they did not build their houſes contiguous to each other. They conſidered it as a badge of ſervitude to be obliged to dwell in a city ſurrounded with walls. Each barbarian fixed his independent dwelling on the ſpot to which a plain, a wood, or a ſtream of freſh water had induced him to give the preference. Neither ſtone, nor brick, nor tiles, were employed in theſe ſlight habitations. They were, indeed, no more than low huts of a circular figure, built of rough timber, thatched with ſtraw, and pierced at the top to leave a free paſſage for the ſmoke. That they conſidered cities as places of confinement rather than of ſecurity, appears from the following circumſtance: when one of their tribes had ſhaken off the Roman yoke, their countrymen required of them, as an evidence of their having recovered liberty, to demoliſh the walls of the towns which the Romans had built in their country. The Romans built ſeveral cities of note on the banks of the Rhine. But in all the vaſt countries from that river to the coaſts of the Baltic, there was hardly one city previous to the ninth century of the Chriſtian era.

In the moſt inclement winter, the hardy German was ſatisfied with a ſcanty garment made of the ſkin of ſome animal. The natives, who dwelt towards the north, clothed themſelves with furs; and the women manufactured for their own uſe a coarſe kind of linen. The game of various ſorts, with which the foreſts of Germany were plentifully ſtocked, ſupplied its inhabitants with food and exerciſe. Their monſtrous herds of cattle, leſs remarkable for their beauty than for their utility, formed the principal article of their wealth. A ſmall quantity of corn was the only produce exacted from the earth. The uſe of orchards, or artificial meadows, was unknown to the Germans; nor can we expect any improvements in agriculture from a people, whoſe property every year experienced a general change by a new diviſion of the arable lands, and who, in that ſtrange operation, avoided diſputes, by ſuffering a great part of their territory to lie waſte and without tillage. Gold, ſilver, and iron, were extremely ſcarce in Germany. Its barbarous inhabitants wanted both ſkill and patience to inveſtigate thoſe rich veins of ſilver, which have ſo liberally rewarded the attention of the princes of Brunſwick and Saxony. Although the various tranſactions of peace and war had introduced ſome Roman coins (chiefly ſilver) among the borderers of the Rhine and Danube; yet the more diſtant tribes were abſolutely unacquainted with the uſe of money, carried on their limited traffic by the exchange of commodities, and prized their rude earthen veſſels as of equal value with the ſilver vaſes, the preſents of Rome to their princes and ambaſſadors. If we contemplate a ſavage nation in any part of the globe, a ſupine indolence and a careleſſneſs of futurity will be found to conſtitute their general character. This was decidedly the caſe with reſpect to the ancient Germans. The care of the houſe and family, the management of the land and cattle, were delegated to the old and infirm, to women and ſlaves. The lazy warrior, deſtitute of every art that might employ his leiſure hours, conſumed his days and nights in the animal gratifications of ſleep and food. Nevertheleſs, the ſound that ſummoned the German to arms was grateful to his ear. It raiſed him from his uncomfortable lethargy, gave him an active purſuit, and, by ſtrong exerciſe of the body, and violent emotions of the mind, reſtored him to a more lively ſenſe of his exiſtence. In the dull intervals of peace, theſe barbarians were immoderately addicted to deep gaming and exceſſive drinking; both of which, by different means, the one by inflaming their paſſions, the other by extinguiſhing their reaſon, alike relieved them from the pain of thinking. They gloried in paſſing whole days and nights at table; and the blood of friends and relations often ſtained their numerous and drunken aſſemblies. The poſſeſſion and the enjoyment of property are the pledges which bind a civilized people to an improved country. But the Germans, who carried with them what they moſt valued, their arms, their cattle, and their women, cheerfully abandoned the vaſt ſilence of their woods for the unbounded hopes of plunder and conqueſt. The innumerable ſwarms that iſſued, or ſeemed to iſſue, from the great ſtore-houſe of nations, were multiplied by the fears of the vanquiſhed, and by the credulity of ſucceeding ages. And from facts thus exaggerated, an opinion was gradually eſtabliſhed, and has been ſupported by writers of diſtinguiſhed reputation, that in the age of Cæſar and Tacitus the inhabitants of the north were far more numerous than they are in our days. On this ſubject ſir William Temple and Monteſquieu have indulged the uſual livelineſs of their fancy. A more ſerious inquiry into the cauſes of population, ſeems to have convinced modern philoſophers of the falſehood, and indeed the impoſſibility, of the ſuppoſition. To the names of Mariana and of Machiavel, we can oppoſe the equal names of Robertſon and Hume.

A warlike nation like the Germans, without cities, letters, arts, or money, found ſome compenſation for this ſavage ſtate in the enjoyment of liberty. Their poverty ſecured their freedom, ſince, ſays Gibbon, our deſires and our poſſeſſions are the ſtrongeſt fetters of deſpotiſm. Cæſar and Tacitus inform us, that the ſtate of ſociety among the ancient Germans was of the rudeſt and moſt ſimple form. They lived entirely by hunting or paſturage. They neglected agriculture, as we have already ſeen; their chief food was milk, cheeſe, and fleſh. While ſociety remains in this ſimple ſtate, men, by uniting together, ſcarcely relinquiſh any portion of their natural independence. The authority of civil government was extremely limited among the Germans. In times of peace they had no common or fixed magiſtrate; but the chief men of every diſtrict diſpenſed juſtice and accommodated differences. In the far greater part of Germany, the form of government was a democracy, tempered indeed, and controlled, not ſo much by general and poſitive laws, as by the occaſional aſcendant of birth and valour, of eloquence and ſuperſtition. Some tribes, however, on the coaſt of the Baltic, acknowledged the rights of kings; but their kings had not abſolute or unbounded power; their authority conſiſted rather in the privilege of adviſing than in the power of commanding. Matters of ſmall conſequence were determined by the chief men; affairs of importance, by the whole community. As ſoon as a youth, born of free parents, had attained the age of manhood, he was introduced into the general council of his countrymen, ſolemnly inveſted with a ſhield and a ſpear, and adopted as an equal and worthy member of the military commonwealth. The aſſembly of the tribe was convened at ſtated ſeaſons, or on ſudden emergencies. The trial of public offences, the election of magiſtrates, and the great buſineſs of peace and war, were determined by its independent voices. Sometimes theſe important queſtions were previouſly conſidered, and prepared in a more ſelect council of the principal chieftains. The magiſtrates might deliberate and perſuade; the people only could reſolve and execute. When timid, though juſt and prudent, counſels were propoſed, they expreſſed their diſlike by a hollow murmur. But whenever a popular orator propoſed to vindicate the meaneſt citizen from either foreign or domeſtic injury, whenever he called upon his fellow-countrymen to aſſert the national honour, or to purſue ſome enterpriſe full of danger and glory, a loud claſhing of ſhields and ſpears expreſſed the eager applauſe of the aſſembly; for the Germans always met in arms. On occaſions of danger a general of the tribe was elected; and in circumſtances of preſſing and extenſive danger, ſeveral tribes concurred in the choice of the ſame general. The braveſt warrior was named to lead his countrymen into the field, by his example rather than his commands. His power expired with the war, and in time of peace the German tribes acknowledged not any ſupreme chief. Princes were, however, appointed, in the general aſſembly, to adminiſter juſtice, or rather to compoſe differences (minuunt controverſias, Cæſar) in their reſpective diſtricts. To the choice of theſe magiſtrates, birth was regarded as much as merit. To each was aſſigned, by the public, a guard, and a council of 100 perſons; and the firſt of the princes appears to have enjoyed a pre-eminence of rank and honour, which ſometimes tempted the Romans to compliment him with the regal title. The Germans reſpected only thoſe duties which they impoſed on themſelves. The moſt obſcure ſoldier reſiſted with diſdain the authority of the magiſtrates. Every individual among the ancient Germans was left at liberty to chuſe whether he would take part in any military enterpriſe which was propoſed; it became, of conſequence, the great object of every perſon, who aimed at being a leader, to gain adherents and to attach them to his perſon and intereſt. Cæſar calls theſe adherents Ambacti and Clientes, *i. e.* retainers or clients. Tacitus calls them Comites, or companions. The chief diſtinction and power of the leaders conſiſted in being attended by a numerous band of choſen youth. This was their pride as well as ornament during peace, and their defence in war. The leaders gained, or preſerved, the favour of theſe retainers by preſents of armour and of horſes, or by the profuſe though inelegant hoſpitality with which they entertained them. But even after they united in ſociety, the Germans circumſcribed the criminal juriſdiction of the magiſtrate within very narrow limits, and exerciſed almoſt all the rights of private reſentment and revenge. Their magiſtrates had the abſolute diſpoſal of the landed property within their diſtrict, and they diſtributed it every year according to a new diviſion; but they had not the power of impriſoning, or of inflicting any corporal puniſhment on a private citizen. Every individual was obliged to avenge the wrongs which his parents or friends had ſuſtained. Their enemies were hereditary, but not irreconcileable. Even murder was compenſated by paying a certain number of cattle. A part of the fine went to the king or ſtate, a part to the perſon who had been injured, or to his kindred.

Chaſtity is aſcribed, almoſt without exception, to the wives of the ancient Germans. Polygamy was not in uſe, except among the princes, and among them only for the ſake of multiplying their alliances. Divorces were prohibited by manners rather than by laws. Adulteries were puniſhed as rare and inexpiable crimes; nor was ſeduction juſtified by example and faſhion. Tacitus evidently indulges an honeſt pleaſure in the contraſt of barbarian virtue with the diſſolute conduct of the Roman ladies ; yet there are ſome ſtriking circumſtances that give an air of truth, at leaſt of probability, to the conjugal faith and chaſtity of the Germans. The German huts, open on every ſide to the eye of indiſcretion or jealouſy, were a better ſafeguard of conjugal fidelity than the walls, the bolts, and the eunuchs of a Perſian haram. Beſides, the Germans treated their women with eſteem and confidence, conſulted them on every occaſion of importance, and fondly believed that in their breaſts reſided a ſanctity and wiſdom more than human. Some of theſe interpreters of fate, ſuch as Valleda, in the Batavian war, governed, in the name of the Deity, the fierceſt nations of Germany. The reſt of the ſex, without being adored as goddeſſes, were reſpected as the free and equal companions of ſoldiers ; aſſociated, even by the marriage ceremony, to a life of toil, of danger, and of glory. In their great invaſions, the camps of the barbarians were filled with a multitude of women, who remained firm and undaunted amidſt the ſound of arms, the various forms of deſtruction, and the honourable wounds of their ſons and huſbands. The women dreaded death much leſs than ſervitude. If the day was irrecoverably loſt they well knew how to deliver themſelves and their children, with their own hands, from an inſulting victor. Heroines of ſuch a caſt may claim our admiration ; but they were moſt aſſuredly neither lovely, nor very ſuſceptible of love.

Conſcious pride taught the German females to ſuppreſs every tender emotion that ſtood in competition with honour, and the firſt honour of the ſex has ever been that of chaſtity.

The religious ſyſtem of the Germans was dictated by their wants, their fears, and their ignorance. They adored the great viſible objects and agents of nature, the ſun and the moon, the fire and the earth ; together with thoſe imaginary deities who were ſuppoſed to preſide over the moſt important occupations of human life. They were perſuaded that by ſome ridiculous arts of divination, they could diſcover the will of the ſuperior beings, and that human ſacrifices were the moſt precious and acceptable offering on their altars. If there was any difference between the Gauls and Germans in point of religion, it conſiſted only in this, that the latter, being more fierce and untractable, were not only more tenacious of their ſuperſtitious rites, but likewiſe more cruel and inhuman in them. It appears, from the teſtimonies of Cæſar, Tacitus, Diodorus Siculus, Strabo, Athenæus, and other ancient authors, that the Germans had no temples, but performed their religious rites in groves erected for that purpoſe, or in woods, foreſts, and deſert places. Temples were not introduced in Germany till long after the Gauls had erected them ; and the inferior divinities introduced among the Gauls, ſuch as Jove or Jupiter, Mars, Apollo, Mercury, Venus, Diana, &c. were alſo adopted by the Germans, though ſome of them were repreſented under different names and attributes. Jupiter was worſhipped under the name of Thor or Taran, *i. e.* the Thunderer ; this name was given by the Gauls to Mars ; and the Germans beſtowed it on their Odin or Woden ; but the name of Jupiter was never adopted by the Gauls, nor by the Germans. Both Gauls and Germans agreed in worſhipping the ſupreme deity under the name of Heſus or Eſus, and under the emblem of an oak, which was conſecrated to him. The goddeſs Hertha was one of their ancient deities, and her idol was preſerved in a wood or grove, " Caſtum nemus," upon a covered cart, and ſhe had but one prieſt to miniſter to her, who was the only perſon that was allowed to approach her. The worſhip of this goddeſs correſponded with that which the Romans and others paid to the " Earth," under the name of " Magna Deorum Mater." A ſolemn proceſſion was occaſionally celebrated in the preſent countries of Mecklenburg and Pomerania. The unknown ſymbol of the " Earth," covered with a thick veil, was placed on a carriage drawn by cows ; and in this manner the goddeſs, whoſe common reſidence was in the iſle of Rugen, viſited ſeveral adjacent tribes of her worſhippers. During her progreſs, the ſound of war was huſhed, quarrels were ſuſpended, arms laid aſide, and the reſtleſs Germans had an opportunity of taſting the bleſſings of peace and harmony. The " Truce of God," ſo often and ſo ineffectually proclaimed by the clergy of the 11th century, was an obvious imitation of this ancient cuſtom.

The influence of religion on the minds of the ancient Germans was far more powerful to inflame than to moderate their fierce paſſions. The conſecrated ſtandards, long revered in the groves of ſuperſtition, were placed in the front of the battle ; and the hoſtile army was devoted with dire execrations to the gods of war and of thunder. A brave man was the worthy favourite of their martial deities ; and the wretch who had loſt his ſhield was baniſhed alike from the religious and the civil aſſemblies of his countrymen. Some tribes of the north ſeem to have embraced the doctrine of tranſmigration ; others imagined a groſs paradiſe of immortal drunkenneſs. (See the Edda, fable 20.) All agreed, that a life ſpent in arms, and a glorious death in battle, were the beſt preparations for a happy futurity, either in this or in another world.

It is ſaid that the Germans, as well as Gauls, were early taught by their Druids, as fundamental truths, an overruling providence, and the immortality of the ſoul ; but theſe noble principles of religion and virtue were ſoon corrupted as inſtruments of divination and ſuperſtition. Cæſar ſays, indeed, (Com. l. vi. c. 21.) that the Germans had no druids, as the Celtes had ; but Tacitus, who was better acquainted with the Germans, ſpeaks frequently of their prieſts, whoſe office and authority, as he ſtates them, were ſimilar to thoſe of the Gauliſh druids, and they ſeem to have been of the ſame order of men, though perhaps they did not bear the ſame name. As to the immortality promiſed by their prieſts, it was in ſome degree conferred by the bards, who by their military ſongs kindled in the breaſts of their audience the enthuſiaſm of arms and glory. The view of arms and of danger heightened the effect of theſe ſongs ; and the paſſions which they tended to excite, the deſire of fame, and the contempt of death, were the habitual ſentiments of a German mind. A contempt of danger and of death was one of the principles which they inſtilled into the minds of their youth, and a regard to which their prieſts inculcated as the ſureſt means of reputation and wealth, and alſo of happineſs in a future life. Under the influence of this principle their armies, which conſiſted more of infantry than cavalry, were eaſily raiſed and maintained. Like the Gauls and Britons, the Germans fought in ſeparate cantons or tribes ; and thus they were induced to exert themſelves with the greater firmneſs and vigour in defence of their relations, neighbours, and friends, and for the honour of their reſpective communities. We are told, indeed, that ſome of them, eſpecially the Cimbri, formed their whole infantry into one ſquare battalion, and placed their wives, children, and baggage behind a fence made of their waggons ; and when they were prepared for an attack, a ſignal was given, which was re-echoed by an univerſal ſhout, and repeated till the engagement commenced. They uſed no art or ſtratagem in fighting, but wholly confided in a furious onſet on the enemy, which they maintained with a deſperate intrepidity till the day was won or loſt: if they were once thrown into diſorder they ſeldom rallied, but became deſperate, and either fought till they were ſlaughtered, or betook themſelves to flight; for it was reckoned inglorious to yield themſelves priſoners. The military weapons of the cavalry among the Germans were ſhields and ſpears, which they uſed in common with the foot, but the latter had, beſides their darts, bows and ſlings, and ſeldom had recourſe to their pikes and ſwords. Their arms were eſteemed their favourite furniture and chief ornament; ſo that they never appeared in public without them. The ſword was ſo ſacred, that the moſt ſolemn and obligatory oaths were thoſe which they took upon a naked blade. Nor did they aſſiſt in any ſolemn rite, without their ſword, ſhield, or ſpear. They even wore them at their familiar viſits, banquets, and religious dances; and they were frequently to be burnt or buried with them, when they died. The ſports, games, and exerciſes of the Germans, were of the maſculine kind, and ſuch as inured them to the operations of war. It was a long time before they acquired any knowledge of the liberal arts, or even that of writing; and we are told, that Charles the Great cauſed ſome of their barbarous poems, which they had been accuſtomed to ſing from memory, and which celebrated the illuſtrious actions of their ancient kings and heroes, to be committed to writing for their uſe, and by way of encouraging them to learn to read. The Saxons, it is ſaid, had ſuch a contempt for letters, that they refuſed to learn to read the goſpels till they were put into verſe, and ſet to ſuch tunes as they could eaſily ſing. Even their laws were not reduced to writing till about the 12th or 13th centuries.

The native diſpoſition of the ancient Germans diſplayed itſelf chiefly in their martial genius, and in their ſingular fidelity. In ſome caſes their love of liberty, and hatred of tyranny and oppreſſion, precipitated them to acts of treachery and even of murder; for in ſuch caſes they were eaſily incenſed, and extremely vindictive. On other occaſions, Tacitus ſays, they were noble, magnanimous, and beneficent, without ambition to aggrandize their dominions, or to invade thoſe from whom they received no injury; rather chuſing to employ their ſtrength or valour defenſively, than offenſively; to preſerve their own, than to revenge their neighbours. In their own houſes, furniture and diet, they were diſtinguiſhed by their plainneſs and ſimplicity; but at the ſame time, they were no leſs diſtinguiſhed by their hoſpitality to ſtrangers, and by their readineſs to ſuccour thoſe that were in diſtreſs. Although in moſt of their cuſtoms the Germans very much reſembled the Gauls, yet, with regard to their funerals, they were very different. The latter performed theſe obſequies with pomp and profuſion; whereas the Germans diſcharged their laſt offices to the dead with plainneſs and ſimplicity; the only grandeur they affected, was to burn the bodies of their great men with ſome peculiar kinds of wood; and afterwards they flung each man's armour into the funeral pile, and ſometimes his riding dreſs. They then depoſited their aſhes in urns, like the Gauls, Romans, and other nations. It may be obſerved in general, that the ſacrifices they offered for their dead, the preſents made to them at their funerals, and the other ſuperſtitious rites performed on theſe occaſions, were all the reſult and the evidence of an eſtabliſhed belief, that the ſoul was immortal.

The ancient Germans were a brave and independent race of men, and peculiarly diſtinguiſhed by their love of liberty and arms. They oppoſed the Roman power, after it had arrived at maturity. After their conteſt with Cæſar, who was provoked by the Treviri to invade their country, and their revolt againſt Auguſtus, which was ſuppreſſed by Agrippa, and the inſurrection which commenced among the Roman legions in Pannonia, quelled partly by Druſus, and finally by Germanicus; their other more conſiderable wars with the Romans were waged againſt the emperors M. Aurelius, Alexander, Maximin, Valerian, Aurelian, Probus, Conſtantius, Julian, Valentinian, and ſome of his ſucceſſors. Some notice is taken of theſe conflicts under the names of the Alemanni, Gepidæ, Franks, Suevi, Heruli, and Burgundians. Ther country was divided into a number of petty ſovereignties, independent of each other, though occaſionally connected by a military union, until it was reduced to the condition of a Roman province; and when the Roman empire was ſhattered by the Northern barbarians, Germany was over-run by the Franks about the year 480, and continued in ſubjection to chieftains of that nation, who governed over the Suabians, Alemans, Friſians, Saxons, Thuringians, and Bavarians, until the end of the eighth century, when Charlemagne united all Germany into one kingdom, as part of the Frankiſh monarchy. The conquered German nations had hereditary dukes of their own at firſt, and were governed by their own laws: but Charlemagne put an end to the former, and governed the different German provinces by counts and royal delegates, and in the year 800 he aſſumed the title and dignity of emperor. But the empire of Charlemagne was a ſtructure erected in ſo ſhort a time, that it could not be of long duration. Under his immediate ſucceſſor it began to totter, and ſoon after fell to pieces. The crown of Germany was ſeparated from that of France, and the deſcendants of Charlemagne eſtabliſhed two great monarchies, ſo ſituated, as to give riſe to a perpetual rivalſhip between them. But the princes of the race of Charlemagne, who were placed on the Imperial throne, were not altogether ſo degenerate as thoſe of the ſame family who reigned in France. In the hands of the former, the royal authority retained ſome vigour; the nobles of Germany, though poſſeſſed of extenſive privileges and ample territories, did not ſo early attain independence. The great offices of the crown continued at the diſpoſal of the ſovereign, and during a long period, fiefs remained in their original ſtate without becoming hereditary in the families of the perſons to whom they had been granted.

At length, the German branch of the family of Charlemagne became extinct upon the death of Louis IV. His feeble deſcendants who reigned in France had ſunk into ſuch contempt, that the Germans, without looking towards them, exerciſed the right inherent in a free people; and in a general aſſembly of the nation at Worms, in the year 911, offered the imperial crown to Otho, duke of Saxony, who declined it on account of his great age, and recommended Conrad, count of Franconia. The latter was unanimouſly elected emperor. His reign was diſturbed by the diſobedience of ſome nobles whom he ſubdued, and by the pretenſions of Henry, ſon of the duke of Saxony, his benefactor. Their quarrels, however, did not prevent Conrad from acknowledging the merit of that prince in the ſame manner as Otho had done his. He recommended Henry as the fitteſt prince to be his ſucceſſor, and his propoſal being approved by the nation, he ſent to Henry, without waiting for the hour of death, the crown, the ſceptre, the lance, the ſword, and other imperial ornaments.

Henry I. aſcended the imperial throne of Germany in 919. He was ſurnamed the *Fowler*, becauſe he was paſſionately fond of hawking. To confirm his authority, he made more uſe of perſuaſion than of arms. His deſcendants, the three Othos, were placed in ſucceſſion on the imperial throne by the ſuffrages of their countrymen. The extenſive territories of the Saxon emperors, their eminent abilities, and enterpriſing genius, not only added new vigour to the imperial dignity, but raiſed it to higher power and pre-eminence. Otho the Great marched at the head of a numerous army into Italy, and, after the example of Charlemagne, gave law to that country. On his arrival at Rome, he was conſecrated by the pope, and crowned emperor of the Romans. He created popes and depoſed them by his ſovereign mandate. He annexed the kingdom of Italy to the German empire. Elated with his ſucceſs, he aſſumed the title of Cæſar Auguſtus. A prince, born in the heart of Germany, pretended to be the ſucceſſor of the emperors of ancient Rome, and claimed a right to the ſame power and prerogative. See the biographical article OTHO.

But while the emperor, by means of theſe new titles and new dominions, gradually acquired additional authority and ſplendour, the nobility of Germany had gone on at the ſame time extending their privileges and juriſdiction. The ſituation of affairs was favourable to their attempts. The vigour which Charlemagne had given to government quickly relaxed. The incapacity of ſome of his ſucceſſors was ſuch, as would have encouraged vaſſals, leſs enterpriſing than the nobles of that age, to have claimed new rights, and to have aſſumed new powers. The civil wars in which other emperors were engaged, obliged them to pay perpetual court to their ſubjects, on whoſe ſupport they depended, and not only to connive at their uſurpations, but to permit and even to authorize them. Fiefs gradually became hereditary. They were tranſmitted not only in the direct, but alſo in the collateral line. The inveſtiture of them was demanded not only by male but by female heirs. Every baron began to exerciſe ſovereign juriſdiction within his own domains, and the dukes and counts of Germany took wide ſteps towards rendering their territories diſtinct and independent ſtates. The Saxon emperors obſerved their progreſs, and were aware of its tendency. But as they could not hope to humble vaſſals already grown too potent, unleſs they had turned their whole force and attention to that enterpriſe, and as they were extremely intent on their expeditions into Italy, which they could not undertake without the concurrence of their nobles, they were ſolicitous not to alarm them by any direct attack on their privileges. They aimed, however, at undermining their power. With this view, they inconſiderately beſtowed additional territories, and accumulated new honours on the clergy, in hopes that this order might ſerve as a counterpoiſe to that of the nobility in any future ſtruggle.

The unhappy effects of this fatal error in policy were quickly felt. Under the emperors of the Franconian and Swabian lines, whom the Germans, by their voluntary election, placed on the imperial throne, a new face of things appeared, and a ſcene was exhibited in Germany which aſtoniſhed all Chriſtendom at that time. The popes, hitherto dependent on the emperors, and indebted for power as well as dignity to their beneficence and protection, began to claim a ſuperior juriſdiction, and in virtue of authority, which they pretended to derive from heaven, tried, condemned, excommunicated, and depoſed their former maſters. Theſe pretenſions gave riſe to the factions of the Guelphs and Ghibelines, of which the former was attached to the popes, and the latter to the emperors. Pope Gregory VII. had obſerved that the princes and nobles of Germany had acquired ſuch conſiderable territories and ſuch extenſive juriſdiction, as rendered them not only formidable to the emperors, but diſpoſed them to favour any attempt to circumſcribe their power. He foreſaw that the eccleſiaſtics of Germany, raiſed almoſt to a level with its princes, were ready to ſupport any perſon who would ſtand forth as the protector of their privileges and independence. With both of theſe Gregory negotiated, and had ſecured many devoted adherents among them, before he ventured to enter the liſts againſt the head of the empire. He began his rupture with Henry IV. upon a pretext that was popular and plauſible. He complained of the venality and corruption with which the emperor had granted the inveſtiture of benefices to eccleſiaſtics. He contended that this right belonged to him, as the head of the church; he required Henry to confine himſelf within the bounds of the civil juriſdiction, and to abſtain for the future from ſuch ſacrilegious encroachments on the ſpiritual dominion. All the cenſures of the church were denounced againſt Henry, becauſe he refuſed to relinquiſh thoſe powers which his predeceſſors had uniformly exerciſed. The moſt conſiderable of the German princes and eccleſiaſtics were excited to take arms againſt him. His mother, his wife, his ſons, were wrought upon to diſregard all the ties of blood and duty, and to join the party of his enemies. At length, the emperor was even obliged to appear as a ſupplicant at the gate of the caſtle in which the pope reſided, and to ſtand there three days barefooted in the depth of winter, imploring a pardon, which he obtained with difficulty.

This act of humiliation degraded the imperial dignity. The two factions kept Germany and Italy in perpetual agitation during three centuries, and, notwithſtanding the return of ſome ſhort intervals of vigour, under the adminiſtration of a few able emperors, the imperial authority continued to decline. During the anarchy of a long interregnum, ſubſequent to the death of William of Holland, it dwindled down almoſt to nothing.

In the year 1273, Rodolphus of Hapſburgh, the founder of the houſe of Auſtria, was elected emperor, not that he might re-eſtabliſh and extend the imperial authority, but becauſe his territories and influence were ſo inconſiderable as to excite no jealouſy in the German princes, who were willing to preſerve the forms of a conſtitution, the power of which they had deſtroyed. Several of Rodolph's ſucceſſors were placed on the imperial throne from the ſame motive, and almoſt every remaining prerogative was wreſted out of the hands of feeble princes, unable to exerciſe or to defend them.

During this period of turbulence and confuſion, the conſtitution of the German empire underwent a total change. The princes, the great nobility, the dignified eccleſiaſtics, and the free cities extended their uſurpations. They claimed and exerciſed the right of governing their reſpective territories with full ſovereignty. They acknowledged no ſuperior with reſpect to any point relative to the interior adminiſtration and police of their domains. They enacted laws, impoſed taxes, coined money, declared war, concluded peace, and exerted every prerogative peculiar to independent ſtates. The forms of feudal ſubordination formed the only connection among the various members of the community. This bond of union, however, was extremely feeble.

From the acceſſion of Rodolph of Hapſburgh, to the reign of Maximilian, the empire felt every calamity which a ſtate muſt endure, when the authority of government is ſo much relaxed. The diſſenſions among its members gave riſe to perpetual private wars, which were carried on with all the violence that accompanies reſentment when unreſtrained by ſuperior authority. Rapine, outrage, exactions, became univerſal. The variety of expedients employed to reſtore order and tranquillity, prove that the grievances occaſioned by this ſtate of anarchy had become intolerable. Arbiters were appointed to terminate the differences among the ſeveral ſtates. The cities united in a league to check the extortions of the nobility, and the latter formed confederacies to maintain tranquillity among their own order. Germany was divided into ten circles, in each of which a provincial juriſdiction was eſtabliſhed. But all theſe remedies proved ineffectual. At length Maximilian inſtituted the imperial chamber, a tribunal compoſed of judges named partly by the emperor, partly by the ſeveral ſtates, and veſted with authority to decide finally concerning all differences among the members of the Germanic body, and thus reſtored ſome degree of vigour to the imperial authority.

But notwithſtanding the ſalutary effects of theſe regulations, the political conſtitution of the German empire, at the beginning of the ſixteenth century, was of a ſpecies ſo peculiar as not to reſemble perfectly any form of government known either in the ancient or modern world. It was a complex body, formed by the aſſociation of ſeveral ſtates, electors, princes, dignitaries of the church, counts, barons, and free cities, each of which poſſeſſed ſovereign and independent juriſdiction within its own territories. Of all the members which compoſed this united body, the emperor was the head. In his name all decrees and regulations, with reſpect to points of common concern, were iſſued; and to him the power of carrying them into execution was committed. But this appearance of monarchical power in the emperor was more than counterbalanced by the influence of the princes and ſtates of the empire in every act of adminiſtration. No law extending to the whole body could paſs, no reſolution that affected the general intereſt could be taken without the approbation of the diet of the empire held at Ratiſbon. In this aſſembly every ſovereign prince and ſtate of the Germanic body had a right to be preſent, to deliberate and to vote. The decrees or receſſes of the diet were the laws of the empire, which the emperor was bound to ratify, and to enforce. In this reſpect the German empire was ſimilar to the Achæan league in ancient Greece, or to that of the United Provinces of the Netherlands, and of the Swiſs cantons in modern times. But, as the acute hiſtorian of the emperor Charles V. obſerves, the Germanic body was not formed by the union of members altogether diſtinct and independent. All the princes and ſtates, joined in this aſſociation, were originally ſubject to the emperors, and acknowledged them as ſovereigns. They originally held their lands as imperial fiefs, and owed the emperor all thoſe ſervices which feudal vaſſals are bound to perform to their liege lord. But though this political ſubjection was entirely at an end, the ancient forms introduced while the emperors governed Germany with authority not inferior to that which the other monarchs of Europe poſſeſſed, ſtill remained. Thus an oppoſition was eſtabliſhed between the genius of the government and the forms of adminiſtration in the German empire. The former conſidered the emperor only as the head of a confederacy, the members of which, by their voluntary choice, raiſed him to that dignity; the latter ſeemed to imply that he is really inveſted with ſovereign power. The emperors were diſtinguiſhed by the moſt pompous titles, and by ſuch marks of dignity as intimated their authority to be ſuperior to that of all other monarchs. The greateſt princes of the empire attended and ſerved them, on ſome occaſions, as officers of their houſhold. They exerciſed prerogatives which no other ſovereigns ever claimed. They retained pretenſions to all the extenſive powers which their predeceſſors had enjoyed in any former age. But, at the ſame time, inſtead of poſſeſſing that ample domain which had belonged to the ancient emperors of Germany, and which ſtretched from Baſil to Cologne, along both banks of the Rhine, they were ſtripped of all territorial property, and had not a foot of land that belonged to them as heads of the empire. Their revenues were reduced almoſt to nothing, and the extraordinary aids which, on a few occaſions, they obtained, were granted ſparingly, and paid with reluctance. The conſequence of this ill-compacted frame of government was, that the emperors imagined themſelves to be the real ſovereigns of Germany, and aimed continually at recovering the exerciſe of thoſe powers which the forms of the conſtitution ſeemed to veſt in them, and which their predeceſſors Charlemagne and the Othos had actually enjoyed. The princes and ſtates, aware of theſe pretenſions, watched the motions of the imperial court to circumſcribe its power within limits ſtill more narrow. This jealouſy of the imperial authority increaſed conſiderably from the time that the elective power was veſted in a few princes of chief dignity.

During a long period, all the members of the Germanic body had a right to aſſemble, and to make a choice of the perſon whom they appointed to be their head. But amidſt the violence and anarchy which prevailed for ſeveral centuries in the empire, ſeven princes, who poſſeſſed the moſt extenſive territories, and who had obtained an hereditary title to the great offices of the ſtate, acquired the excluſive privilege of nominating the emperor. This right was confirmed to them by the golden bull (ſee BULL); the mode of exerciſing it was aſcertained, and they were dignified with the appellation of *Electors*. (See ELECTOR.) The nobility and free cities, being thus ſtripped of a privilege which they had once enjoyed, were leſs connected with a prince, towards whoſe elevation they had not contributed by their ſuffrages, and came to be more apprehenſive of his authority. The electors, by their extenſive power, and the diſtinguiſhing privileges which they poſſeſſed, became formidable to the emperors, with whom they were placed almoſt on a level in ſeveral acts of juriſdiction. Thus, the introduction of the electoral college into the empire ſtrengthened the principles of diſcord in the Germanic conſtitution, which were continually alimented by the various and repugnant forms of civil policy in the ſeveral ſtates. The free cities were ſmall republics, in which the maxims and ſpirit peculiar to that ſpecies of government prevailed. The princes and nobles to whom ſupreme juriſdiction belonged poſſeſſed a ſort of monarchical power within their own territories. Their common deliberations could not be carried on with the ſame ſpirit while the love of liberty and attention to commerce were the reigning principles in the cities; and the deſire of power, and ardour for military glory, the governing paſſions of the princes and nobility. The ſecular and eccleſiaſtical members of the empire were as little fitted for union as the free cities and the nobility. Conſiderable territories had been granted to ſeveral of the German biſhoprics and abbeys, and ſome of the higheſt offices of the empire, having been annexed to them unalienably, were held by the eccleſiaſtics raiſed to theſe dignities. The younger ſons of noblemen of the ſecond order, who had devoted themſelves to the church, were commonly promoted to theſe ſtations of eminence and power; and it was no ſmall mortification to the princes and great nobility, to ſee perſons raiſed from an inferior rank to the ſame level with themſelves, or even exalted to ſuperior dignity. The education of theſe churchmen, the genius of their profeſſion, and their connection with the court of Rome, rendered their character, as well as their intereſt, different from thoſe of the other members of the Germanic body, with whom they were called to act in concert. Thus another ſource of variance was opened.

To all theſe cauſes of diſſenſion muſt be added one more, ariſing from the unequal diſtribution of power and wealth among the ſtates of the empire. The electors and other nobles of the higheſt rank not only poſſeſſed ſovereign juriſdiction, but governed ſuch extenſive, populous, and rich countries, as rendered them great princes. Many of the other members, though they enjoyed all the rights of ſovereignty, ruled over ſuch petty domains, that their real power bore no proportion to this high prerogative. The electors and emperors, by turns, endeavoured to extend their own authority, by encroaching on thoſe feeble members of the Germanic body, who ſometimes defended their rights with much ſpirit, but more frequently, being overawed or corrupted, tamely ſurrendered their privileges, or meanly favoured the deſigns formed againſt them.

But the empire of Germany comprehended countries of ſuch vaſt extent, and was inhabited by ſuch a martial and hardy race of men, that when the abilities of an emperor, or zeal for any common cauſe could rouſe this unwieldy body, it was ſtill able to act with force. Charles V. grandſon of Maximilian, and heir to the kingdom of Spain, in right of his mother, was elected emperor in the year 1519. In his reign happened the reformation of religion cauſed by Luther, which occaſioned inceſſant wars till 1648. (See LUTHER and REFORMATION.) There were moments when Charles V. flattered himſelf with the hope of being able to hold the balance between the Roman Catholics and the Lutherans. But the contending parties were too much inflamed with animoſity, and in addition to his wars againſt Francis I. of France, he was forced to ſuſtain a violent one in the heart of the empire. Fortune, which ſmiled upon him in the beginning of his reign, forſook him towards its end. He abdicated the imperial throne, in 1558, in favour of his brother Ferdinand I., who had the addreſs of getting his ſon Maximilian II. declared king of the Romans, or ſucceſſor to the imperial crown in his life-time. This precaution became familiar to the houſe of Auſtria, and kept the imperial ſceptre in that family, until the extinction of the German empire. By his laſt will Ferdinand ordered that if either his own male iſſue, or that of his brother Charles ſhould fail, his Auſtrian eſtates ſhould revert to his ſecond daughter Anne, wife to the elector of Bavaria. This circumſtance is the origin of the oppoſition made by the houſe of Bavaria, in later times, to the Pragmatic ſanction in favour of Maria Thereſa, mother of Joſeph the ſecond.

The reign of Maximilian II. was diſturbed by internal commotions, and an invaſion from the Turks. He died in 1576, and was ſucceeded by his ſon Rodolph, who was involved in wars with the Hungarians, and in differences with his brother Matthias, to whom the empire devolved at his death. Having no children, Matthias conferred the crown of Hungary on his couſin Ferdinand arch-duke of Auſtria, and cauſed him to be elected king of Bohemia, which election proved the ſource of a long war. Ferdinand perſecuted the numerous ſectaries in Bohemia. They took up arms; the brave Mansfeld fought at their head, and Matthias, who came to the aſſiſtance of his kinſman, died of vexation, for not having been able to obtain a complete triumph over the Bohemians. A tender of the imperial crown was made to Maximilian, duke of Bavaria, who prudently declined the offer. Ferdinand was therefore proclaimed emperor in 1619, but the Bohemians, maintaining that the ſame individual could not wear the crown of Germany together with that of Bohemia, conferred the latter on Frederick, the elector palatine. Yielding to the intreaties of his ſpouſe Elizabeth, daughter of James I. of England, againſt his own conviction, Frederick made a ſplendid triumphal entry into Prague; but a few days after, his army was attacked on the heights near the town, and completely routed. He was obliged to fly with his wife and children, and found at laſt an aſylum in Holland. His defeat was the beginning of the thirty years' war which ravaged Germany from the Danube and the Rhine to the ſhores of the Baltic, without little intermiſſion from the battle of Prague to the peace of Weſtphalia. The unfortunate Frederick, who had been put under the ban of the empire, died broken-hearted. Ferdinand's arms were almoſt conſtantly victorious againſt the Proteſtant princes for the ſpace of ten years. He was on the point of cruſhing their party when Guſtavus Adolphus of Sweden ruſhed upon him. In vain did the Imperialiſts commanded by Tilly endeavour to check his career; they were defeated and diſperſed. Ferdinand was going to ſue for peace when the fall of the Swediſh monarch at Lutzen re-animated his hopes: Wallenſtein's defection did not arreſt his arm. He continued fighting againſt his Proteſtant vaſſals to the hour of his death, which happened in 1637. The war raged with unabated fury under his ſon Ferdinand III. who was appointed his ſucceſſor on the imperial throne. The Proteſtant cauſe was ably defended by the heroes brought up under the great Guſtavus Adolphus. Hiſtory will never forget the names of the duke of Saxe Weimar, of Bannier, Torſtenſon, Piccolomini, Merci, Wrangel, and many others who ſhook the Auſtrian power, till at length a general peace was concluded in 1648, which being guaranteed by Sweden and France, has been conſidered for a century and a half as forming the baſis of the political ſyſtem of Europe, under the name of the peace of Munſter or peace of Weſtphalia.

Leopold I. who was elected emperor of Germany, after the death of his father Ferdinand III. in the year 1657, had to combat the French on one ſide, and the Turks on the other. The latter advanced to the walls of Vienna, but were compelled to raiſe the ſiege by the valour of John Sobieſki, king of Poland. The fertile province of Alſace was conquered by France, but the Turks, having been repeatedly defeated by prince Eugene of Savoy, were forced to cede Tranſylvania by the peace of Carlowitz in 1699. During Leopold's long reign, the duke of Hanover was admitted into the electoral college, the elector of Saxony obtained the elective royal crown of Poland, the elector of Brandenburg was acknowledged hereditary king of Pruſſia, and a prince of the Bourbon family was ſeated on the Spaniſh throne. Leopold died in 1705. The reign of his ſon Joſeph I. laſted but ſix years, and is remarkable only for the victories which the great duke of Marlborough gained in his cauſe over the French. As he left no male iſſue, the elector of Mayence exerted all his influence to procure the imperial crown to his brother the archduke Charles, who was at that time in Spain, diſputing the crown of that kingdom with Philip of Anjou, grandſon to Louis XIV. The elevation of Charles to the empire terminated the conteſts which had haraſſed Spain and Germany. The peace of Utrecht, concluded in 1713, was followed by that of Baden with France in 1714, and that of Paſſarowitz with the Turks in 1717.

Charles VI. intent upon ſecuring his hereditary dominions to the archducheſs Maria Thereſa his daughter, framed that famous Pragmatic ſanction which was ſoon to diſturb again the peace of Germany. Happily for him the crown of Great Britain devolved to the houſe of Hanover, which circumſtance drew the connection of Auſtria and England againſt their common enemy more cloſe. Charles VI. married his daughter to Francis duke of Lorraine, and died in 1740. No ſooner was he in the grave than the Pragmatic ſanction was attacked on all ſides. The great Frederick of Pruſſia conquered Sileſia, and Spain and Bavaria preferred their claims on ſeveral provinces. The intrigues of France cauſed the imperial throne to be filled, after an interregnum of two years, by the elector of Bavaria, who took the name of Charles VII, and was proclaimed emperor in 1742.

But after five years of diſaſtrous warfare, he died deprived nearly of all his ſtates. Maria Thereſa had ſufficient influence to place her huſband on the throne of the empire in 1745. Francis I. was acknowledged as emperor of Germany by the king of Pruſſia at the peace of Dreſden, ſigned on the 25th of December 1745, and by the French, at the peace of Aix-la-Chapelle in 1748.

The interval of peace which Germany enjoyed was not of long duration. Frederick the Great of Pruſſia having diſcovered the plots which were formed againſt him by the emperor, the elector of Saxony, Ruſſia and France, and being ſubſidized by England, occupied Saxony, and reſiſted the attacks of his numerous enemies with alternate ſucceſs, for the ſpace of ſeven years. Peace was at length ſigned once more at Hubertſburgh on the 15th of February 1763. Francis I. died two years after. His ſon Joſeph II. who had been declared king of the Romans in 1764, was proclaimed emperor after his death. His attempt to poſſeſs himſelf of part of the dominions of Charles Theodore, the laſt elector of Bavaria, who died in December 1777, diſturbed the peace of Germany for a ſhort time. No battle of any conſequence was fought between the Auſtrian and Pruſſian armies; but the ſevere winter campaign of the latter end of 1778, and the beginning of 1779, having thinned the ranks of both, the treaty of Teſchen was concluded on the 13th of April 1779, and the peace of Weſtphalia appealed to, and confirmed for the laſt time. Maria Thereſa left her hereditary dominions to her ſon Joſeph II. at her death, which happened in 1780. Frederick the Great of Pruſſia, who was the laſt pillar of the Germanic conſtitution, died in 1786. Ambitious of imitating the example of his illuſtrious opponent, Joſeph II. introduced many ſalutary reforms in the adminiſtration of his dominions, proclaimed an unbounded religious toleration, ſuppreſſed a number of uſeleſs convents, aboliſhed the uſe of the rack in criminal inquiſitions, and extinguiſhed the remains of ſervitude and villainage which oppreſſed the peaſants of his dominions. But his well-intended innovations were too ſudden. Diſcontents broke out in the Netherlands, which he vainly attempted to ſtifle by force inſtead of adopting conciliatory meaſures. The rebellion of his Flemiſh ſubjects broke his heart. He died childleſs, though he had been married twice; and his brother Leopold, grand duke of Tuſcany, ſucceeded him on the imperial throne in 1790. His unfortunate engagement with the king of Pruſſia and the elector of Saxony, to oppoſe the French revolution with all their might, and to aſſiſt the emigrants in their attempts to re-enter France by force, haſtened the violent meaſures of the war party in France, which ultimately led to the extinction of the German empire. He died on the 1ſt of March 1792. His ſon Francis II. was raiſed to the imperial throne in the middle of July following. He embarked in the confederacy formed againſt France, loſt the Auſtrian Netherlands, the Briſgau, and all his poſſeſſions in Italy, and was at length obliged to abdicate the imperial throne of Germany, and to be contented with the title of emperor of Auſtria. See CONFEDERATION *of the Rhine.*

The peace of Weſtphalia, which had been regarded as the baſis of the political ſyſtem of Europe, had, in fact, ſown the ſeeds of the diſſolution of the German empire, by conferring on each prince and ſtate of the German confederacy the privilege of contracting alliances in their own names Their intereſts were continually claſhing with each other. The irreſiſtible force of revolutionary France has only accelerated a diſorganization, which would infallibly have taken place, through the rivalſhip of the Auſtrian and Pruſſian monarchs, ſupported, one by the Catholic, and the other by the Proteſtant ſtates. Compoſed of ſuch diſcordant materials, it is rather a matter of ſurpriſe that its exiſtence as a ſtate ſhould have been protracted to the length of one thouſand years.

The Germans never formed a nation united by the ties of ſimilar habits, laws and religion. Theſe differed in almoſt every petty principality, and the tie of language, from its many idioms and different pronunciation, was ſo weak, that the national hatred of the inhabitants of the Pruſſian dominions againſt thoſe of the Auſtrian ſtates was as great as that which prevails between the Engliſh and the French. The difference between the Proteſtant and Catholic countries was alſo ſo conſiderable, that whilſt farmers in the former enlivened their leiſure by ſtudy, the clergymen in the latter were even ignorant of the firſt four rules of arithmetic. Palitzſch, a Saxon farmer, who was a fellow of the Royal Society of London, died in 1788, and ſix months before his death a clergyman was wanted, in the gazette of Cologne, capable of teaching the rudiments of common arithmetic. The only feature which may be marked as a national one in the Germans of all perſuaſions and places, is the induſtry and perſeverance of the middle and lower ranks, and the pride and haughtineſs of the nobility. As ſoldiers, the Germans, when ably commanded, have always ſhewn themſelves endowed with ſteady courage and perſevering ſtrength. But the name of German is extinct. Henceforth the traveller muſt inquire into the peculiar character and diſpoſition of the Auſtrian, Pruſſian, Saxon, Bavarian, Weſtphalian, and the inhabitant of Wirtemberg, Baden, Berg, Heſſe Darmſtadt, Naſſau, and the other ſmaller ſtates of the confederacy of the Rhine. I. G. Meuſel's Statiſtics. Robertſon's Introduction to the Hiſtory of the emperor Charles V. Buſching's Geography. Anc. and Mod. Univ. Hiſt. Gibbon's Decline, &c. of the Roman Empire.

GERMANY, *Upper* and *Lower*, in *Ancient Geography*, diviſions of *Gaul*; which ſee.

GERMANY, in *Geography*, a town of America, in Adams' county, Pennſylvania, containing 1013 inhabitants.

GERMEN, or GERM. See EMBRYO.

GERMEN, in *Botany* and *Vegetable Phyſiology*, the rudiments of the fruit, conſtituting one of the two eſſential parts of the piſtil of a flower, the ſtigma being the other; the ſtyle, which uſually elevates the latter, not being indiſpenſable, nor always preſent. The Latin word *germen* properly means a bud, or ſprout (ſee GEMMA); which latter, in ſcientific language, is now univerſally uſed in its ſtead. Linnæus therefore applied *germen* technically, and very happily, to the ſeed-bud, or origin of the future offspring, which had as yet no appropriate name. In this he is generally followed, even by the only perſon who could effectually have contended with him in ſuch a point, the celebrated Juſſieu. Nevertheleſs, Gærtner, aſſuming ſome well-founded authority on account of his valuable labours reſpecting fruits and ſeeds, prefers the word *ovarium*, borrowed from anatomiſts, for it is not claſſical Latin. The only reaſon for this innovation is, as he is pleaſed to expreſs it, that Linnæus "*ſatis improprie*" calls this part *germen*. The authority of Gærtner has unfortunately miſled one excellent writer of late to adopt the term *ovarium*, to which we object, not ſo much for its want of claſſical authority, as it might well be defended on the ground of analogy, but becauſe it is not appropriate, and is not uſed by Gærtner in the original anatomical ſenſe, but in a new and arbitrary one. Vegetables have no ſuch organ as the *ovarium* of animals. Malpighi, much more correctly, calls the *germen* the *uterus*; but this is improper for plants with naked ſeeds; whereas *germen* is applicable in all caſes to the rudiment of the fruit, whatever its nature may be. Such a comprehenſive term is of the more value, as not having any reſpect to the diſputable point of whether any ſeeds be really naked or no. We agree with Gærtner that they cannot in their origin be naked, but muſt have ſome integument through which they are impregnated; ſee Fecundation *of Plants*. In an advanced ſtate the ſame able author could not but allow the exiſtence of naked ſeeds in a certain ſenſe, that is, ſuch as have only their own eſſential integuments, but no real *pericarpium* or ſeed-veſſel.

Gærtner very ſucceſsfully combats the Linnæan hypotheſis, that the germen originates from the pith of the plant, as the ſtamens from the woody part. This idea was purely hypothetical, and is unſupported by any anatomical fact, however ingenious the theory of generation deduced from it by the illuſtrious Swede.

The germen is formed as early as any part of the flower, of which indeed it frequently conſtitutes the baſe. Before the ſtigma is ripe for impregnation, all the internal parts of the germen, eſpecially the young ſeeds, receive their due ſhape and ſtructure, except only the embryo, the rudiments of which can ſcarcely be detected at that period. If no impregnation takes place, the germen, and even the ſeeds ſometimes continue to grow, but a cavity only in ſuch caſe will be found in the place of the embryo, which has at leaſt proved abortive and withered away, if it ever had any exiſtence. More frequently indeed only the huſks or withered rudiments of ſeeds are found in an advanced unimpregnated germen; and ſtill more generally the whole germen withers if the ſtamens and ſtigma have not performed their office.

Germens are either ſolitary or numerous, ſimple or aggregate, in different genera of plants. With reſpect to ſituation, it is important to note whether the germen be ſuperior, that is, above the baſes of the calyx and corolla, or inferior, below them. Such a difference commonly marks a very eſſential generic diſtinction, yet in that moſt natural genus *Saxifraga*, ſome ſpecies have a ſuperior and others an inferior germen. This proves, on a careful anatomical inveſtigation, to depend merely on a greater or leſs degree of elevation of the organ in queſtion within the cavity of the calyx. Indeed ſuch an inveſtigation of flowers in general will ſhew that there is perhaps no ſuch thing as an inferior germen, ſtrictly ſpeaking, becauſe there muſt neceſſarily be a continuation of the integuments of the flower and their veſſels, in ſome form or other, along the outer part of what is commonly deemed an inferior germen, to the ſtalk whence their nouriſhment is derived. But this "were to conſider too curiouſly." The line is in almoſt every caſe drawn with ſufficient diſtinction for all uſeful purpoſes, and is generally indicated in due time by a ſpontaneous ſeparation of parts. *Sanguiſorba* is erroneouſly judged by Linnæus to have the germen below the corolla though above the calyx, a ſtrange and unexampled circumſtance indeed! He was miſled by the cloſe adheſion of the thin pellucid tube of the corolla to the germen. In *Adoxa*, however, there is an approach towards ſuch a ſingularity of ſtructure, the calyx being inſerted half way down, while the corolla crowns the germen, for this plant, being akin to *Saxifraga*, partakes of that irregularity of poſition in the germen which we have already deſcribed.

Nothing is more wonderful than that difference of vaſcular conſtitution in the germen of different genera or natural orders, by which, though in all caſes nearly equally juicy while young and growing, in ſome it becomes coriaceous, or woody, and dry, as it ripens, while in others it attains a ſoft pulpy conſiſtence, which obliterates all its original internal ſtructure. The wiſe ends anſwered by theſe differences are indeed apparent, but the means by which they are accompliſhed are, if not inſcrutable, hitherto unexplained. S.

GERMER, St., in *Geography*, a town of France, in the department of the Oiſe; 12 miles W. of Beauvais.

GERMERSHEIM, a town of France in the department of Mont Tonnerre, and chief place of a canton, in the diſtrict of Spire; 5 miles S. of Spire. The place contains 1251, and the canton 11,745 inhabitants, in 16 communes. It is ſituated at the conflux of the Queich and the Rhine, and was erected into a town by Rodolphus I., who died here in 1290. It was taken by the French in 1794. N. lat. 49° 12'. E. long. 8° 25'.

GERMINATION, in *Vegetable Phyſiology*, the firſt beginning of vegetation in ſeeds, is accompliſhed by moiſture, heat, and air, acting mechanically and chemically on the ſubſtance and component parts of the ſeed, as well as ſtimulating its vital principle. Theſe agents muſt perform their functions together, in order to produce a ſalutary effect, otherwiſe the vital principle, or the chemical properties of the ſeed, may be ſtimulated or ſpoiled, nor muſt their application, generally ſpeaking, be longer delayed than uſually happens in the ordinary courſe of nature. Some ſeeds, indeed, may be kept out of the ground for years, or may remain buried far beneath its ſurface, we know not how long, without loſing their vegetative power; while others muſt ſcatter themſelves in their own way, immediately from the ſeed-veſſel, in order to ſucceed with certainty. A ſeed abſorbs, through the veſſels of its baſe, or ſcar, any moiſture that comes in its way, and it ſoon meets with ſuch a ſupply when committed to the ground, at the ſame time receiving, throughout its whole ſubſtance, a definite portion of heat, ſome ſeeds requiring more than others. Atmoſpherical air is alſo neceſſary to the germination of ſeeds, on account of the oxygen gas which makes a part of its compoſition, and which modern chemiſts have found to be abſorbed by ſeeds, in the moments of incipient germination, from or through the ſurrounding ſoil. This appears from their being incapable of vegetation while buried deep in the earth, or while under the exhauſted receiver of an air-pump; though ſuch as have been ſo ſituated immediately grow, when the atmoſphere has acceſs to that part of the ſoil in which they lie. By the above agents the bulk of the ſeed is increaſed, and its vital principle ſtimulated. The integuments burſt, and the radicle, or young root, protrudes, which being moſt ſuſceptible of the ſtimulus of moiſture, for that reaſon (as Dr. Darwin ingeniouſly judged,) elongates itſelf in the direction where it meets with this ſtimulus, increaſing chiefly at the extremity, and deſcending into the earth. It is a well-known fact that the radicle takes this direction, in whatever poſition the ſeed may happen to lie. Dr. Darwin's ſeems to us the beſt explanation of this curious law of the vegetable conſtitution, and preferable to any one founded on principles of mechanics or of gravitation. Accordingly, the rudiments of the young plant, conſiſting of the cotyledons and plumula or bud, being moſt ſtimulated by air, raiſe themſelves out of the ground, entirely for the moſt part, in purſuit of it. If ſome few cotyledons do remain and wither under ground, it is only becauſe they have already met with a ſufficiency of air or oxygen to anſwer their deſtination. See Cotyledones.

During the proceſs of incipient germination, the immediately neceſſary ſupplies of nouriſhment, till the young root can derive any from the ſoil, are furniſhed by the *albumen*, a ſubſtance either conſtituting a ſeparate body of itſelf, as in graſſes, corn, palms, &c., which, from a hard, dry, and taſteleſs maſs, changes, by the action of water and oxygen, into a milky or ſaccharine fluid, witneſs the operation of malting; or the ſame ſubſtance is lodged in, or united with, the bulk of the cotyledons, as in the leguminous tribe. If the *albumen* happens to ſuffer chemical deterioration, by keeping or otherwiſe, the ſeed germinates more feebly, or not at all. Hence gardeners prefer old ſeeds of melons and cucumbers, as producing leſs luxuriant plants, and more fruit in proportion. We preſume the conſequences of keeping affect the chemical qualities of the albumen before the vital principle ſuffers, becauſe of the ſucceſs of recent French chemiſts, who by the copious application of oxygen reſtore their original nature. See this whole ſubject more fully detailed in the Tranſactions of the Linnæan Society, vol. 9. p. 204—217. S.

GERMISCH, in *Geography*, a town of Germany, in the biſhopric of Freyſing; 21 miles S. of Weilhaim.

GERMONIO, Anastasio, in *Biography*, was born at Sala, in Piedmont, in 1551; his education was almoſt entirely neglected till he had attained the age of manhood. Feeling, at this period, his own deficiency, he applied himſelf with ſo much diligence, that in the courſe of a few months he felt equal to engage in the ſtudy of the law. He took his degree at the univerſity of Turin, and was appointed to the profeſſorſhip of the canon-law, an office which he held, in conjunction with other poſts of honour and emolument, till his archbiſhop was created a cardinal; he then accompanied him to Rome, and acquired the eſteem of Sixtus V. and the ſucceeding pontiffs. He was appointed by Clement VIII. to aſſiſt in compiling the ſeventh book of decretals, in which were inſerted the decrees of the council of Trent, with explanations. After this he was entruſted by the dukes of Urbino and Savoy with the management of their concerns at the ſee of Rome. So high was his reputation, that two biſhoprics were offered him which he refuſed, but at length accepted of the archbiſhopric of Tarantaſia, in Savoy. He was next ſent embaſſador, by duke Charles Emanuel, to the court of Madrid, where he died in 1627. Beſides his notes on the Decretals, and other ſmaller pieces on the Digeſt and Code, he publiſhed "De Sacrorum immunitatibus Lib. tres, &c." printed at the Vatican, 1591;—"Pomeridianæ ſeſſiones in quibus Latinæ Linguæ dignitas defenditur," &c. His writings are highly eſteemed for the purity of the language and the accuracy of the reaſoning. Moreri.

GERMS, in *Geography*, a town of Auſtria; 62 miles W.N.W. of Vienna. N. lat. 48° 32′. E. long. 15°.

GERMUK, a town of Aſiatic Turkey; 45 miles W. of Diarbekir.

GERN, a town of Ruſſia, in the government of Tala; 28 miles W.S.W. of Tula.—Alſo, a town of Bavaria; 15 miles W.N.W. of Braunau.

GERNACH, a town of Germany, in the principality of Wurzburg; 5 miles W.N.W. of Geroldſhofen.

GERNOI, a fortreſs of Ruſſia, in the government of Kolivan, ſeated on the Irtiſch; 204 miles S.W. of Kolivan. N. lat. 51° 44′. E. long. 78° 14′.

GERNOIARSKOI, a fortreſs of Ruſſia, in the government of Kolivan, on the Irtiſch; 196 miles W.S.W. of Kolivan. N. lat. 52° 30′. E. long. 77° 14′.

GERNORIETZKOI, a fortreſs of Ruſſia, in the government of Kolivan, on the Irtiſch, 180 miles W.S.W. of Kolivan. N. lat. 52° 45′. E. long. 77° 14′.

GERNRODE, a town of Germany, in the principality of Anhalt Bemburg, in which was an abbey founded in 960, and richly endowed for ladies, by Gero, margrave of Luſatia, which was ſecularized in favour of the houſe of Anhalt, at the peace of Weſtphalia; 30 miles W. of Deſſau. N. lat. 51° 45′. E. long. 11° 20.

GERNSHEIM, or Gerensheim, a town of Germany given, in 1802, to the landgrave of Heſſe Darmſtadt; 81 miles E.S.E. of Mentz.

GERNYOSZEG, a town of Tranſilvania, on the river Maros; 10 miles S.W. of Kereſztur.

GEROCOMIA, of γηρω, *aged*, and κομιζω, *I cheriſh*; a term uſed by the ancients for that ſort of medicinal practice which treated of the proper regimen to be obſerved in old age.

GERODA, in *Geography*, a town of Germany, in the territory of Eichsfeld, with a rich Benedictine abbey; eight miles N.E. of Duderſtadt.

GERODOT, a town of France, in the department of the Aube; nine miles E. of Troyes.

GEROLDSHOFEN, a town of Germany, in the biſhopric of Wurzburg; 20 miles N.E. of Wurzburg.

GEROLDSTEIN, a town of Germany, in the county of Katzenelnbogen; ſeven miles S. of Naſtede.

GEROLSTEIN, a town of France, in the department of the Sarre, and chief place of a canton, in the diſtrict of Prum; 24 miles N. of Treves. The place contains 350, and the canton 2892 inhabitants, in 29 communes. N. lat. 50° 16′. E. long. 6° 38′.

GERON Point, a cape of Ireland, in the county of Antrim, on the eaſt coaſt. W. long. 5° 50′. N. lat. 55° 3′.

GERONA, or Gironne, Lat. *Gerunda*, a town of Spain, in the province of Catalonia, the ſee of a biſhop, ſuffragan of Tarragona. This is a fortified town, of nearly a triangular form, ſituated on the ſide and at the foot of a ſteep mountain; the river Tar runs through it. The ſtreets are narrow and crowded, but the houſes are tolerably well built. It has ſeveral churches and convents; and its population amounts to about 14,000 perſons, a fourth of which number conſiſts of prieſts, monks and nuns, ſcholars and ſtudents. Several provincial councils have been held in this place, one in 517, another in 1068, &c. The trade of this town is inconſiderable, and its only manufactories conſiſt of a few looms for ſtockings, coarſe cloths, and woollen and cotton ſtuffs. The cathedral and collegiate churches are the two moſt remarkable edifices in Gironne. The treaſury of the cathedral is richly furniſhed with chalices, croſſes, ſhrines, relics, &c. of gold and ſilver ſet with jewels. In the Capuchin convent there is an Arabian bath, conſtructed in the moſt elegant ſtyle, and conſiſting of columns ſtanding on an octagon ſtylobate, or low-baſe, encircling a reſervoir to contain water. The univerſity of Gironne, founded in 1521 by Philip II., was aboliſhed in 1715 by Philip V. After the ſuppreſſion of the Jeſuits, public inſtruction was concentrated in one college, accommodating 900 ſtudents, who are taught the Latin grammar, rhetoric, philoſophy, and theology. The library is ſelect and extenſive. Schools are kept by the community of the Beguine nuns for the gratuitous inſtruction of poor girls; 47 miles N.E. of Barcelona. N. lat. 42° 10′. E. long. 2° 35′.

GERONIMO, St., a town of Mexico, in New Biſcay; 90 miles N. of Parral.

GERONTE, a ſmall iſland in the Mediterranean, near the coaſt of Natolia. N. lat. 36° 20′. E. long. 30° 4′.

GERONTES, in *Antiquity*, a kind of judges, or magiſtrates, in ancient Sparta, anſwering to what the Areopagites were at Athens. See Areopagus.

The word is formed of Greek, γερων, which ſignifies *old man*. Whence alſo the words *gerontic*, ſomething belonging to an old man; and *geronicon*, a famous book among the modern Greeks, containing the lives of the ancient monks.

The ſenate of gerontes were called *geruſia*, that is, aſſembly or council of old men.

The gerontes were originally inſtituted by Lycurgus: their number, according to ſome, was twenty-eight; and, according to others, thirty-two. They governed in conjunction with the king, whoſe authority they were intended to balance, and to watch over the intereſts of the people. Polybius defines their office in few words, when he ſays, "per ipſos, et cum ipſis omnia adminiſtrati." None were to be admitted into this office under ſixty years of age, and they held it for life. They were ſucceeded by the Ephori.

GERONTESSA, in *Geography*, a ſmall iſland in the gulf of Engia; four miles ſouth of Engia.

GERONTOXON, in *Surgery*, a little ulcer, ſhaped like the head of a dart, and making its appearance occaſionally on the cornea of old perſons. The term is derived from γερων, *an old perſon*, and τοξον, *a dart*.

GEROPOGON, in *Botany*, from γερων, *an old man*, and πωγων, *a beard*, alluding to the long hoary down of the ſeed. Linn. Gen. 398. Schreb. 525. Willd. Sp. Pl. v. 3. 1491. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 110. Juſſ. 170. Lamarck. Illuſtr. t. 646. Gærtn. t. 160.—Claſs and order, *Syngeneſia Polygamia-æqualis*. Nat. Ord. *Compoſitæ Semifloſculoſæ*, Linn. *Cichoraceæ*, Juſſ.

Gen. Ch. *Common calyx* ſimple, of numerous upright, lanceolate, ſomewhat awl-ſhaped, keeled leaves, longer than the corolla. *Cor.* compound, ſomewhat imbricated, uniform; each floret hermaphrodite, with a corolla of one petal, ligulate, abrupt, five-toothed; the outer ones equal in number to the calyx-leaves, inner ones fewer and ſhorter. *Stam.* Filaments five, very ſhort; anthers united into a cylindrical tube. *Piſt.* Germen oblong; ſtyle thread-ſhaped, the length of the ſtamens; ſtigmas two, thread-ſhaped, recurved. *Peric.* none, except the permanent, oblong, upright, gaping calyx. *Seeds* of the circumference awl-ſhaped, as long as the calyx; their crown ſtalked, of five ſpreading rough briſtles: thoſe of the diſk awl-ſhaped, but ſhorter, their crown feathery. *Recept.* naked.

Eſſ. Ch. Receptacle naked. Calyx ſimple, of many leaves. Seeds of the diſk with a feathery crown; thoſe of the circumference with one of five naked rays.

Obſ. Linnæus originally deſcribed the receptacle as naked, which is confirmed by Gærtner, Willdenow, and Jacquin. Afterwards he attributed chaffy ſcales to this part, which is adopted by Schreber, but, as we believe, without foundation. Jacquin, in conſideration of the etymology, properly makes this genus, as well as *Tragopogon* and *Andropogon*, of the maſculine gender.

Two certain ſpecies of *Geropogon* only are known. They have the cloſeſt natural affinity to *Tragopogon*, but differ in the briſtly, not feathery, crown of their external row of ſeeds. The genus is merely artificial, as not at all ſupported by habit, nor is the difference in the crown of the ſeeds greater than what occurs amongſt indubitable ſpecies of one genus in others of this natural order.

1. G. *glaber*. Linn. Sp. Pl. 1109. Jacq. Hort. Vind. v. 1. t. 33.—"Leaves ſmooth."—Native of Italy and the Levant, ſometimes kept in botanic gardens for curioſity only. It is annual, with a branched *ſtem*, 12 or 18 inches high, clothed with many alternate, claſping, long, graſſy, ſmooth *leaves*, each branch terminated by a ſmall, inconſpicuous, pale pink *flower*, like the pink hawkweed, but far leſs handſome. The *ſeeds* are larger and more remarkable. The *herb* abounds with milky bitteriſh juice. Nothing can be more cloſely allied than this plant to *Tragopogon porrifolius* of Linnæus: ſee Engl. Bot. t. 638.

2. G. *hirſutus*. Linn. Sp. Pl. 1109. (Tragopogon gramineo folio, ſuaverubente flore; Column. Ecphr. t. 231.)—"Leaves hairy."—Found by Columna, who alone of all botaniſts ſeems actually to have ſeen this ſpecies in a wood of wild pear-trees near Cirinola in Italy, flowering in May. It appears to differ from the preceding, chiefly in the roughneſs of its *leaves*, which nevertheleſs is ſo preciſely and forcibly indicated by Columna, that we dare not preſume it not to be a ſufficient diſtinction. All authors have adopted this plant from Columna, nor had Linnæus a ſpecimen.

A third ſpecies occurs in recent writers, G. *calyculatus*; Linn. Syſt. Veg. ed. 13. 592. (Tragopogon calyculatus; Jacq. Hort. Vind. v. 2. 48. t. 106.) This was received by Jacquin from Italy, and he ſent a ſpecimen to Linnæus, who referred it to *Geropogon*. The habit is that of a *Scorzonera*. *Root* perennial. *Flower-ſtalk*, *calyx*, and upper *leaves* hairy. *Calyx* of a double row of ſcales, ſhorter than the *corolla*, which is yellow. Crown of the *ſeed* ſlightly hairy, and, as far as we can perceive, uniform.—This is certainly no genuine *Geropogon*, and we are convinced it is the identical *Scorzonera hirſuta* of Linnæus, well figured in Columna's Ecphraſis, t. 233, though unfortunately we cannot prove it to demonſtration, there being no ſpecimen of the latter in the Linnæan herbarium. The plant in queſtion is however the *Geropogon hirſutus* of Allioni, Fl. Pedem. v. 1. 229, as his ſynonyms ſhew, though he took it to be annual. S.

GERRARD, in *Geography*, a county of Kentucky, in America, containing 6083 inhabitants, of whom 1234 are ſlaves.

GERRARDS, Peter van Zyl, in *Biography*, a painter, born at Amſterdam in 1607. He came to England and lived in the ſame houſe with Vandyke on terms of friendſhip and intimacy. He ſtudied his manner ſucceſsfully, and on his return to Amſterdam was ſo highly thought of, as to bear the name of the ſecond Vandyke.

GERRES, Geruli, or *Giroli*, in *Ichthyology*, names given by the Venetians to a fiſh common in that part of the world. It is the ſmaris, or mæna alba of authors. Artedi very judiciouſly makes it a ſpecies of the ſparus, and diſtinguiſhes it from others, by its having a black ſpot on each ſide, and the pectoral and tail-fins red.

GERRHA, Γεῤῥα, among the Greeks, wicker hurdles, reſembling the Roman *vineæ*, which the Romans held over their heads to ſhelter themſelves.

GERRHÆ, or Gerrhi, in *Ancient Geography*, a people of Scythia, in Europe, S. of the Danube.—Alſo, a people of Aſiatic Sarmatia, not far from the Caſpian ſea.

GERRHUS, a river of Sarmatia, which runs into the Palus Mæotides.—Alſo, a river of Aſia, in Albania.

GERRI, in *Geography*, a town of Spain, in Catalonia; 27 miles N. of Balanguer.—Alſo, a town of Africa, in Nubia, ſituated on the Nile; containing about 140 houſes; 150 miles N.N.E. of Sennaar. N. lat. 16° 15'. E. long. 33°

GERRISH, a ſmall iſland, near cape Neddock, cloſe to the main land of the diſtrict of Maine, in America.

GERRY, a townſhip of America, in the ſtate of the Maſſachuſetts, and county of Worceſter; incorporated in 1786, and containing 14,000 acres of land, in which are 802 inhabitants; 30 miles N.W. of Worceſter.

GERS, a river of France, which riſes near La Barthe de Neſtes, in the department of the Upper Pyrenées, traverſes the department of the Gers, and runs into the Garonne, about three miles S.E. of Agen.

Gers, one of the nine departments of the ſouth-weſt, or Garonne region of France, bounded on the N. by the department of the Landes and the Lot and Garonne, on the E. by the department of the Upper Garonne, on the S. by the departments of the Upper and Lower Pyrenées, and on the W. by the department of Landes. This department is compoſed of Condommois, Armagnac, and Comminges, and takes its name from the river which croſſes it from ſouth to north. Its capital is Auch. It is ſituated in N. lat. 43° 40′; its territorial extent is 7,047$\frac{1}{2}$ kiliometres, or about 339 ſquare leagues, and the number of its inhabitants is eſtimated at 291,845. It is divided into five diſtricts, *viz.* Condour, containing 67,103 inhabitants, Lectoune, with 57,445, Auch, having 52,825, Lombes, with 37,393, and Mirande, with 77,079 inhabitants. The number of its cantons is 30, and of its communes 700. The total of its contributions, perſonal, ſumptuary, and on moveables and immoveables, &c. is 2,663,310 francs, and the expence of adminiſtration, juſtice, and public inſtruction, is 278,498 francs. The ſoil of this hilly department is indifferently fertile, yielding moderate crops of grain, wine, fruits, and good paſtures.

GERSA, or Gairsa, an iſland of Scotland, five miles E. of Enhallow, two S. of Weir, and one E. of Mainland, is two miles long and one broad, and contains 50 inhabitants. The greateſt part conſiſts of a conical hill; ſteep on the W. ſide, and towards the E. more plain and fertile. The only harbour is that of Millburn on the E. coaſt. See Gairsa.

GERSAU, or Gerisau, a village or town of Switzerland, at the foot of the Rigi, and the ſmalleſt republic in Europe. Its territory is about a league in breadth, and two leagues in length; ſituated partly on a ſmall neck of land at the edge of the lake of Schweitz, and partly lying upon the rapid declivity of the Rigi. It contains about 1200 inhabitants, having their general aſſembly of burgeſſes, their landamman, their council of regency, their courts of juſtice, and their militia. In the whole republic there is not a ſingle horſe; and the only way of arriving at the town is by water, excepting a narrow path down the ſteep ſides of the mountain, which is almoſt impaſſable. Geriſau is entirely compoſed of ſcattered houſes and cottages of a very neat and pictureſque appearance; each dwelling is provided with a field or ſmall garden. The inhabitants are much employed in preparing ſilk for the manufactures of Baſle. This little republic is under the protection of the four cantons, Lucern, Uri, Schweitz, and Underwalden; and in caſe of war furniſhes its quota of men. The town is ſix miles diſtant S.W. from Schweitz. N. lat. 46° 55′. E. long. 8° 20′.

GERSCHITZ, a town of Bohemia, in the circle of Konigingratz; nine miles N.W. of Konigingratz.

GERSCHNITZ, a town of Germany, in the principality of Bayreuth; ſix miles E. of Bayreuth.

GERSDORF, a town of Germany, in the principality of Querfurt; four miles N.E. of Juterbock.

GERSON, in *Biography*, chancellor of the church and univerſity of Paris at the beginning of the fifteenth century; according to whom the ground-work of all diſcant was the plain-chant; and in his treatiſe upon the education of children for the choir of Notre Dame, he enjoins a particular attention to chanting, counterpoint, and diſcant, as the three moſt eſſential branches of their inſtruction and ſtudy. (Magiſter cantûs ſtatutis horis doceat pueros planum cantum principaliter, et contrapunctum, et aliquos diſcantus honeſtos—decent and ſober melodies.) He likewiſe tells us, that in this cathedral, during his time, the choiriſters were only allowed, by the ſtatutes, to practiſe diſcant till their voices broke. (Nec faciat eos tantùm inſiſtere in talibus, quod perdant in grammatica profectum; attento maximè quod in eccleſia noſtra diſcantus non eſt in uſu, ſed per ſtatuta porhibitus, ſaltem quoad voces quæ mutatæ dicuntur). The Abbé Lebeuf underſtands theſe laſt words as we have tranſlated them: (Le déchant n'étoit point en uſage dans l'egliſe de Paris, et qu'au contraire il étoit défendu par les ſtatuts, au moins á l'égard des voix qui avoient paſſé le tems de la mutation. Traité Hiſt. ſur le Chant. Eccles. p. 92.) The indefatigable Abbé Lebeuf found in the king of France's library the ſtatutes here alluded to, which had been framed in the 13th century, and from which the chancellor had been ordered to make extracts in 1408. He concludes the fourth article of his tract, which relates to pſalmody, by informing us that no written diſcant was allowed in church miſſals or graduals, except for the exerciſe and improvement of the ſinging boys. (Nec debet in cantu notulato regulariter immiſceri diſcantus, pueris exceptis propter exercitationem ſuam. Gerſon, tom. iv. ultimæ edit. p. 717.)

GERSPACH, in *Geography*, a town of Germany, in the county of Eberſtein, on the Murg; taken by the French in 1794; three miles S.E. of Baden. N. lat. 48° 48′. E. long. 8° 20′.

GERSPRINTZ, a town of Germany, in the county of Erbach; ſeven miles N.W. of Erbach.

GERSTEN, Christian Louis, in *Biography*, was born at Gieſſen in 1701: here he was educated, and in the year 1733 he was appointed profeſſor of mathematics and the mechanical ſciences in that city. On account of ſome diſpute he was diſmiſſed from his office, and left Gieſſen in 1744; he went firſt to Altona, and from thence to Peterſburgh; but meeting with no encouragement, he returned and attempted to get reinſtated in his office, but failing in his deſign, he inſulted the landgrave, was arreſted at Franckfort in 1748, and doomed to perpetual impriſonment in the caſtle of Marburg, with an annual allowance of 200 florins. Here he employed himſelf in teaching the mathematics to thoſe young perſons who came to his priſon for inſtruction, and his leiſure moments were occupied in ſtudying the phenomena of the atmoſphere, and the changes which take place in it, ſo as to become very expert in the ſcience of meteorology. In the year 1760 he was liberated from his confinement, but his freedom was not complete; he was admitted at large for a time by way of proving whether he was entitled to a general diſcharge: eſcaping however from his ſhackles he went privately to Franckfort, where he kept himſelf concealed, or at leaſt quiet, till he died in 1762. His works were numerous, and written in the Latin language: they chiefly relate to meteorology, to the methods of calculating eclipſes, and to the ſtructure of aſtronomical inſtruments. He was eſteemed by his contemporaries for his integrity and his learning. He ſent ſome papers to the Royal Society of London, of which ſeveral were inſerted in the volumes of their Tranſactions. Moreri.

GERSTUNGEN, in *Geography*, a town of Germany, in the principality of Eiſenach, on the Werra; 8 miles W. of Eiſenach.

GERSWALDE, a town of Germany, in the Ucker Mark of Brandenburg; 9 miles S. of Prenzlaw.

GERTHAUSEN, a town of Germany, in the county of Henneberg; 10 miles W. of Meinungen.

GERTRUDENBERG, a town of Germany, in the biſhopric of Oſnabruck; 1 mile E. of Oſnabruck.

GERTRUYDENBERG, St., a town of Brabant, but in later times ſubject to Holland, with a good harbour, formed by the Merwe, which here extends to a conſiderable lake, called "Bies Boſch," over which is a paſſage of two hours to Dort. It is built in the form of a creſcent, with regular fortifications, good baſtions, and forts with ſluices: by means of which they can lay the adjacent country under water. In ancient charters it is called "Mons Littoris," the mountain of the ſhore. In 647, Pepin de Landen, duke of Brabant, gave it to his daughter Gertrude, who built a church dedicated to St. Amand, biſhop of Tongres; but the place afterwards becoming celebrated by the death and pretended miracles of Ste. Gertrude, it has ſince been called "Mont de Ste. Gertrude," or Gertrudenberg. The caſtle was built in 1321. After paſſing through many viciſſitudes, it was ſummoned by the French in February 1793, and taken; but ſoon after evacuated. The French took it again in 1795. It is diſtant 10 miles S.E. of Dort, and 7 N.E. of Breda. N. lat. 51° 40′. E. long. 4° 44′.

GERTZ, a town of Germany, in the principality of Wurzburg; 5 miles W.S.W. of Munerſtat.

GERVAIS, Armand Francis, in *Biography*, was born at Paris about the year 1660: he was educated with the Jeſuits, and at fifteen years of age he entered among the bare-footed Carmelites. At the age of twenty-two he was appointed by his ſuperiors to teach theology to the younger members of the order; and he was at the ſame time diſtinguiſhed as a pulpit orator. Some years after this he withdrew into the monaſtery of La Trappe, where he ſucceſſively filled very important offices belonging to that order. The changes which he introduced, and the reforms which he meditated, created an alarm; and in 1698 he reſigned his offices, and quitted his reſidence in the monaſtery. From this period he wandered about, from ſolitude to ſolitude, following the ſame aſcetic courſe of life which he had been in the habit of practiſing in the college. Having, in 1745, publiſhed the firſt volume of an intereſting "General Hiſtory of the Ciſtercian Order in France," in which was a ſevere attack upon the Bernardins, he was arreſted and impriſoned in the abbey of Notre Dame des Reclus, in the dioceſe of Troyes, where he died in 1751, at the age of ninety-one. He publiſhed, beſides the work alluded to, "The Life of St. Cyprian," with an abridgment of his works, including notes and diſſertations: "The Lives of Peter Abelard and of his wife Heloiſe;" "The Hiſtory of Suger, Abbot of St. Denys," in three volumes, 12mo. "The Life of St. Irenæus," in two vols. 12mo. Alſo lives of St. Paul, Epiphanius, Ruffinus, and other eminent perſons. He was diſtinguiſhed as a controverſialiſt, and was the opponent of Father Courayer on the ſubject of Engliſh ordinations. He is characterized as a man of great learning and ſingular virtues, but his manners were auſtere, impetuous, and forbidding. Moreri.

Gervais, *St.* in *Geography*, a town of France, in the department of the Puy de Dôme, and chief place of a canton, in the diſtrict of Riom; 15 miles N. W. of Riom. The place contains 2180, and the canton 9204 inhabitants, on a territory of 282½ kiliometres, in 11 communes.

Gervais-*de-Maſſey*, *St.* a town of France, in the department of the Orne, and chief place of a canton, in the diſtrict of Domfront; 9 miles N. N. E. of Domfront. The place contains 1068, and the canton 17,228 inhabitants, on a territory of 132½ kiliometres, in 14 communes.

Gervais-*la-Ville*, *St.* a town of France, in the department of Herault, and chief place of a canton, in the diſtrict of Beziers. The place contains 1263, and the canton 8641 inhabitants, on a territory of 137½ kiliometres, in 10 communes.

GERVASE of Tilbury, in *Biography*, an hiſtorian of the thirteenth century, a native of Tilbury, in Eſſex, and nephew to king Henry II. He was, through the intereſt of Otho IV. made marſhal of the kingdom of Arles. He wrote a commentary on Geoffrey of Monmouth's Britiſh Hiſtory, and alſo a tripartite Hiſtory of England. His other works are "A Hiſtory of the Holy Land;" "Origenes Burgundionum;" "Mirabilia Orbis," and a Chronicle; entitled "Imperialium Otiorum." The compilation of the exchequer book, entitled "Liber Niger Scaccarii," was aſcribed to him; but Mr. Madox, who publiſhed a correct edition of it, gives it to Richard Nelſon, biſhop of London. Moreri. Gen. Biog.

GERVASIO Gatti, the nephew of Bernardo; was alſo a painter of conſiderable merit in the ſame ſtyle of colouring, as is evident in a picture of St. Sebaſtian, in the church of St. Agatha at Cremona, where it is united to the deſign of the antique; and alſo in the Martyrdom of St. Cecilia, at St. Pietro, in the ſame city.

GERVASO, St. in *Geography*, a town of Italy, in the department of the Mela; 15 miles S. of Breſcia.

GERUMA, in *Botany*, barbarouſly corrupted by Forſkall from an Arabic name *Djerrum*. Forſk. Ægyptiaco-Arab. 62. Juſſ. 264. Lamarck. Dict. v. 2. 702.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. "*Meliæ*, or perhaps *Malvaceæ*," Juſſ.—"*Rhamni?*" Lamarck.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, flat, five-toothed, ſmall, green, permanent. *Cor.* Petals five, lanceolate, abrupt, ſpreading, thrice as long as the calyx, white. Nectary, a thick ring ſurrounding the germen, bearing the ſtamens on its outer edge. *Stam.* Filaments five, erect, half the length of the corolla; anthers erect, triangular. *Piſt.* Germen globoſe, deeply immerſed in the nectary; ſtyle thread-ſhaped, ſmall; ſtigmas three, widely ſpreading, red, wedge-ſhaped, emarginate at the extremity. *Peric.* Capſule ſuperior, oval, of four, or perhaps five, cells, and as many valves. *Seeds*, two in each cell, oval, inſerted into a triangular white pulp; one of them often abortive.

Eſſ. Ch. Calyx with five teeth. Petals five, abrupt. Nectary, a ring round the germen. Stigmas three, emarginate. Capſule ſuperior, ovate, of four or five cells. Seeds two, affixed to a pulpy receptacle.

1. G. *alba*. Leaves alternate, oval-oblong, ſomewhat ſerrated.

This is all that can be gathered from Forſkall's account, and it forms a botanical enigma. Some circumſtances indicate an affinity to Juſſieu's *Euphorbiæ*. The accounts of the ſtigmas and of the fruit are the moſt remarkable. Nothing is ſaid of the habit, duration, or ſenſible qualities.

GERUND, in *Grammar*, a ſort of tenſe, or time, of the infinitive mood: very like to the participle, but indeclinable.

The word is formed of the Latin *gerundivus*; and that from the verb *gerere*, *to bear*.

The gerund expreſſes not only the time, but alſo the manner of an action; as, he fell in running poſt.

It differs from the participle, in that it expreſſes the time, which the participle does not. And from the tenſe properly ſo called, in that it expreſſes the manner, which the tenſe does not.

Grammarians are much embarraſſed to ſettle the nature and character of the gerunds: it is certain they are no verbs, becauſe they do not mark any judgment or affirmation of the mind, which is ſuppoſed to be the eſſence of a verb: and beſides, they have their ſeveral caſes, which verbs have not.

Some, therefore, will have them to be adjectives paſſive, whoſe ſubſtantive is the infinitive of the verb: on this footing they denominate them verbal nouns, or names formed of verbs, and retaining the ordinary regimen thereof.

Thus, ſay they, *tempus eſt legendi libros*, or *librorum*, is as much as to ſay, *tempus eſt τὸ legere libros*, vel *librorum*. But others diſpute this deciſion.

The Greeks have neither gerunds nor ſupines; but inſtead of them they make uſe of the infinitive, in the ſame manner as the French; πρὸς τὸ πιεῖν, *pour boire*. When the article happens to be made uſe of, then its genitive is put for the gerund in *di*, as τοῦ ποιῆσαι, *faciendi*, of doing; the dative or ablative τῷ is put for the gerund in *do*; and the neuter for the gerund in *dum*. But the infinitive in this ſenſe is often expreſſed without the article, as Ἄριστος ἀκοντίζειν, *jaculandi peritus*, an excellent archer; Δῶκε φέρειν, *ferendum dedit*, he gave it to carry. In Greek, however, the termination τέον correſponds to the Latin gerunds; thus, from λέγω, to ſay, is deduced λεκτέον, *dicendum*, it muſt be ſaid. Theſe verbal adjectives, as they may be called, ſometimes denominated gerunds, are uſed occaſionally either in an active or a paſſive ſenſe; την γην θεραπευτεον, it is for thee to cultivate the ground: τη γνωμη ὑπηρετειν ἐθιστεον το σωμα, και γυμναστεον συν πονοις και ἱδρωτι, the body ſhould be accuſtomed to obey the underſtanding, and be diſciplined with toils and ſweat. Xenophon.

An ingenious grammarian obſerves, that the Latin gerunds in *di*, *do*, and *dum*, are but the participle in *dus* in the oblique caſes; and as this is taken from the preſent participle, they have its ſenſe, namely, an *active* ſenſe. On the ſame principle that participles expreſs *powers* or *habits* in action, and their tendency is to ſignify thoſe powers, and not their *operation*, *i. e.* to become abſtract nouns; the oblique caſes of the participle in *dus*, when alone, become in their nature abſtract nouns. Hence gerunds, being thus nouns in reality, are governed like other nouns in the genitive, dative, accuſative, and ablative, either with or without a prepoſition; as *ratio ſcribendi*, the art of writing; *charta utilis ſcribendo*, paper is uſeful for writing; *promptus ad audiendum*, ready for hearing, or to hear; *memoria excolendo augetur*, the memory is increaſed by cultivating. Gerunds alſo, having the nature of nouns, may govern a genitive; as *facultas agrorum ſuis latronibus condonandi*, the power of the beſtowing of his lands on his thieves. The gerunds, however, as retaining in a degree their verbal character, govern the caſe of their reſpective verbs, as *viſendi domum poteſtas*, *venit ad recipiendum pecunias*, *parcendo victis*. As adjectives aſſume the nature of nouns when uſed alone in the neuter termination, ſo the gerunds in *dum*, the neuter of participles in *dus*, become ſubſtantives, denoting, with *eſt*, neceſſity or obligation, as *vivendum eſt mihi recte*, living well muſt be to me, or I muſt live well. Jones's Grammar of the Latin Tongue, 1800.

GERY, St. in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the diſtrict of Cahors, 5 miles N. W. of Cahors. The place contains 1250, and the canton 6035 inhabitants, on a territory of 180 kiliometres, in 9 communes.

GERYON, a name given by ſome of the affected chemical writers to quickſilver.

GERZAT, in *Geography*, a town of France, in the department of the Puy de Dôme; 4 miles N. E. of Clermont.

GERZEN, a town of Bavaria; 11 miles E. of Landſhut.

GESAN, a town of the Arabian Irak; 8 miles S. E. of Mendali.

GESAS, a town of Sileſia, in the principality of Neiſſe; 3 miles S. E. of Patſchau.

GESEKE, a town of Germany, in the kingdom of Weſtphalia; 9 miles E. S. E. of Lipſtadt.

GESERICH, a lake of Pruſſia, in Oberland, near Dutch Eylau.

GESERVAGHERD, a town of Perſia, in Choraſan; 30 miles S. of Esfenan.

GESHEN, *Rocks and rivers of*. See AMHARA.

GESHURITES, in *Scripture Geography*, a people who dwelt beyond Jordan, in the half tribe of Manaſſeh.

GESIS, in *Geography*, a town of Germany, in the county of Feldkirch; 4 miles E. of Feldkirch.

GESKENDORF, a town of Pruſſia, in Oberland; 7 miles S. S. E. of Salfeldt.

GESMOLD, a town of Germany, in the biſhopric of Oſnabruck; 12 miles S. E. of Vorden.

GESNER, CONRAD, in *Biography*, "the greateſt naturaliſt the world had ſeen ſince Ariſtotle," the firſt who ever collected a muſeum of natural hiſtory, and the diſcoverer of the only true principles of botanical arrangement in the flower and fruit, "to which the very exiſtence of botany as a ſcience is owing," was born at Zurich in 1516. Like moſt of thoſe who have rendered the moſt eminent ſervices to ſcience or their fellow-creatures, he had to contend with the greateſt difficulties, eſpecially with poverty in his youth, and with a feeble and ſickly conſtitution to the day of his death. He very early imbibed an ardent love of plants from his mother's brother, named Friccius, and this ſeems to have led him to the ſtudy of animals, and even of foſſils. He was educated for the medical profeſſion, which he ſubſequently practiſed in his native town, and to the emoluments of which he was indebted for the means of purſuing and promoting, by various expenſive means, his darling ſtudies. He founded and ſupported a botanic garden; kept a painter and an engraver in wood conſtantly in his ſervice, and acquired a very extenſive library. He exerciſed the pencil himſelf with great ſucceſs, to which the excellence of the botanical cuts he has left us, with reſpect to the habit as well as fructification of plants, is owing. Many of theſe appear in the *Epitome* of Camerarius, and a large collection of the whole has been publiſhed in more recent times by Trew and Schmiedel, printed from the original blocks. Geſner undertook various laborious journeys in purſuit of plants, eſpecially on the Alps; and while he was, perhaps, the moſt learned naturaliſt of his own or any age, he rivalled the moſt experienced of his contemporaries in practical obſervation. He united to the inveſtigation of the external characters of plants, the moſt aſſiduous attention to their medical properties, and his own health and life were frequently endangered by the experiments he made for the good of others. He was reported to have killed himſelf with a doſe of two drams of the root of *Doronicum*, but though his ſtomach was at firſt debilitated, he ſpeedily recovered, and amuſed his friends with a narrative of his caſe. At length this great man fell a victim to the more immediate duties of his profeſſion, having caught the plague, of which he died on the 13th of December, 1565, aged 49. When he found his end approaching, he requeſted to be carried into his muſeum, where he expired amid the monuments of his labours, thankful for what he had been able to accompliſh, and ſupported by all the pious hopes and conſolations of a Chriſtian philoſopher. His piety and benevolence were no leſs eminent than his talents. He was the general peacemaker among ſuch of his literary acquaintances as were more iraſcible or leſs candid, and he laid aſide, for a while, his own immediate employments, to devote his ſervices to the family of a deceaſed friend, Moiban, whoſe work on Dioſcorides he ſuperviſed, and publiſhed for their emolument. He was much attached, by ſimilarity of taſte, to Valerius Cordus, who died in 1544 at Rome, on his travels, at the early age of 29, and whoſe "Hiſtoria Plantarum" was ſubſequently edited by Geſner. Theſe able botaniſts had never had a perſonal interview, and Geſner was more intimately acquainted with a young man named David Kyber, who died, at nearly the ſame age, of the plague at Straſburgh in 1553, and whoſe "Lexicon Rei Herbariæ Trilingue" (Latin, Greek, and German) he publiſhed the ſame year, with a very affectionate and conſolatory epiſtle to the father of the author.

The principal works of Conrad Geſner are the following, not to mention various little treatiſes relating to Botany, or to the Materia Medica, which from time to time came from his ready and prolific pen, ſome of them accompanying the books he edited for other people.

" Bibliotheca univerſalis," or a catalogue of Latin, Greek, and Hebrew books, printed at Zurich, 1545, in one volume folio, with criticiſms, and often ſpecimens of each. This ſeems to have given Haller the idea of his own " Bibliotheca Botanica," and " Bibl. Anatomica."

" Hiſtoriæ Animalium," compriſed in five books, making three great folio volumes in a very ſmall type, with numerous wooden cuts. The firſt was publiſhed at Zurich in 1551, the laſt in 1587, after the deceaſe of the author. There is alſo an edition in German. This is a vaſt compilation, and critical reviſal of all that had been done before him in Zoology, with every thing that he could ſay of his own knowledge to illuſtrate the ſubject, and many incidental botanical, as well as medical remarks. Inſtead of being the work of a phyſician, who raiſed and maintained himſelf by his practice, and who was cut off in the middle of a moſt active and uſeful life, one would ſuppoſe it the labour of a recluſe, ſhut up for an age in his ſtudy, and never diverted from his object by any other cares. This work is arranged according to the plan of Ariſtotle, only the oviparous quadrupeds are ſeparated from the viviparous. It does not extend to inſects or ſhells. The former however had not eſcaped the attention of Geſner, for his labours reſpecting them make a part of the work of Mouffet, entitled " Inſectorum ſive Minimorum Animalium Theatrum," publiſhed at London in 1634, the earlieſt book on entomology.

The " Icones Animalium," with their nomenclature, form a ſeparate publication from the above, conſiſting of the wooden cuts and names only.

" Aquatilium Animantium Enumeratio juxta Plinium," a little 8vo. printed at Zurich in 1556. A liſt of the German and Engliſh names is ſubjoined.

A little work in Latin, " De Lacte," treating of milk and its preparations, from various authors. Zurich, 1541, in 8vo.

" De Secretis Remediis Theſaurus;" a Pharmacopœia, which has gone through a number of editions in various languages.

" De raris et admirandis herbis, quæ ſive quod noctu luceant, ſive alias ob cauſas, Lunariæ nominantur." A curious and learned little work, with wooden cuts, in 4to. Zurich, 1555. It is accompanied with a deſcription of the celebrated mount Pilat, or *Mons Fractus*, the northern extremity of the Alps, which Geſner viſited in 1555. Several alpine plants are here, for the firſt time, noticed.

" De omni rerum Foſſilium genere." Zurich, 1565, 8vo. Alſo " De rerum Foſſilium, Lapidum et Gemmarum maxime figuris," with wooden cuts, more curious than uſeful.

The botanical remarks relative to the ſcientific arrangement of plants, on which the ſupereminent merits of this great man are founded, are chiefly to be gathered from his letters, which were publiſhed after his death. From the number of wooden cuts, and of drawings, which he had prepared, it is probable he meditated a general botanical work, the future arrangement of which frequently occupied his thoughts, and prompted many of theſe letters.

Geſner married at the early age of 20, for which he was accuſed of imprudence, but it does not appear that he had any reaſon to repent. His wife ſurvived him, and notwithſtanding the dangerous nature of his diſeaſe, which was accompanied with a peſtilential carbuncle, ſhe did not deſert his death-bed, for he expired in her arms. He left no offſpring. His remains were honourably interred, the day after his deceaſe, in the cloiſter of the great church at Zurich, near thoſe of his intimate friend, Fryſius, who died the preceding year. Abundance of Latin, and ſome Greek verſes, were compoſed to his honour, and his life, written by his countryman Joſias Simler, was publiſhed in the enſuing year. From this work, and Haller's Biblioth. Bot. much of the above information is derived. Haller mentions Geſner as probably the firſt perſon who, being ſhort-ſighted, found the advantage of concave glaſſes. S.

We have received the following additional account of C. Geſner, in relation to his medical profeſſion.

His father, who was a worker in hides, was killed in the Swiſs civil war, and left him in ſuch poverty, that he went to Straſburg, and entered into a ſituation as a ſervant. His maſter, having obſerved his great inclination to reading, allowed him to employ the time, which was not abſolutely neceſſary to his ſervice, in ſtudy; and he made ſuch progreſs while at Straſburg, that, having acquired a little money, he went to Paris, where he firſt attained an ample knowledge of the Latin and Greek languages, and of rhetoric, and afterwards applied to the ſtudy of philoſophy and medicine: but as he ſoon found the means of ſubſiſtence fail, he was under the neceſſity of returning to his native country, and of teaching the languages and philoſophy for a livelihood. This expedient was ſucceſsful, and even procured him the means of viſiting Montpellier, where he reſumed the ſtudy of medicine, which he completed, by taking the degree of doctor at Baſil in the year 1540. He then determined to ſettle at Zurich, where his merit procured him the appointment of profeſſor of philoſophy, and he diſcharged the duties of that office, with univerſal reputation and eſteem, during twenty-four years. Theſe duties, and his ſtudies in the cloſet, prevented him from entering largely into the practice of medicine; in which, however, his extenſive knowledge furniſhed him with ſuch numerous reſources, that his practice was extremely ſucceſsful, and he roſe ſuperior to the prejudices of his contemporaries. Geſner had always a decided predilection for the ſtudy of botany, which he early conceived and retained through life, as we have already mentioned in the former part of this article. It was not without great trouble and difficulty that he became a ſcientific man; for he was of a delicate and ſickly conſtitution; but his ſpirit and courage gave him ſtrength to ſupport the fatigues of body and mind. Notwithſtanding the delicacy of his habit, he traverſed the Alps in ſearch of plants; and among other journeys over thoſe mountains, he made one with Jean Bauhin in 1561. He even culled plants from the waters, and has been known to plunge into the lake of Zurich to procure thoſe which grew there. Ever animated by the ſame ſpirit, he viſited Paris again, travelled through the ſouthern provinces of France, and thence paſſed into Italy. In order to ſtudy the nature of fiſhes, he went to Venice with a view to inveſtigate thoſe of the Adriatic, and ſometime afterwards he repaired to Straſburg to examine thoſe of the Rhine. From theſe ſources of information, from a conſtant perſonal obſervation, conjoined with the ſtudy of the writings of the ancients, he obtained the means of accompliſhing that immenſity of treatiſes, which a man, who only attained to 49 years of age, could hardly be ſuppoſed capable of producing.

Gesner, John Matthias, was born at Roth, in Anſpach, in 1691, where his father was a clergyman. He received the firſt part of his education at the gymnaſium of Anſpach, and was quickly diſtinguiſhed by his progreſs in the ancient and oriental languages. From Anſpach he went to Jena, where he exhibited his learning and talents in ſeveral publications. In 1715 he was appointed co-rector of the gymnaſium of Weimar, and keeper of the public library. In 1730 he accepted of the rectorſhip of Thomas's ſchool at Leipſic, and on the eſtabliſhment of the univerſity of Gottingen he was invited to be the profeſſor of rhetoric, an office in which he was ſo greatly diſtinguiſhed, as to acquire the reputation of being the moſt able philologiſt of the age. He was at the ſame time made librarian and preſident of the German ſociety, and to his inſpection all the ſchools of Gottingen were given. On the appointment of the Royal Society at Gottingen he was the firſt member of the hiſtorical claſs, and was afterwards appointed a counſellor of ſtate, and perpetual director. He died in 1761. His works are much too numerous to be named in this place, but they were ſuch as to entitle him to almoſt the higheſt rank in the literary world. Among others may be noted his "Index etymologicus Latinitatis:" and his "Theſaurus Latinæ Linguæ et Eruditionis Romanæ," 4 vols. fol. Geſner, in this elaborate work, followed the order of Stephanus, but added ſuch notes and other improvements as appeared neceſſary. Theſe additions conſiſt chiefly in the number of remarkable phraſes and paſſages from the Roman claſſics with illuſtrations. Gen. Biog.

Gesner, Solomon, was born at Boleſlau, in Sileſia, in the year 1559. Having received the early part of his education at his native place, he was ſent to Breſlaw to purſue the ſtudies neceſſary to his future profeſſion. From this place he went to Straſburg, where he was ſo fortunate as to obtain an academic exhibition for five years, which he employed in the ſtudy of philoſophy, the mathematics, and the learned languages, as well the Hebrew, Chaldee, and Syriac, as thoſe of Greece and Rome. He now became private tutor to a noble Livonian, and when he was 24 years of age he was admitted to the degree of M. A. In 1592, he was invited to fill the theological chair in the univerſity of Wittemberg, and almoſt immediately entered upon the duties of his office, and was at the ſame time admitted to the degree of D. D. He alſo occupied the important poſts of dean and rector of the univerſity, aſſeſſor in the eccleſiaſtical conſiſtory, and firſt preacher in the church. His cloſe application to buſineſs injured his health, and he fell a ſacrifice to a complication of diſorders in 1605, when only in the 46th year of his age. His works are a Latin tranſlation of "The Prophecy of Hoſea," "Diſquiſitions on the Pſalter," treating of the dignity, the uſe, the argument, and the connection of the Pſalms, and many other works of a theological and controverſial nature. Gen. Biog.

Gesner, John, a canon of Zurich, and profeſſor of natural philoſophy and mathematics in that univerſity, probably belonged to the ſame family as the great Conrad. He was the intimate friend of Haller, in whoſe ſociety he ſtudied at Leyden and Baſle, and with whom he maintained a cloſe correſpondence during the life of that diſtinguiſhed man. Their taſte for botany was the ſame, and their characters ſimilar. His letters make an intereſting part of the "Epiſtolæ ad Hallerum," and abound with ſolid and curious botanical criticiſm and information. He paid much attention to the cryptogamic claſs, and other difficult branches of the ſcience, as well as to the anatomy and phyſiology of plants. He ſurvived his learned friend 12 years, dying in 1790, at the age of 81.

This author publiſhed two phyſiological diſſertations on plants in 1740 and 1741, reprinted at Leyden in 1743, along with Linnæus's "Oratio de peregrinatione intra patriam." In theſe he treats of the life and ſtructure of vegetables, their propagation, ſexes, elaſtic motion of ſome of their ſtamens, and their methodical claſſification. He reviews the experiments and obſervations of Leeuwenhoeck, Malpighi, Grew, Hales, &c. announces the then novel ſyſtem of Linnæus, whom, with a kind of prophetic ſpirit, he calls "a man deſtined to reform all natural hiſtory." Theſe diſſertations are the beſt and moſt compendious epitome poſſible of all the botanical ſcience of that day, in which the improvements of each writer are ſet in the moſt juſt and inſtructive point of view for their mutual illuſtration.

With all his knowledge, the ſubject of our preſent article, and even his friend Haller, were impoſed on by one of the groſſeſt deceptions. A perſon preſented him with a common meadow Crowfoot, on ſome branches of which were ſtuck flowers of the common Daiſy. He immediately publiſhed, in 1753, a learned diſſertation on vegetable monſters, entitled "de Ranunculo bellidifloro," in which he exhibits a figure of this ſtrange anomaly. As Haller had given his ſanction to the diſcovery, botaniſts could ſcarcely ſuppoſe it was an evident miſtake, till ſir Joſeph Banks obtained the original ſpecimen after Geſner's death. On its being ſoftened with boiling water, in the preſence of ſeveral botaniſts, amongſt whom was the writer of this, the ſtem of the *Ranunculus* came out of the baſe of the daiſy, as from a ſheath; and indeed the different pubeſcence of each was very diſtinguiſhable before their ſeparation. A hiſtory of the whole is given by Mr. Konig, in his Annals of Botany, v. i. 368, with a plate drawn for ſir Joſeph Banks by Mr. Bauer, and ſigned by all the witneſſes.

Geſner publiſhed at different times eleven diſſertations in quarto, from 1759 to 1773, under the general title of "Phytographia Sacra." Some of the latter only are illuſtrative of the plants of ſcripture, the reſt being of a general nature, containing various anatomical and phyſiological, as well as botanical and economical matter. He adopts the Linnæan ſyſtem, and furniſhes many remarks confirming the ſexual doctrine.

He meditated a very extenſive work on the characters of plants, for which he had prepared a conſiderable number of exquiſitely engraved, though too much crowded, plates, ſome of which are in our hands; but this publication never took place.

He wrote alſo on extraneous foſſils, and compoſed an index to Weinmann's *Phytographia*, printed in 1787 in 8vo. A catalogue of his library for ſale was publiſhed in 1798, by which it appears to have been one of the beſt collections of botanical books ever offered to the public. S.

GESNERIA, in *Botany*, named by Plumier in memory of the great Conrad Geſner; ſee that article. Linn. Gen. 308. Schreb. 404. Willd. Sp. Pl. v. 3. 230. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 2. 331. Juſſ. 165. Plum. Gen. 27. t. 9. Lamarck Illuſtr. t. 536. Gærtn. t. 177.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Campanulaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, ſuperior, in five deep, acute ſegments, permanent. *Cor.* of one petal, incurved and recurved; tube thickiſh, with a contraction at the neck and a funnel-ſhaped throat; limb five-cleft, obtuſe; its upper ſegments concave, or erect, the three lower flat and ſpreading. *Stam.* Filaments four, moſtly ſhorter than the corolla, two longer than the others; anthers arrow-ſhaped, ſimple. *Piſt.* Germen inferior, depreſſed, roundiſh; ſtyle thread-ſhaped, parallel to the ſtamens; ſtigma capitate. *Peric.* Capſule roundiſh, crowned with the ſpreading calyx, imperfectly two-celled, the partition being longitudinally interrupted in the middle. *Seeds* very numerous, minute. *Receptacles* attached to the partition at each ſide.

Eſſ. Ch. Calyx five-cleft, crowning the germen. Corolla incurved and recurved. Capſule inferior, imperfectly two-celled. Seeds numerous.

Obſ. We prefer, with Linnæus, the name *Geſneria* to *Geſnera*, as the moſt correct in its conſtruction, and ſupported by the beſt analogies, though Plumier originally wrote the latter. In ſuch caſes it is needleſs to burthen the reader with preciſe quotations, and we merely adopt the orthography that appears the beſt, except there be any difference worth commemorating.

Linnæus has given but three ſpecies of this genus, to which Swartz has added ſeven new ones, beſides the Linnæan *Craniolaria fruticoſa*, in his Prodromus Fl. Ind. Occ. where he alſo made the *Cyrilla* of L'Heritier a *Geſneria;* ſee Cyrilla. But in his Fl. Ind. Occ. 1032 he ſubmits to the opinion of thoſe who reckon it diſtinct. All the *Geſneriæ* are of Weſt Indian origin, and very little known in Europe, except the *tomentoſa*, kept in botanic gardens for its rarity rather than beauty. Several of the ſpecies firſt deſcribed by Swartz are eminently handſome, and well deſerve to be introduced into our ſtoves, eſpecially his *ventricoſa*, which bears tubular curved ſcarlet flowers, with projecting ſtamens, like ſome of the fineſt *Ericæ*. All the ſpecies are ſhrubby, except *G. pumila* of Swartz, whoſe leaves reſemble a *Primula* or *Ajuga*, and *G. acaulis* of Linnæus, Sp. Pl. 850. (Rapunculo affinis, &c. Sloane Jam. v. 1. t. 102. f. 1.) both which are herbaceous, and ſcarcely riſe above the ground. The *leaves* in all are ſimple, alternate, moſtly ſtalked, more or leſs crenate, toothed, or ſerrated, rough or ſmooth. *Flowers* corymboſe, moſtly on a long common ſtalk. *Corolla* variouſly ſhaped in different ſpecies, but always more or leſs curved, from above one to two inches long. They chiefly grow in rocky, ſhady, mountainous places in Jamaica, or in Hiſpaniola. Full deſcriptions of all that Dr. Swartz has obſerved may be found in his Fl. Ind. Occ. v. 2. 1015—1031.

GESORIACUM, in *Ancient Geography*, a town of Gaul, belonging to the Morini; now *Boulogne*.

GESSENE, in *Geography*, a town of Bohemia, in the circle of Boleſlau; nine miles N. E. of Turnau.

GESSERIT, Quamdiu. See Quamdiu *ſe bene geſſerit*.

GESSES is the furniture belonging to a hawk. See Jesses.

GESSI, Francesco, in *Biography*, a favourite diſciple and imitator of Guido Rheni in the art of painting, ſome of whoſe works are little inferior to thoſe of his maſter, and are often ſold for his. He is generally known by a want of fulneſs of execution, and of energy in his actions.

GESSIGO Point, in *Geography*, a cape of Ireland, in the county of Sligo, at the northern extremity of Sligo bay. N. lat. 54° 22′. W. long. 8° 33′.

GESSO, a town of Naples, in Abruzzo Citra; 15 miles N. E. of Civita Borella.

GESSOPS, a town of the ſtate of Maryland, in America; eight miles E. S. E. of Fort William.

GESSOR, a name uſed by ſome of the Arabian writers for galbanum.

GESTA, in *Geography*, a town of Sweden, in Weſt Gothland; 23 miles N. E. of Uddevalla.

GESTATION, Uterine, or *utero-geſtation*, in *Midwifery*, the bearing or containing a fœtus in the womb. See Conception.

Gestation is alſo a term in the *Ancient Medicine*, uſed for a ſort of exerciſe, by us called carriage.

It conſiſted in making the patient ride on horſeback, or in a chariot, or a boat; or even in rocking him in his bed, if he could not endure a more violent agitation.

Aſclepiades firſt brought frictions and geſtation into practice. The deſign of geſtation was to recover ſtrength, after a fever, &c. was gone.

GESTE, in *Geography*, a town of France, in the department of the Mayne and Loire; 12 miles N. W. of Chollet.—Alſo, a river of Germany, which runs into the Weſer, near its mouth; called alſo *Geiſte*.

GESTICULATION, the making of affected, indecent, or unſuitable geſtures, or even of proper ones in too great number. Geſticulation is a grievous fault in an orator.

GESTINEN, in *Geography*, a town of Switzerland, in the canton of Uri; 15 miles S. of Altorff.

GESTRICIA, a province of Sweden, about 51 miles long and 10 wide; bounded on the N. by Helſingland, on the E. by the gulf of Bothnia, on the S. by Upland, Weſtmanland, and Dalecarlia, and on the W. by Dalecarlia. The inhabitants do not concern themſelves with agriculture, but derive their chief ſupport and wealth from mines, forges, foreſts, lakes, and rivers. The capital of this province is *Gefle*, which ſee.

GESTU *et Fama*, in *Law*, an ancient writ, where a perſon's good behaviour was impeached; now out of uſe.

GESTUNGSHAUSEN, or Geshausen, in *Geography*, a town of Germany, in the principality of Coburg; ſeven miles E. of Coburg.

GESTURE, a motion of the body, intended to ſignify ſome idea or paſſion of the mind.

Quintilian defines geſture, *totius corporis motus & conformatio*. Geſtures are a kind of natural language, which ſupplies the uſe of ſpeech in thoſe naturally dumb. The mimes and pantomimes were very great proficients in the ſtyle of geſture.

Geſture conſiſts principally in the action of the hands and face; and may be defined, a ſuitable conformity of the motion of the countenance, and of ſeveral parts of the body, in ſpeaking of the ſubject matter of the diſcourſe. (See Action.) With regard to oratory, geſture may properly be called the ſecond part of pronunciation; in which, as the voice ſhould be ſuited to the impreſſions it receives from the mind, ſo the ſeveral motions of the body ought to be accommodated to the various tones and inflections of the voice. When the voice is even and moderate, little geſture is required; and nothing is more unnatural and diſguſting than violent motion, in diſcourſing upon ordinary and familiar ſubjects. The motions of the body ſhould, therefore, riſe in proportion to the vehemence and energy of the expreſſion, as the natural and genuine effect of it.

Geſture is either *natural*, or from *imitation*. The former denotes ſuch actions and motions, either of the whole body, or of ſome particular part of it, as naturally accompany our words, juſt as theſe reſult from the impreſſions of our minds. As to the whole body, it ſhould not continue long in the ſame poſition, but be conſtantly changing, with a gentle and moderate motion. As to the ſeveral parts of the body, the head is the moſt conſiderable: to lift it up too high, has the air of arrogance and pride: to ſtretch it out too far, or throw it back, appears clowniſh and unmannerly; to hang it downwards on the breaſt, ſhews an unmanly baſhfulneſs and want of ſpirit; and to ſuffer it to lean on either ſhoulder, argues ſloth and indolence: in calm and ſedate diſcourſes, the head ſhould keep its natural ſtate and upright poſture, occaſionally moving, and turning gently, ſometimes on one ſide, and ſometimes on the other, as occaſion requires, and then returning back to its natural poſition. It ſhould always accompany the other actions of the body, except in averſion, which is expreſſed by ſtretching out the right hand, and turning the head to the left. But nothing is more indecent than violent motions and agitations of the head.

The paſſions are principally repreſented by the countenance; and the ſeveral parts of the face contribute to the proper and decent geſture of the whole. In a calm and ſedate diſcourſe, all the features retain their natural ſituation. In ſorrow, the forehead and eye-brows lower, and the cheeks hang down; but in expreſſions of joy and chearfulneſs, the forehead and eye-brows are expanded, the cheeks contracted, and the corners of the mouth drawn upwards. Anger and reſentment contract the forehead, draw the brows together, and thruſt out the lips; and terror elevates both the brows and forehead. To theſe natural ſigns of the paſſions, the orator ſhould endeavour to conform.

The motions of the eyes require the moſt careful management; becauſe, as Cicero obſerves, (De Orat. lib. iii. cap. 59.) other parts of the countenance have but few motions; whereas all the paſſions of the ſoul are expreſſed in the eyes by ſo many different actions, that cannot poſſibly be repreſented by any geſtures of the body, if the eyes be kept in a fixed poſture. Thus, in ſpeaking on pleaſant and delightful ſubjects, the eyes are briſk and chearful; but they ſink and are languid in delivering any thing melancholy and ſorrowful. In anger, the eyes diſcover a certain vehemence and intenſeneſs; in expreſſions of hatred and deteſtation, the eyes are turned either aſide or downwards: thus Virgil has expreſſed Dido's reſentment and diſdain of Æneas,

> "Illa ſolo fixos oculos averſa tenebat."
> Æn. lib. vi. ver. 469.

The eyes are alſo ſometimes turned downwards, to expreſs modeſty; and they ſhould be always turned towards the object which is addreſſed. A gentle and moderate motion of the eyes is commonly moſt ſuitable, whereby they may be directed to ſome of the audience with an air of reſpect and modeſty; but their motions ought to vary, according to the different nature of the paſſions which they are deſigned to diſcover in the ſpeaker, and convey to his hearers.

The ſhoulders ſhould neither be elevated nor depreſſed: a continued motion of the arms ſhould be avoided; their action ſhould be very moderate, and follow that of the hands, which need never be idle: Quintilian lays great ſtreſs on the action of the hands, when he ſays, "The hands, without which all geſture is lame and weak, have a greater variety of motions than can well be expreſſed: for they are almoſt equal to our words. Do we not deſire with them, promiſe, call, diſmiſs, threaten, beſeech, deteſt, fear, enquire, deny? Do not they expreſs joy, ſorrow, doubt, confeſſion, penitence, meaſure, plenty, number, and time? Do not they excite reſtraint, prove, admire, and ſhame? That in ſo great a variety of ſpeech among all nations and countries, this ſeems to me the common language of mankind." Inſt. Orat. lib. xi. cap. 3.

As all bodily motion is either upward or downward, to the right or left, forward or backward, or circular, the hands are employed by the orator in all theſe, except the laſt; and as they ſhould correſpond with our expreſſions, they ought to begin and end with them. In admiration, and addreſſes to heaven, they muſt be elevated, but never raiſed above the eyes; and in ſpeaking of things below us, they are directed downwards. Side motion ſhould generally begin from the left, and terminate gently on the right: in demonſtrating, addreſſing, and on ſeveral other occaſions, they are moved forward; and in threatening, ſometimes thrown back: when the orator ſpeaks of himſelf, his right-hand ſhould be gently laid on his breaſt. When no other motion is neceſſary, the hands ſhould be kept about as high as the breaſt, ſo as to make nearly a right angle with the arm. They ſhould never be ſuffered to hang down, nor to loll upon the cuſhion or bar. The left-hand ſhould never move alone, but accommodate itſelf to the motions of the right: in motions to the left, the right-hand ſhould not be carried beyond the left ſhoulder: in promiſes and expreſſions of compliment, the motion of the hands ſhould be gentle and ſlow; but in exhortations and applauſe, more ſwift. The hands ſhould be generally open; but in expreſſions of compunction and anger, they may be cloſed. Neither the breaſt nor the belly ſhould be thruſt out; the trunk ſhould be eaſy and flexible, ſuiting itſelf to the motions of the head and hands; and the feet ſhould be kept ſteady.

There are other geſtures, which ariſe from *imitation*, as when the orator deſcribes ſome action, or perſonates another ſpeaking: but here he ſhould be careful not to overact his part, by running into any ludicrous or theatrical mimicry, or changing his action or voice in a manner unſuitable to his own character. See farther on this ſubject, Ward's Oratory, vol. ii. p. 344, &c. p. 360, &c. Sheridan's Lect. on Elocution, lect. vii. p. 113, &c. See alſo ACTION, IMITATION, PRONUNCIATION, and VOICE.

GESTUS BONUS, in *Law*. See GOOD *a-bearing*.

GESVALDO, in *Geography*, a town of Naples, in Principato Ultra; 13 miles N.W. of Conza.

GESVES, a river of Africa, which runs into the Atlantic, a little to the north of the iſland of Biſſagos.

GESULA. See GEZULA.

GETA, SEPTIMIUS, in *Biography*, ſecond ſon of the emperor Severus, and brother and partner of Caracalla, was born at Milan in 189, and was raiſed to the title of Auguſtus. In the eighth year of his age he was moved with compaſſion at the fate of ſome of the partiſans of Niger and Albinus, who had been ordered to be executed, and his father, ſtruck with the humane feelings of his child, remitted the ſentences. Though he was not free from the vices of an heir to the empire, yet the mildneſs of his diſpoſition made him a greater favourite with the people than his brother, and this circumſtance inflamed their mutual hatred. On the death of Severus both princes ſucceeded to a joint ſovereignty, but their union was of ſhort duration. Caracalla, jealous of his brother's popularity, ordered him to be poiſoned, and when he found the infamous act could not be effected, he murdered him with his own hands in the preſence of his mother Julia, who, in the attempt to defend her favourite ſon, was ſeverely wounded in the arm by Caracalla. Geta had not reached the twenty-third year of his age when he fell a victim to the brutality of his brother. Before his death, Severus had, in the anguiſh of a diſappointed father, foretold that the weaker of his ſons would fall a ſacrifice to the ſtronger, who, in his turn, would be ruined by his own vices. Univer. Hiſt. Gibbon's Rom. Hiſt. See alſo the article CARACALLA.

GETA, in *Geography*, a town of Sweden, on the N. coaſt of the iſland of Alan. N. lat. 60° 25'. E. long. 9° 50'.

GETÆ, or GETES, a tribe of Scythians, who, according to Herodotus (l. iv.), inhabited that part of Thrace which is near the Iſter or Danube. Strabo ſays (l. vii.) that they had the ſame language with the Thracians, and he repreſents them as occupying thoſe arid and uncultivated plains which lie along the ſea-coaſt between the mouths of the Iſter and that of the Tyras, in which the army of Darius, in its march againſt the Scythians, was in danger of periſhing for want of water. Pliny (l. iv. c. ii.) ſays, that they inhabited that declivity of Mount Hæmus which is turned towards the Danube. Under the empire of Trajan, the Getæ were ſubjected to the Roman dominion. Herodotus ſpeaks of Zamolxis as the legiſlator of the Getæ, and he ſays that from him they derived the dogma of the ſoul's immortality; and Trajan attributed to this principle the intrepidity with which they encountered death in the perils of war. The Getæ poſſeſſed only a ſmall ſpace along the coaſt, but their territory extended to a conſiderable diſtance in the interior of the country. Thoſe who inhabited the weſtern part in aſcending the Danube, were called "Dacians;" but thoſe who were more appropriately denominated Getæ, occupied the eaſtern parts near the Euxine ſea; and thoſe who inhabited the banks of the river Tyras, were called "Tyrigetes." They had all the ſame language. Theſe people were continually intermixing themſelves with the Scythians, Baſtarnæ, Sarmatians, Mœſians, and Thracians. The Getæ were without doubt the ſame people with thoſe who were called Goths, and whoſe migrations were ſo extenſive. See Goths.

GE-TCHAO, a town of China, of the third rank, in Chang-tong; 27 miles E.S.E. of Lu.

GETE, part of the country of the Eluts, in Chineſe Tartary, ſo called even to the time of Timur, is regarded by ſome geographers as the country of the ancient Maſſagetæ, towards the lakes of Palkati, Balkaſh or Tengis, and Zaizen. The contaiſch, or great Khan, uſed chiefly to reſide at Harcas, or Erga, on the river Ili, which flows from the S.E. into the lake of Balkaſh. See Jats.

GETHSEMANE, in *Scripture Geography*, a village in the mount of Olives, whither Jeſus ſometimes retired, and in a garden of which he endured his agony, and was taken by Judas. Matt. xxvi. 36, &c.

GETHYLLIS, in *Botany*, (γηθυλλις, is an ancient Greek name for ſome ſort of pot-herb of the onion-tribe, and is therefore well-enough applied to this bulbous plant, as it appears to be derived from γηθος, *gaiety* or *joy*, and may allude to the beauty of its bloſſoms.) Thunb. Nov. Gen. 13. Linn. Gen. 235. Suppl. 27. Schreb. 228. Willd. Sp. Pl. v. 2. 104. Mart. Mill. Dict. v. 2. Juſſ. 54. (Papiria; Thunb Act. Lund. p. 1. ſect. 2. 111.)—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Spathaceæ*, Linn. *Narciſſi*, Juſſ.

Gen. Ch. *Cal.* none, except an obliquely truncated cylindrical ſheath. *Cor.* of one petal, ſuperior; tube very long, thread-ſhaped; limb widely ſpreading, regular, in ſix deep, elliptic-oblong, equal ſegments. *Stam.* Filaments ſix, inſerted into the mouth of the tube, ſhorter than the limb, often divided; anthers linear, vertical, rolled inwards, often two to each filament. *Piſt.* Germen inferior; ſtyle ſimple, capillary, longer than the ſtamens; ſtigma capitate. *Peric.* Berry club-ſhaped, obtuſe, radical, ſeſſile on the bulb itſelf, ſomewhat fleſhy, of one cell. *Seeds* imbedded in pulp, globoſe, ſmooth, lying over each other in a triple ſeries.

Eſſ. Ch. Corolla with a very long thread-ſhaped tube; limb in ſix deep ſegments. Berry radical, club-ſhaped, of one cell. Seeds numerous.

Obſ. Linnæus, miſled by the occaſional luxuriance of the ſtamens, placed this genus in the claſs *Dodecandria*.

Four ſpecies are defined in Willdenow, beſides his and Jacquin's G. *plicata*, Hort. Schoenbr. v. 1. 42. t. 80, which is *Hypoxis plicata* of Linnæus, and we are at a loſs to diſcover why it is removed to *Gethyllis*, for which no reaſon is given, nor does the deſcription in Jacquin ſuggeſt any, except the length of the tube. The fruit, when known muſt decide this queſtion.

G. *ciliaris*, Linn. Supp. 198. Jacq. Hort. Schoenbr. v. 1. 41. t. 79, is a good example of the genus. The *bulb* is globoſe, with a very ſtrong tuberous baſe, and thick fibres. *Stem* none. *Leaves* ſeveral, three or four inches high, linear, obtuſe, fringed, ſpirally twiſted. *Flower* the height of the leaves, greeniſh-white, the ſize of a daffodil.

G. *ſpiralis*, Gawler in Curt. Mag. t. 1088, has a white flower, externally purpliſh, and very narrow, flat, ſmooth leaves. It is diſtinguiſhed in that work from the original ſpecies G. *afra*, Linn. Sp. Pl. 633. Herb. Linn. on the authority of ſome ſpecimens and drawings of the late excellent Mr. Maſſon, in the hands of Meſſrs Lee and Kennedy, in which both plants are well defined. According to this authority, G. *afra* is ſaid to have properly twelve ſtamens. Thunberg certainly confounded theſe two.

All the ſpecies of *Gethyllis* have the habit of a *Colchicum*, but the berry, ſaid to be very pleaſantly ſcented and well-taſted, is their ſtriking characteriſtic. They are natives of the Cape of Good Hope, rarely ſeen in our gardens, where they do not eaſily bloſſom.

GETONIA, a name given by Dr. Solander, and, as we preſume, derived from γητης, *a ruſtic*, but of its application in the preſent inſtance we have no information. Roxb. Coromand. v. 1. 61. (Calycopteris; Lamarck Illuſtr. t. 357.)—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Holoraceæ*, Linn. *Eleagni*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, ſuperior, deeply divided into five equal, elliptical, obtuſe, ſpreading ſegments, permanent. *Cor.* none. *Stam.* Filaments ten, ſhorter than the calyx, inſerted in two rows into the lower part of its ſegments, capillary, erect; anthers incumbent, roundiſh. *Piſt.* Germen inferior, ovate, furrowed; ſtyle thread-ſhaped, ſhorter than the ſtamens; ſtigma ſimple. *Peric.* none, except the cruſt of the ſeed, which is ovate, furrowed, crowned with the large withered calyx. *Seed* ſolitary, ovate.

Eſſ. Ch. Calyx in five deep ſegments, ſuperior. Corolla none. Seed coated, crowned with the enlarged withered calyx.

1. G. *floribunda*. Roxb. Corom. v. 1. 61. t. 87.—Native of foreſts on the coaſt of Coromandel, where it was firſt noticed by Kœnig, flowering in February and March. The *ſtem* is woody and climbing, with long, round, leafy branches, downy like the whole plant. *Leaves* oppoſite, ſtalked, ovate, acute, entire, about two inches long. *Flowers* in axillary and terminal, compound leafy cluſters, with oppoſite ſtalks, inodorous, greeniſh-white. *Seed* and permanent calyx of a ruſty hue.—The natives call this ſhrub Bandy-moorroodoodoo.

We have no doubt of the propriety of Lamarck's ſynonym, which our lamented predeceſſor, the Rev. Mr. Wood, not knowing the *Getonia*, could ſcarcely aſcertain. (See Calycopteris.) If we be right, the main branch in Lamarck's plate is diminiſhed, the ſeparate fruits only, and permanent ſtamens, being of the natural ſize.

GETTYSBURGH, in *Geography*, a ſmall poſt-town of America, in the ſtate of Pennſylvania and Adams county, ſituated at the head of Rock creek, one of the head-waters of the Monococy; containing about 30 houſes; 9 miles N. of the Maryland line, and 118 W. by S. from Philadelphia.

GETZENDORFF, a town of Auſtria, ſeated on the river Raiſenpach; 12 miles S.E. of Vienna.

GEVASI, a town of the Arabian Irak, on the Tigris; 95 miles S.E. of Bagdad.

GEVAUDAN, a mountainous country of France, ſo called before the revolution, ſituated in Languedoc; of which Mende was the capital.

GEVES, a town of Africa, ſituated on a river of the ſame name, S. of the river St. Domingo.

GEUL, a river of France, which runs into the Meuſe, about 5 miles below Maeſtricht.—Alſo, a town of France, in the department of the Lower Meuſe; 5 miles N. of Wyck.

GEUM, in *Botany*, is mentioned by Pliny, though we learn nothing from that author reſpecting the derivation of its name. Ambroſinus conjectures that it comes from γαιω, *to be ſplendid*, becauſe its beautiful flowers and ſeeds are the boaſt and glory of the Alps.—Avens, or Herb-bennet.—Linn. Gen. 256. Schreb. 343. Willd. Sp. Pl. v. 2. 1113. Lamarck. Illuſtr. t. 443. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 554. Juſſ. 338. Gærtn. t. 74. (Caryophyllata; Tourn. t. 151. Lamarck. Dict. v. 1. 398.) Claſs and order, *Icoſandria Polygynia*. Nat. Ord. *Senticoſæ*, Linn. *Roſaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, in ten ſegments, rather upright; the alternate ſegments very ſmall, acute. *Cor.* Petals five, rounded; claws narrow, the length of the calyx, into which they are inſerted. *Stam.* Filaments numerous, awl-ſhaped, of an equal length with the calyx, and inſerted into it; anthers ſhort, broadiſh, obtuſe. *Piſt.* Germens numerous, collected into a head; ſtyles inſerted into the ſide of each germen, hairy, long; ſtigmas ſimple. *Peric.* none; common receptacle of the ſeeds oblong, hairy, placed on the reflexed calyx. *Seeds* numerous, compreſſed, rough; each tipped with the long geniculated ſtyle.

Eſſ. Ch. Calyx in ten ſegments, inferior. Petals five. Seeds with a jointed awn. Receptacle columnar.

Only five ſpecies of *Geum* are deſcribed by Linnæus in the laſt edition of his Species Plantarum, though in Willdenow's edition we meet with eleven of this genus, of which number G. *urbanum* and *rivale* are the only Britiſh ones, and to which we are enabled, by the aſſiſtance of Dr. Smith, to add two nondeſcripts from his herbarium.

1. G. *urbanum*. Common Avens, or Herb-bennet. Linn. Sp. Pl. 716. Engl. Bot. t. 1400.—" Leaves ternate. Stipulas rounded and cut. Flowers erect. Awns of the ſeeds hooked, naked."—Frequent in woods and hedges, perennial, flowering from May to Auguſt. The *root* is fibrous, and ſlightly aromatic. *Stem* erect, about two feet high, branched at the upper part, clothed with deflexed hairs. *Leaves* unequally ternate, hairy, lobed and cut. *Stipulas* very large. *Flowers* terminal, ſolitary, erect, yellow, with petals ſhorter than the calyx. *Seeds* rather hairy, with naked purpliſh awns.

2. G. *rivale*. Water Avens. Linn. Sp. Pl. 717. Engl. Bot. t. 106.—" Radical leaves lyrate. Stipulas ovate, acute, cut. Flowers drooping. Awns twiſted and feathery."—Found in meadows and moiſt woods more commonly than is uſually imagined, perennial, flowering in June and July. *Root* ſpreading, woody, aſtringent and aromatic, ſometimes of uſe in intermittent fevers. *Stem* about a foot high, drooping at the top. *Leaves* lyrate, or confuſedly pinnate, ſerrated, hairy. *Petals* erect, never fully expanding. The general appearance of this elegant ſpecies, an univerſal favourite amongſt botaniſts, is thus juſtly deſcribed in Engliſh Botany, " the rich combination of the dark-green wrinkled leaves, with the glowing red-brown of the ſtem and calyx, and ſingularly delicate colour of the petals, added to the graceful poſition of the flowers, render this one of the moſt pictureſque of our native plants."

3. G. *virginianum*. American Avens. Linn. Sp. Pl. 716. (G. canadenſe; Jacq. Hort. v. 2. 82. t. 175.)—" Stem-leaves ternate; the upper ones lanceolate. Stipulas oblong. Flowers erect. Awns of the ſeeds naked, hooked."—Native of North America, from whence it was introduced by Mr. P. Miller in 1739. It is nearly allied in habit to G. *urbanum*, but the *petals*, which are ſhorter than the *calyx*, are white, and the whole plant is of a greener hue. Its *leaflets* are alſo more attenuated towards the baſe. It flowers in June, and is a hardy perennial. *Root* inodorous. *Radical-leaves* generally bipinnate. *Seeds* ſmooth.

4. G. *ſtrictum*. Upright Avens. Willd. Sp. Pl. v. 2. 1113. (G. aleppicum; Jacq. Ic. Rar. v. 1. 10. t. 93.)—" Stem-leaves pinnate; leaflets and ſtipulas cloven and cut. Flowers erect. Petals longer than the calyx. Awns of the ſeeds naked, hooked."—Native of North America. A hardy perennial, flowering in June and July. *Flowers* yellow. *Fruit* hairy. The whole plant is covered with whitiſh hairs.

5. G. *japonicum*. Japan Avens. Willd Sp. Pl. v. 2. 1114. Thunb. Japon. 220.—" Leaves ſimple, moſtly three-lobed, ſhaggy. Flowers erect. Fruit hairy. Awns naked."—There is no figure of this ſpecies, which is perennial, and grows in Japan. *Stem* round, rather more than a foot high. *Flowers* terminal, with petals as long as the calyx. *Seeds* ovate, covered with greyiſh hairs.

6. G. *pyrenaicum*. Pyrenean Avens. Willd. Sp. Pl. v. 2. 1115. (Caryophyllata pyrenaica, ampliſſimo et rotundiori folio, nutante flore; Tourn. Inſt. 295.)—" Flowers drooping. Petals longer than the calyx. Awns hairy, twiſted at the baſe."—This is taken up by Willdenow from Tournefort, and is perennial, found on the Pyrenées. Its appearance is ſimilar to G. *rivale*, but differs in the large ſize of its radical leaves, and ſhape of its awns, which are thinly covered with hairs, and naked at the top. *Stem* erect, about a foot and half high. *Seeds* very woolly.

7. G. *atlanticum*. Avens of Mount Atlas. Willd. Sp. Pl. v. 2. 1116. Desfont. Atlant. v. 1. 402.—" Lower-leaves pinnate. Stem generally ſingle-flowered. Fruit hairy. Awns twiſted."—A native of Mount Atlas, perennial. *Stem* nearly two feet high, ſimple. *Stipulas* large, ovate, cut. *Flowers* yellow. This is nearly allied to G. *montanum*, but differs in having fewer leaflets, a taller ſtem, and twiſted, not bearded, awns.

8. G. *potentilloides*. Siberian Avens. Willd. Sp. Pl. v. 2. 1116. (Dryas geoides; Jacq. Hort. v. 3. 38. t. 68.)—" Leaves pinnate, toothed. Stem with about two flowers. Calyx of the fruit erect. Awns ſtraight, naked."—Native of the mountains of Siberia, and introduced into Kew gardens in 1780 by Dr. Pallas. We have it from Chelſea garden. It flowers in June, and is a hardy perennial. *Root* inodorous, but with an aromatic taſte. *Petals* yellow, larger than the diviſions of the *calyx*. *Seeds* with long awns.

9. G. *montanum*. Great Mountain Avens. Linn. Sp. Pl. 717. Jacq. Auſtr. v. 4. t. 373.—" Leaves pinnate, hairy; the outer leaflet very large, round; the lower ones regularly decreaſing. Stem ſingle-flowered. Awns upright, ſhaggy."—This, and the following ſpecies (G. *reptans*) are found moſt abundantly on the higheſt alps of Auſtria and Switzerland, where they are extremely ornamental during the months of July and Auguſt. Mount Cenis is deſcribed by travellers as a favourite habitat of theſe beautiful plants. The *root* of G. *montanum* is fibrous, aſtringent, and ſomewhat aromatic. *Stem* round, leafy, from three or four inches to a foot in height, erect, generally ſingle-flowered, ſimple. *Petals* roundiſh, yellow, longer than the *calyx*. *Seeds* oval, brown, with a long feathery *awn*.

10. G. *reptans*. Creeping Avens. Linn. Sp. Pl. 717. Jacq. Auſtr. v. 5. 38. t. app. 22.—" Leaves pinnate, cut,

hairy. Runners of the ſtem creeping. Stem ſingle-flowered. Awns upright, ſhaggy."—Place of growth and time of flowering ſame as in the preceding ſpecies. *Root* yellowiſh. *Runners* long, reddiſh. *Flower-ſtalks* erect, reddiſh, ſhaggy. *Petals* five or eight, ſometimes ten, large, yellow. *Seeds* retaining the *ſtyle*, which is broken off in the middle and looks like a jointed *awn*.

11. G. *anemonoides*. Anemone Avens. Willd. Sp. Pl. v. 2. 1117.—" Leaves pinnate, ſmooth; leaflets wedge-ſhaped, toothed at the top. Stem ſingle-flowered. Awns upright, ſhaggy."—There is no figure of this rare ſpecies extant. Willdenow has very properly reduced it to *Geum*, though the plant was formerly known as *Dryas pentapetala*. (Linn. Sp. Pl. 717.) Native of Kamtſchatka. *Root* perennial, throwing out filiform, woody *creepers*. *Stipulas* narrow. *Petals* five, large, round, white, ſpreading. *Seeds* numerous, tipped with an hairy awn, and longer than the *flower*. It appears by the Linnæan Herbarium to be a very elegant ſpecies.

12. G. *parviflorum*. Small White Avens.—Radical leaves lyrate, taller than the ſtem. Stipulas cut. Flowers nearly ſeſſile. Petals ſhorter than the calyx. Awns feathery.—Gathered by Commerſon in the ſtraits of Magellan. The radical *leaves* are interruptedly lyrate, hairy, bluntly cut and crenate, about three inches long, moſt reſembling thoſe of G. *rivale*. *Stem* ſolitary, ſcarcely two inches high, clothed with ſhort denſe hairs, and bearing two or three ternate wedge-ſhaped leaves, and as many ſmall, nearly ſeſſile *flowers*, which appear to be ſomewhat drooping, but this can ſcarcely be determined by the dried ſpecimen. The *petals*, ſaid by Commerſon to be white when freſh, are ſmaller than the ſegments of the *calyx*. *Germens* hairy as in G. *rivale*.

13. G. *calthifolium*. Marſh-marigold leaved Avens.—Radical leaves kidney-ſhaped, almoſt circular, ſharply crenate; on ſlightly leafy ſtalks. Calyx turbinate, with lanceolate ſegments. Awns hairy.—Gathered by Mr. Menzies on the weſt coaſt of North America.—This is remarkable for the reſemblance of its radical leaves in ſhape and ſize to thoſe of *Caltha paluſtris*, except their being ſlightly hairy, and their long footſtalks being furniſhed with a few little oblong or three-lobed leaflets, indicating an approach to a lyrate leaf altogether. *Stem* above a foot high, erect, bearing three or four ſmaller, ſeſſile rounded *leaves*, more deeply crenate or cut, and terminating in about three *flowers*, on ſlender ſtalks. *Calyx* hairy at its baſe, turbinate; its ſegments oblong-lanceolate, obtuſe, at length erect, the larger ones equal in length to the *petals* which are yellow and broad, like thoſe of a common Crowfoot. *Awns* ſtraight, bluntiſh, hairy in the lower part, poſſibly becoming hooked at an advanced period.

Geum *Urbanum*, in the *Materia Medica*, is a common Britiſh plant, called *Avens*, in woods and hedges, flowering from May till Auguſt. The root, which is the part medicinally employed, has an aromatic and ſomewhat aſtringent taſte, and a pleaſant ſmell of the clove kind, eſpecially when it is produced in dry and warm ſoils. It gives out its aſtringent matter equally to watery and ſpirituous menſtrua; but its aromatic part moſt perfectly to the latter. In diſtillation with water it yields a ſmall quantity of whitiſh concrete oily matter, of a very grateful fragrance. This plant, though little uſed in Britain, is held in great eſtimation for various virtues on the continent; but the character, under which it has been received ſince the year 1780, is that of a febrifuge; many inſtances having been adduced of its efficacy in obſtinate intermittents, after the Peruvian bark had failed. It is ſaid that a tincture of the root, made in the proportion of four ounces of the root digeſted with a quart of brandy in a ſand heat, and given in the quantity of half an ounce or more, two, three, or four times a day, ſeldom fails to cure agues. Others have given it with equal ſucceſs in decoction, powder, or electuary, in the proportion in which the Cinchona bark is commonly employed. This root has alſo been found uſeful in ſeveral chronic diſorders, as a general tonic and aſtringent; and experiments made by Buchhave evince its antiſeptic power to exceed that of Peruvian bark. Woodville, Med. Bot.

GEVOLLUNG, in *Geography*, a town of Auſtria; eight miles S. of St. Polten.

GEVREY, a town of France, in the department of the Côte d'Or, and chief place of a canton, in the diſtrict of Dijon; 7 miles S. of Dijon. The place contains 1128, and the canton 7894 inhabitants, on a territory of 260 kiliometres, in 36 communes.

GEVUINA, in *Botany*, a barbarous Chili name, adopted by Molina.—Juſſ. 424.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. uncertain.

Gen. Ch. *Cal.* none. *Cor.* Petals four, placed croſswiſe. *Stam.* Filaments four, two of them very ſhort. *Piſt.* Germen ſuperior, ſimple; ſtyle one; ſtigma thickiſh. *Peric.* Capſule nut-ſhaped, coriaceous, of one cell. *Seed* ſolitary. A *tree*, native of Chili, where Dombey and Molina have gathered it. The *leaves* are pinnated, compoſed of four or five pair with an odd one. *Flowers* terminal, ſpiked, two together, many of them abortive. *Fruit* eatable, like a hazel-nut, whence the Spaniards call it *Avellano*. *Seed* deſtitute of albumen. *Capſule* much like that of the *Calophyllum*. Juſſ.

GEUSS, John Michael, in *Biography*, was born in Holſtein in 1745. His father undertook the care of his education, and found in his ſon a turn for mathematical and philoſophical purſuits, which he encouraged, and by which he became diſtinguiſhed, and was choſen profeſſor of the mathematics in the univerſity of Copenhagen. His principal work was the " Theory of the Art of conſtructing Mines," in the compoſition of which he was aſſiſted by the MSS. of Belidor, which he had the good fortune to obtain, though they had been ſuppreſſed in France, after the death of that able engineer. He publiſhed alſo a " Treatiſe on the Art of conſtructing Mines." He gave a tranſlation in the German language, from the Daniſh, of Olafſen and Povelſen's voyage to Iceland, which was printed in two volumes 4to. He ſent ſeveral valuable papers to Brehm's, Ingenieur-und-Artillerie Magazin, and publiſhed a ſet of logarithmic tables.

GEUTZ, in *Geography*, a town of Germany, in the duchy of Anhalt-Cothen, near Cöthen.

GEWICZE, Gewitz, or *Geevitſch*, a town of Moravia, in the circle of Olmutz; 24 miles weſt of Olmutz. N. lat. 49° 45′. E. long. 16° 35′.

GEWOLD, Christopher, in *Biography*, flouriſhed in the ſeventeenth century. He was one of the aulic counſellors of Maximilian, firſt elector of Bavaria, who confided to his care the archives of the duchy, in order that he might make uſe of them as an hiſtorian. His works relate chiefly to the hiſtory of his own country; of theſe we may mention " Genealogia Sereniſſimorum Bojariæ Ducum, 1605." " Chronicon Monaſterii Reicherſpergenſis." " Delineatio Norici veteris, ejuſque Confinium;" and " Commentarius de Septem viratu Romani Imperii." Moreri.

GEX, in *Geography*, a ſmall territory of France, in the cidevant province of Burgundy, extending from Fort d'Ecluſe to the village of Croſſay, and from the town of Gex to Geneva, being ſeven leagues in length and three in breadth, watered by the Rhine and other ſtreams, and bounded on the weſt by mount Jura, which yields excellent paſtures. The principal articles of trade are cheeſe, wine, and coal. It now forms a part of the department of lake Leman.

Gex, a town of France, in the department of Leman, and chief place of a canton, in the diſtrict of Geneva, ſituated at the foot of mount St. Claude; 9 miles N. N. W. of Geneva. The place contains 2461, and the canton 9209 inhabitants, on a territory of 212½ kiliometres, in 14 communes. N. lat. 46° 20′. E. long. 6° 8′.

GEYER, a town of Germany, in the circle of Erzgeburg, ſituated in the midſt of mines, and having manufactures of vitriol, ſulphur, alum, and arſenic; 6 miles W. S. W. of Wolkenſtein.

GEYERSBERG, a town of Bohemia, in the circle of Konigingratz; 28 miles E. N. E. of Chrudim.

GEYRACH, a town of the duchy of Stiria; 9 miles S. S. E. of Cilley.

GEYSS, or Geysa, a town of Germany, in the biſhopric of Fulda, ſituated on the Ulſter; 15 miles N. E. of Fulda. N. lat. 50° 43′. E. long. 10°.

Geyss *Rucken Jaſſelek*, a mountain of Germany, which ſeparates Upper Carniola from the county of Cilley; 6 miles N. E. of Stein.

GEYSZING, New, a town of Saxony, in the margraviate of Meiſſen; 12 miles S. E. of Pilnitz.

GEZAEL, a town of the Arabian Irak, on the Euphrates; 120 miles W. N. W. of Baſſora.

GEZAN, or Dsjesan, a ſea-port town of Arabia Felix, in the principality of Abu-Ariſch (ſee *Abu*-Arisch); 23 miles W. of Abu-Ariſch, the capital of the principality. This province of Gezan, ſituated on the Arabic gulf, and in a fertile country, carries on a conſiderable trade in ſenna, of which great plenty is furniſhed by the circumjacent territory, and alſo in coffee, which is brought hither from the mountains of Haſchid-u-Bakil. It has a trade likewiſe with the ports on the oppoſite ſide of the Arabic gulf; but has no intercourſe with the ſubjects of the Imam.

GEZEID, a town of Egypt, on the right bank of the Nile; 27 miles N. N. W. of Cairo.

GEZIRA, or Jasseera, a town of Aſiatic Turkey, and capital of a pachalic, in the province of Diarbekir, on the right bank of the Tigris. The whole province of Diarbekir is alſo called "Al Gezira;" 75 miles S. E. of Diarbekir. N. lat. 37° 16′. E. long. 40° 42′.

GEZIRA Cubros, in the *Materia Medica of the Ancients*, a name given to talc by Avicenna, Serapion, and others. Theſe authors do not give any explication of what ſort of ſubſtance they mean by this name, but ſeem to ſuppoſe it a thing univerſally known, and only give a liſt of its qualities.

GEZIRAT al Dahab, or *Gezirat Iddabab*, or the *Golden Iſland*, in *Geography*, an iſland in Lower Egypt, formed by canals cut from the left bank of the Nile, oppoſite to Faoua.

Gezirat al Teir, or *Iſland of Birds*, an iſland in the Red ſea. N. lat. 22° 18′. E. long. 37° 56′.

GEZULA, or Gesula, an inland province of the empire of Morocco, E. of the province of Suz, and N. of Vled de Nun: this, together with the province of Dra, lies in the vicinity of mount Atlas which, in this ſouthern part of the country, extends almoſt to the ſea. The inhabitants of this province are conſidered as the moſt ancient people of Africa. The country produces a great quantity of barley, and affords paſture for cattle: it has mines of iron and copper, of which are made various utenſils, that are exchanged for cloth, ſpices, horſes, and other neceſſaries. It has every year a fair, which laſts two months, for the ſale and exchange of cattle and merchandize in general. The people are free, being allies rather than ſubjects of Morocco. Their arms conſiſt of ſabres, large ſharp two-edged ſwords and lances. They are numerous, but have no towns, and they generally live in camps and villages.

GFOLL, a town of Auſtria; 8 miles W. N. W. of Crems.

GHALESKA, a town of Arabia Felix, which was once a famous city and ſea-port, but now ſunk into decay, about 20 cottages only remaining to ſhew the place where it ſtood, and the inhabitants are provided only with dates, and the milk and fleſh of a few ſheep; 20 miles S. of Hodeida.

GHALGHULUWA, in *Zoology*, the Ceyloneſe name of a ſpecies of Eaſt Indian ſerpent, a ſnake of a pale brown, variegated with tranſverſe ſtreaks of white, and found among rocks and ſtones.

GHAN is a name given in Muſcovy to caravanſeras.

GHANA, as Edriſi and Abulfeda call it, or Ghinny, in *Geography*, a city and capital of a kingdom in Africa, ſituated nearly midway between the Indian ſea and the Atlantic on the E. and W.; and between the Mediterranean and the Ethiopic ſeas on the N. and S.; and, therefore, conſidered by major Rennell as the point on which the *central* and *eaſtern* poſitions depend. This country lies on the borders of the Neel-Abeed, or Guin river, and is bounded on the N. by Caſhna or Kaſſina, on the E. by Wangara, on the S. by Melli or Lamlem, and on the W. by Mekzara and Kaſſina. The city is placed in Rennell's map on the north bank of the river. According to Edriſi, Ghana is diſtant 37 journies (each day's journey of Edriſi being about 19.06 geographical miles) from "Germa," through Agadez, or Agadoſt. Germa is an ancient and ruined city of Fezzan, about four journies E. S. E. of Mourzouk, in N. lat. 27° 25′. E. long. 16° 20′. Agadez is 25 of Edriſi's journies from Germa, bearing S. by W. or S. S. W. from the capital of Fezzan. Ghana is 12 days of Edriſi's ſcale to the ſouthward of Agadez, or about 229 geographical miles. It appears that Ghana lies ſomewhat to the eaſt of the line which paſſes through Agadez from Germa, and Mr. Rennell has taken 700 as the general line of diſtance from Germa to Ghana. Mr. Matra was told, at Morocco, that Ghinny (Ghana of Edriſi) was 40 journies from Kabra, the port of Tombuctoo, along the bank of the Niger. Theſe, taken at the caravan rate between Fezzan and Egypt, Morocco and Jarra, &c. that is, at 16.3 per day, produce 652 geographical miles. The interſection of this line with that from Germa places Ghinny in N. lat. 16° 10′. E. long. 13° 2′; in which poſition it ſtands at 760 miles from the city of Benin, on the coaſt of Guinea. For the further ſettlement of this important point in adjuſting the map of Africa, ſee Rennell's Proceedings of the African Aſſociation, p. 119, &c.

GHANARA, a city of Africa, the capital of Wangara, ſituated on a river, which runs into the Niger, or rather into a lake (the Lybia Palus of Ptolemy) formed by the Niger. N. lat. 13° 40′. E. long. 15° 40′.

GHASSA, or Gassa, capital of a diſtrict in the northern part of Bootan, in the Eaſt Indies, and the ſtation of a zompoon, or provincial governor. The higheſt mountain in its neighbourhood, whoſe head is eternally covered with ſnow, ſends forth a ſpring of water at its baſe of ſo great a degree of heat, that few are found capable of bearing, even for a ſhort time, any part of the body immerſed in it. It is ſituated near the ſpring-head of Pa-tchieu river. N. lat. 27° 53′. E. long. 89° 18′.

GHAT, a ſmall iſland in the river St. Lawrence. N. lat. 35° 30′. W. long. 93° 20′.

GHAVKANI, a town of Perſia, in the province of Irak; 25 miles E. of Iſpahan.

GHEBAN. See Geban.

GHEBRABA, a town of Perſia, in the province of Irak; 5 miles N.W. of Iſpahan.

GHEDI, a town of Italy, in the department of the Mela; 10 miles S. of Breſcia.

GHEDEMIS. See Gadamis.

GHEDEN, a town of Aſiatic Turkey, in the government of Sivas; 15 miles S. of Amaſieh.

GHEDMAN, a town of Perſia, in Choraſan; 18 miles S. of Herat.

GHEIRA, a town of Aſiatic Turkey, in Natolia; 38 miles N.N.E. of Mogla.

GHEIVE, a town of Aſiatic Turkey, in Natolia; 20 miles E.N.E. of Iſnik.

GHELA, a town of Arabia, on the coaſt of the Red ſea, anciently called "Ocelis;" 48 miles S.S.E. of Mocha.

GHELEN, Sigismond, in *Biography*, was born of a reſpectable family at Prague. When he had attained to a proper age for improvement by foreign travel, he went into France and Italy, and acquired an accurate knowledge of the languages of thoſe countries. On his return he [illegible] through Baſil, and made himſelf known to Eraſmus, at whoſe recommendation Froben engaged him as his corrector of the preſs, by which he gained a ſmall but competent maintenance. He ſoon aſſumed a higher office than that of corrector of proof-ſheets, and joined to it the duties of a critic and tranſlator. He publiſhed a dictionary of the Greek, Latin, German and Dalmatian languages; and annotations upon Pliny and Livy. He tranſlated from the Greek into Latin the Antiquities of Joſephus, ſome Homilies of Chryſoſtom, and many other learned works. Juſt before his death, which happened in 1554, he had employed his talents on, and nearly finiſhed, a verſion of Juſtin Martyr's works. Beſides thoſe already mentioned he was editor of many other works. He was acute and ingenious, and wrote with elegance and fluency. In his private character he was mild and placid, ſimple and ſincere. Moreri.

GHEMARA. See Gemara.

GHEME, in *Geography*, a town of Italy, in the department of the Gogna; 13 miles N.N.W. of Novara.

GHEMISH, a town of Aſiatic Turkey, in the government of Sivas; 24 miles W. of Amaſieh.

GHENNA. See Ghinna.

GHENT, a city of France, and chief place of a diſtrict, in the department of the Scheldt, formerly capital of Auſtrian Flanders, ſituated on the conflux of the rivers Scheldt, Lis, Moeze, and Lieve, which, together with a number of canals, interſect it in a variety of directions, and divide the town into 26 ſmall iſlands. It is encompaſſed by walls about 15 miles in circumference, and includes gardens and corn-fields. Since the French revolution it has been divided into four quarters, *viz.* North, South, Eaſt, and Weſt, and as many cantons. The former contains 15,000, and the correſponding canton 17,454 inhabitants, on a territory of 22½ kiliometres, in two communes; the ſecond, or ſouth, contains 15,000, and its canton 16,469 inhabitants, on a territory of 35 kiliometres, in two communes; the third, or eaſt, includes 13,000, and its canton 16,073 inhabitants, on a territory of 35 kiliometres, in three communes; and the fourth, or weſt, contains 13,000, and its canton 18,319 inhabitants, on a territory of fifteen kiliometres, in three communes. This city was firſt choſen for their habitation by the Nervii, and afterwards occupied by the Vandals, who gave it the name of "Wanda," whence the preſent appellation of Gand, or Ghent, is ſuppoſed to be derived. It was encompaſſed with walls by Odoacer, grand foreſter of Flanders, and has ſince been frequently enlarged, particularly in the year 1397, by order of Philip the Bold, 25th count of Flanders. The inhabitants were always warlike, and often engaged in military conteſts with their own princes, and with their neighbours, which were conducted in many inſtances with ſavage cruelty, and terminated in extenſive and ſanguinary ſlaughter. Ghent was the birth-place of Charles V., of whoſe nativity in their town the inhabitants had little reaſon to boaſt, as he loaded them with frequent and heavy impoſitions, chaſtiſed them with rigour for their occaſional revolts, and ſubjected the magiſtrates and ſeveral of the chief citizens to the moſt humiliating treatment. This conduct on his part inflamed their diſpoſition to revolt, and the conſequence was, that one of the fineſt cities in Europe was reduced to a ſtate of perfect ſolitude. However, it afterwards regained ſome ſmall portion of its ancient ſplendour, and became, at leaſt previouſly to times of recent confuſion, conſiderable. In November 1676, was concluded in this city the famous treaty called the "Treaty of Ghent," conſiſting of 25 articles, and amongſt others ſome of them ſtipulating that the Spaniſh and foreign troops ſhould leave the country, that the provinces of Holland and Zealand ſhould remain united with the others, that the Catholic religion ſhould be maintained, and that the ancient privileges of the country ſhould be ſecure; and this treaty was approved and ratified by Philip II., king of Spain. In 1678 Ghent was taken by Louis XIV., king of France, but reſtored to Spain at the treaty of Nimeguen in the ſame year; and it remained in their poſſeſſion till it was taken by the allies in 1706, after the battle of Ramillies. It was ſeized by the French in 1708, but recaptured by the allies under prince Eugene and the duke of Marlborough, in the ſame year. Ghent was erected into a biſhopric in 1559 by pope Paul IV., at the ſolicitation of Philip II., king of Spain, ſubject to the archbiſhop of Malines. It had, beſides the cathedral, ſix pariſh churches, and many religious houſes: ſome of the ſtreets are broad and well-paved, and the market places ſpacious, in the midſt of one of which is a ſtatue of Charles V., in his imperial habit. Ghent carries on a conſiderable trade in cloth, linen, lace, and ſilk manufactures, and is much aſſiſted, in favourable times, by two navigable canals; one to Sas-de-Ghent, and another to Bruges, Oſtend, &c. The magiſtracy conſiſts of burgomaſters, echevins, and common-council. John, the third ſon of Edward III., king of England, was born in this city, and from this circumſtance called John of Gaunt. In November 1792, the French took poſſeſſion of this city, but evacuated it on the retreat of Dumourier; however, they afterwards regained it in their progreſs through the country: 30 miles S.W. of Antwerp. N. lat. 51° 3′ 15″. E. long. 3° 43′ 20″.

GHER, a town of Africa, in the county of Sugulmeſſa, or Sijilmiſſa, on the Ziz, near mount Atlas; 90 miles N.W. of Sugulmeſſa.

GHERANGOL, a town of Africa, in the country of the Foulahs, on the S. ſide of the river Senegal. N. lat. 16° 40′. W. long. 14°.

GHEREDE, a town of Aſiatic Turkey, in Natolia; 28 miles E. of Boli.

GHERGISTEN Mountains, a chain of montains of Aſia, ſituated on the N. of the country of Candahar, 15 miles N. of Candahar.

GHERGONG, or Kirkanu, a town of Aſam, and capital of the country, on the Degoo, 160 geographical miles nearly E. by N. from Goalpurah. The houſes are conſtructed of wood, and each of them has a garden, or ſome cultivated ground in front, which gives the place a great extent. It is fortified, and has four gates, encompaſſed with a fence of bamboos, and incloſing villages and tilled fields; it is conſtructed of ſtone and earth. The rajah's palace is ſurrounded by cauſeways, planted with bamboos, and the ditch on the outſide is full of water; the palace contains many lofty and ſpacious apartments, particularly a ſaloon 150 cubits long and forty broad, ſupported by 66 pillars of wood at certain intervals. In the town there is a ſmall market, which, however, contains no ſhop-keepers, but the ſellers of betel; as the inhabitants lay up a ſtock of proviſions ſufficient to laſt them a year, and have no occaſion to purchaſe any for daily uſe. N. lat. 35° 30′. E. long. 93° 10′. See Asam.

GHERIAH, a ſea-port of Hindooſtan, on the weſt of Pirate coaſt, in the county of Concan; late the capital and principal port of Angria. It was ſtrongly fortified by the pirate Angria, from whom it was taken by admiral Watſon and colonel Clive, in the year 1756; 80 miles N.N.W. of Goa. N. lat. 16° 37′. E. long. 73° 8′.

GHERKINS. See Guerkins.

GHERMA, or Germa, in *Geography*. See Ghana.

GHERMANSIK, a town of Aſiatic Turkey, in Natolia; 15 miles E. of Scala-Nova.

GHERRI. See Gerri.

GHERUA, a town of Arabia, in the province of Lachſa, or Hadsjar; 45 miles W.N.W. of El Catif.

GHERZE', a town of Africa, in Tripoli; 50 miles S. of Meſurada. N. lat. 31° 28′. E. long. 14° 30′.

GHESILPOUR, a town of Hindooſtan, in the circar of Rantampour; 28 miles S.S.W. of Suiſopour.

GHEUK SHA, *i. e. Blue Water*, a lake of Perſian Armenia, 60 miles long, and 6 broad; 50 miles E.N.E. of Erivan.

GHEUREL, a town of Aſiatic Turkey, in Natolia; 28 miles W.N.W. of Angara.

GHEUTSI, a town of Aſiatic Turkey, in Caramania; 16 miles E. of Cogni.

GHEYSSIQUAS, a tribe of Hottentots, inhabiting a diſtrict of South Africa, bordering on the country of Caffraria. M. Vaillant, being at no great diſtance from Orange river, found ſome of theſe people, who pointed out to him a chain of mountains to the eaſt, which was occupied by their principal tribes, and which ſeparated them from the Caffres, or at leaſt from the Briquas and Bremas, conſidered by them as tribes of Caffres. The chief difference between the Gheyſſiquas and the nations that ſurround them conſiſts in the colour of their ornaments, to which they impart a dazzling whiteneſs by proceſſes peculiar to themſelves. The women are well-made, lively, and prone to laugh or dance; but at the ſame time modeſt and reſerved. The people, in general, are ſaid to be very hoſpitable and generous. The practice of ſemi-caſtration prevails in all their hordes without exception, and they are the only tribe among the Hottentots who adopt it. Different accounts are given by travellers of the reaſon of this ſingular operation. Kolben, ſtating it to conſiſt in the extraction of the left teſticle, repreſents it as a religious ceremony, prevailing among all the Hottentots, but this is not true in fact. Others aſcribe it to a deſire on the part of the Gheyſſiquas to remove every impediment in running, and others again aſſign as its cauſe a wiſh to prevent the too abundant propagation of the ſpecies. But neither of theſe cauſes produces the effect aſcribed to them. Vaillant ſuppoſes that it is a mark of diſtinction, adopted by their anceſtors, when at war with neighbouring nations, by which they might know one another; but this account is no leſs fanciful and improbable than any other. Whatever is the cauſe from which this practice originates, it is performed by the father, commonly at the birth of the child; though it is ſometimes deferred till the child has completed his third year.

GHEZ, a town of Grand Bucharia; 24 miles S.S.E. of Balk. N. lat. 36° 16′. E. long. 65° 40′.

GHEZAN. See Gezan.

GHEZZI Pier Leone, called *Cavalier Ghezzi*, in *Biography*, a painter who was a pupil and imitator of Pietro Cortona. He was ſelected with Luti Treviſani, and other artiſts of the ſame ſtyle, to paint the prophets in St. John Lateran; and executed many other works of leſs conſequence; but he obtained moſt celebrity by his ſkill in caricature, which he freely indulged.

GHIABUNDER, in *Geography*, a town of Bengal; 25 miles S.S.W. of Goragot.

GHIBELINS. See Gibelins.

GHICKERS, an appellation given to thoſe who inhabited the northern and largeſt diviſion of the hilly tract ſituated between the Behut, the Sinde, and Caſhmere, in Hindooſtan, by way of contraſt to the Joudis, who occupied the ſouthern and leaſt diviſion.

GHIDORE, in *Geography*, a province of Bengal, bounded on the N. by Bahar, on the N.E. and E. by Curruckpour, on the S. by Birboom, and on the S.W. by Curruckdeah and Moy. The chief place is Ghidore; which is 70 miles S.E. of Patna. N. lat. 24° 53′. E. long. 86° 23′.

GHIEZ, a fortreſs of Perſia, in the province of Irak, taken by the Afghans in 1723.

GHILAN, or Kilan, ſynonymous with the ancient *Gela*, a province of Weſtern Perſia, bounded on the N. by the provinces of Aderbijan or Aiderbeitzan and Schirvan, on the N.E. by the Caſpian ſea, on the E. by the Caſpian ſea and the province of Mazanderan, on the S. by the Perſian Irak, and on the W. by the provinces of Aderbijan and Curdiſtan; about 200 miles from E. to W., and 150 from N. to S. This is one of the moſt beautiful and fertile provinces of Perſia, producing ſilk, olives, rice, tobacco, and moſt excellent fruits of all kinds, and in ſuch abundance, as not only to ſupply the wants of its inhabitants, but ſufficient to provide for a great part of Perſia and Armenia. The manufactures and ſilk of Ghilan are eſteemed the beſt in Perſia, and have been in ſuch repute for many years, that Raſhd, its capital, is become one of the firſt commercial towns in this part of Aſia. The fineſt ſort is uſually white, and chiefly ſent into the interior cities of Perſia, or ſold to the Turks; the inferior kind is yellow, and principally diſpoſed of to the Ruſſians. Raſhd ſupplies the bordering provinces of Perſia, and the independent neighbouring ſtates, as far as Georgia, with European merchandize, except the goods which are tranſported immediately from Aſtrakan, through Kiſlar and Moſtok, to the neareſt part of Georgia, and of the neighbouring mountains; and thoſe ſent from Shamakee to the Leſgue Tartars, and other independent tribes. In this province are ſeen whole foreſts of mulberry, box, and walnut trees. Every peaſant has a garden to his cottage, planted with orange-trees, citrons, figs, and vines. For a further account of the trade and government of this province, we refer to the articles Caspian *Sea* and Persia. We ſhall here only add, that in the year 1792 Akau, called by Dr. Pallas Aga Mamet, collected an army, and purſued his conqueſts in the vicinity of Ghilan, till at length he had no rival, except Hidaet, khan of Ghilan, whom he forced to fly from Raſht or Raſhd, his place of reſidence, and who was killed near the port of Sinſili. In conſequence of theſe events Akan became monarch of the whole of Weſtern Perſia; and having been made an eunuch in his infancy by order of Nadir Shah, he nominated for his ſucceſſor his nephew Baba Serdar.

GHILDI, a town of Africa, on the Senegal; 30 miles N.W. of Gallam.

GHILON, a town of Curdiſtan; 50 miles S.S.W. of Erbil.

GHINALA, a town and territory of Africa, on the river Rio Grande, near its mouth. N. lat. 11° 15′. W. long. 14° 15′.

GHINIA, in *Botany*, ſo named by Schreber in memory of Luca Ghini, who, in the 16th century, was profeſſor of botany at Bologna and Piſa, in each of which univerſities he greatly improved, if he did not entirely found, the botanic garden, and was the firſt who made the ſtudy of botany an eſſential part of medical education. He publiſhed no book himſelf, but Haller mentions the exiſtence of a manuſcript copy of his lectures, and he communicated many things in correſpondence to the writers of his time. Schreb. 19. Willd. Sp. Pl. v. 1. 114. Mart. Mill. Dict. v. 2. Swartz. Ind. Occ. v. 2. 1087. (Tamonea; Aubl. Guian. 659. Juſſ. 109. Lamarck, Illuſtr. t. 542. Swartz. Prod. 94.)—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Vitices*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, tubular, permanent, inferior, its orifice with five pointed ſpreading teeth. *Cor.* of one petal, irregular; tube long, narrow; limb of two lips, the upper one largeſt, roundiſh, concave, aſcending; lower in three deep roundiſh ſegments, the middlemoſt larger, deflexed, emarginate. *Stam.* Filaments four, inſerted into the tube above its baſe, two of them longer than the reſt; anthers each of two ſeparated oblong cells, one of them terminal, fertile in the longer ſtamens only, the other like a little ſcale in the middle of each filament. *Piſt.* Germen roundiſh, ſuperior; ſtyle thread-ſhaped, the length of the tube; ſtigma four-lobed. *Peric.* Drupa turbinate, angular, dry, projecting beyond the permanent calyx. *Nut* angular, of four or five cells. *Seeds* ſolitary.

Eſſ. Ch. Calyx with five ſharp ſpreading teeth. Corolla ringent, two-lipped; the lower lip three-lobed. Nut coated, four-celled, inveſted with the calyx. Seeds ſolitary. Anthers of two diſtant lobes.

Obſ. We think this genus ought to be placed in *Didynamia*, along with *Verbena*, to which it is nearly akin, though only the longer ſtamens appear to be perfect; but this may be variable, and cannot well be determined without repeated examinations of wild ſpecimens.

1. G. *ſpinoſa*. Willd. n. 1. Ait. Hort. Kew. ed. 2. v. 1. 45. (G. verbenacea; Sw. Ind. Occ. v. 2. 1089. Verbena curaſſavica; Linn. Sp. Pl. 28. Veronicæ ſimilis, &c. Herm. Parad. t. 240.)—"Fruit with four thorns. Leaves ſmooth."—Native of ſeveral parts of the Weſt Indies, where Houſton and Swartz have gathered and examined it. This is an annual and rather humble herbaceous plant, with a branched *ſtem*, ovate deeply ſerrated *leaves*, and long looſe ſpikes of ſmall whitiſh *flowers*.

2. G. *mutica*. Willd. n. 2. Sw. Ind. Occ. v. 2. 1090. (Tamonea ſpicata; Aubl. Guian. 660. t. 268.)—"Fruit without thorns. Leaves downy."—Native of Guiana and Cayenne. Much like the former, but with downy *leaves*, and an unarmed *fruit*, and the middle ſegment of the lower lip of the *corolla*, according to Swartz, is emarginate in this, entire in the preceding. Neither of them have much beauty, nor any other qualities to recommend them for cultivation with us in the ſtove, though perhaps they might be planted out for the ſummer, if deſirable, like other tender annuals.

GHINNA, or Ghenne', in *Geography*, a town of Egypt, on the E. ſide of the Nile, oppoſite to Kuft, or Coptos, on the other ſide, and diſtant from Coſſeir, or Koſire, on the Red ſea, about 90 geographical miles. N. lat. 26° 11′. E. long. 32° 45′.

GHINUE, a town of Aſiatic Turkey, in Natolia; 24 miles N.W. of Sinob.

GHIO. See Kemlik.

Ghio, a town of Africa, belonging to the Foulahs, on the Senegal; 12 miles S.W. of Goumel.

GHIR. See Gir.

GHIRGIN. See Guinguin.

GHIRLANDAIO, Domenico, in *Biography*, a painter, of whom Vaſari ſpeaks as being of the firſt rank in his time. His real name was Corradi. He at firſt was employed by his father, in his own profeſſion of goldſmith, at Florence, who obtained the name of Ghirlandaio, by having been the firſt to make little metallic garlands (*Ghirlandi*) for children to wear. Domenico continued to paint, after he had adopted painting as his profeſſion, for the churches and convents in Florence, both in freſco and in oil. He, like other artiſts of the time, introduced into his pictures the portraits of his friends, but gave them more character appertaining to the ſubject, than had hitherto been done there; and he was the firſt who left off gilding in pictures, and attempted to imitate its effects by colours. He was called to Rome by Sixtus IV. to aſſiſt other maſters employed in painting his chapel. His works there were afterwards ſpoiled to make room for thoſe of M. Angelo. He was highly honoured, and employed nobly; but his greateſt glory is, having had the great hero of the art, M. Angelo, for a pupil. He died in 1493, at the age of 44. His brothers, David and Benedetto, finiſhed many of his works, and educated his ſon Ridolfo to the art, who afterwards made great progreſs, and obtained eſteem from Raphael himſelf, who invited him, but not ſucceſsfully, to work in the Vatican. In Ridolfo's pictures, Mr. Fuſeli ſays, "there is ſomething analogous to the genius of Raphael; the compoſition, the vivacity of the face, the choice of colours, ſomething ideal in the uſe of nature, betray ſimilar maxims, with inferior powers." He died in 1560, aged 75.

GHIRNAH, in *Geography*, a river of Hindooſtan, which runs into the Taptee; 36 miles S.W. of Burhanpour.

GHISCIOLA, a town of Italy, in the department of the Upper Po; 15 miles E. of Cremona.

GHISTELLES, a town of France, in the department of the Lys, and chief place of a canton, in the diſtrict of Bruges; 11 miles S.W. of Bruges. The place contains 2500, and the canton 11,404 inhabitants, on a territory of 182½ kiliometres, in 18 communes.

GHIVIRA, a town of Italy, in the department of the Olona; 30 miles N.W. of Milan.

GHIZNI, or Gazna, an ancient empire of Hindooſtan, founded by Abiſtagi, governor of Koraſan, A. D. 960, who revolted from the king of Bucharie. Ghizni conſiſted chiefly of the tract which compoſed the kingdom of Bactria, after the diviſion of Alexander's empire; that is, the countries lying between Parthia and the Indus, and ſouth of the Oxus. The Ghiznian empire, ſubject to the ſame cauſes of decay with other unwieldy ſtates of rapid growth, was, in 1158, forcibly divided; the weſtern, and largeſt part, and which ſtill retained the ancient name of the empire, being ſeized on by the family of the Gaurides, (ſo denominated from Gaur, or Ghor, a province and city lying beyond the Indian Caucaſus), while the provinces contiguous to both ſhores of the Indus, remained to Chuſero, or Cuſroe, who fixed his reſidence at Lahore: and even his poſterity were, in 1184, driven out of their kingdom by the Gaurides. The death of the emperor Mahomed Gori, in 1205, occaſioned a new diviſion of the Ghiznian empire; the Perſian part remaining to Eldoze, and the Indian part to Cuttub, who founded the Patan, or Afghan dynaſty, in Hindooſtan. In 1221 Gengiz Cawn, among his extenſive conqueſts, accompliſhed that of the empire of Ghizni; putting an end to the dynaſty of Charaſm, which then occupied that throne, and driving before him the unfortunate Gelali, ſon of the reigning emperor; who ſwam the Indus to avoid his fury. The ancient empire of Ghizni is nearly comprehended by the kingdom, known at preſent by that of Candahar. See Candahar.

Ghizni, or *Gazna*, a city of Candahar, once the reputed capital of the Ghiznian empire, and placed among the weſtern ſources of the Indus, and not far from the Indian Caucaſus. The poſition of Ghizni is erroneouſly fixed by M. D'Anville in the N.W. extreme of Cabul; whereas it appears to be almoſt in the very heart of that province. It is termed the "Second Medina," on account of the great number of illuſtrious perſons whoſe remains have been interred there. Wonderful ſtories are related concerning its extent and population in ancient times; nevertheleſs, Baber expreſſes his ſurpriſe at its having ever been pitched on for the ſeat of any empire. Ghizini is diſtant about 56½ geographical miles S. by W. from Cabul, about 167½ ſuch miles from Candahar, and about 88 miles from Bamian. N. lat. 33° 35'. E. long. 68° 22'.

GHOBAN. See Goban.

GHOER, a town of Holland, in Overyſſel, on the Rigge; 10 miles N.N.E. of Borkeloe.

GHOR. See Gaur.

GHORAIB, a town of Arabia, in the country of Yemen; 15 miles E. of Iambo.

GHOUP, a mountain of Southern Africa. This, and alſo Nieuweld, are a continuation of the Roggeveld mountain, and join the diviſions bearing the ſame name in the diſtrict of Graaf Reynet. They have lately been deſerted, on account of the number of Booſjeſman Hottentots, who dwell cloſe behind them.

GHOURBUND, a town, and diſtrict of Cabul; 42 miles N.W. of Cabul. N. lat. 34° 55'. E. long 67° 52'.

GHOURI, a town of the kingdom of Balk. N. lat. 35° 40'. E. long. 66° 56'.

GHULE el Aljaib, a town of Arabia Felix; 10 miles N.N.E. of Chamir.

GHULPAIGAN, a town of Perſia, in the province of Irak, taken by the Afghans in 1723; 100 miles N.N.W. of Iſpahan. N. lat. 33° 45'. E. long. 50° 40'.

GHUMISCHKANA, a town of Aſiatic Turkey, in the government of Trebiſond; 50 miles S.S.W. of Trebiſond.

GHUNFUDE, a ſea-port of Arabia, on the Red ſea, belonging to the ſheriff of Mecca. All veſſels which carry coffee to Jidda are compelled to anchor here, and pay a duty; 145 miles S. of Mecca. N. lat. 29° 7'.

GHUNI, one of the ſmaller Cape Verd iſlands, being little more than a rock.

GHURMAN, a town of Perſia, in Segeſtan; 30 miles N.E. of Ferah.

GHYASPOUR, a town of Hindooſtan, in Bahar; 20 miles W.S.W. of Chuprah.

GIA, an Italian adverb, uſed in *Muſic* for already, formerly, *cidevant:* as "Gia maeſtro di cappella del Duomo di Milano," formerly maeſtro di cappella, or compoſer, to the cathedral of Milan.

GIABBAR, in *Geography*, a fortreſs of Aſiatic Turkey, in the province of Diarbekir; 120 miles S.S.W. of Diarbekir.

GIACOMELLI Geminiano, in *Biography*, of Parma, compoſed for the theatres of Venice, between the years 1704 and 1736, ſeven or eight different dramas, written chiefly by Apoſtolo Zeno and Metaſtaſio. He was the ſcholar of Capelli; but adopted a more high and flighty ſtyle, with which the Venetians were much captivated, before they heard the more graceful and expreſſive airs of Vinci and Haſſe.

GIACOMO, St. in *Geography*, a town of Italy; three miles S. of Verona.—Alſo, a town of the Valteline; two miles N.W. of Chiavenna.

Giacomo, *St., Valley of*, a valley of Switzerland, which is part of the county of Chiavenna. It is narrow, and watered by the torrent Lira; contains about 10 pariſhes, is under the juriſdiction of the commiſſary, and poſſeſſes ſeveral important privileges that preſerve the inhabitants from the oppreſſion which their neighbours endure. All cauſes are tried in the valley. The criminal ſtatutes are thoſe of Chiavenna, with this difference, that inſtead of the aſſeſſor, the valley chuſes four perſons, who are always preſent at the examination; and without whoſe concurrence, torture cannot be inflicted, nor ſentence paſſed. The valley has its own code of juriſprudence, and courts independent of the commiſſary, from the deciſion of which an appeal lies to the diet.

The lower part of the valley produces vines and corn; the upper, rye, barley, and paſture, mixed with large groves of fir and pine.

Giacomo Arkadelt, in *Biography*, a Netherlander, and a diſciple of Juſquin, enumerated by Adami among the ſingers and compoſers of the pontifical chapel in the 16th century. He was maeſtro di cappella ſome time to the cardinal of Lorrain, and had acquired great fame by his madrigals, of which he publiſhed at Venice, between the years 1539 and 1575, five books. In one of which is the celebrated madrigal, "Il bianco e dolce Cigno cantando muore," which was in high favour all over Europe.

GIADEN, in *Geography*, a town of Arabia, 60 miles W.S.W. of Mecca.

GIADILA, a town of Arabia, in the province of Nedsjed, 90 miles S.W. of Kariatim.

GIADRI, a town of Albania, on the Drino; eight miles N. of Aleſſio.

GIAGAS of Africa. See Jagas.

GIAGH, or Jehagh, a cycle of twelve years, in uſe among the Turks and Cathayans.

Each year of the giagh bears the name of ſome animal; the firſt that of a mouſe; the ſecond, that of a bullock; the third, of a lynx or leopard; the fourth, of a hare; the fifth, of a crocodile; the ſixth, of a ſerpent; the ſeventh, of a horſe; the eighth, of a ſheep; the ninth, of a monkey; the tenth, of a hen; the eleventh, of a dog; and the twelfth, of a hog.

They alſo divide the day into twelve parts, which they call giaghs, and diſtinguiſh them by the name of the ſame animals. Each giagh contains two of our hours, and is divided into eight *keh*, as many as there are quarters of hours in our day.

GIALAKOVA, in *Geography*, a town of European Turkey, in Romania; 60 miles N.E. of Filippopoli.

GIALLOLINO, in *Natural Hiſtory*. See Naples *Yellow*.

GIAMANI, in *Geography*, a town of Perſia, in the province of Chuſiſtan; 28 miles S.S.W. of Suſter.

GIAMBASH, a town of Aſiatic Turkey, in Natolia; 20 miles S.S.E. of Smyrna.

GIANAH, a town of Perſia, in the province of Kerman; 50 miles E. of Singian.

GIANCAZZO, St. a town of Naples, in the province of Otranto; 12 miles S.W. of Brindiſi.

GIANNONE, Peter, in *Biography*, was born at or near Naples about the year 1680. He was educated for, and practiſed in, the law, but was much more diſtinguiſhed as an hiſtorian. In 1723 he wrote a "Hiſtory of Naples," in four volumes 4to. The ſtyle is pure, but the freedom with which he diſcuſſed ſeveral topics relating to the origin of the papal power gave ſo much offence to the court of Rome, that he was obliged to exile himſelf from his native country. He found an aſylum with the king of Sardinia, who did not, however, dare to avow himſelf his protector, but choſe rather to repreſent his ſituation as that of a priſoner. Giannone died in Piedmont in 1748. Extracts from his hiſtory were afterwards printed in Holland under the title of "Anecdotes Eccleſiaſtiques." His poſthumous works were given to the world in a quarto volume, containing, among other miſcellaneous matter, his profeſſion of faith, and a juſtification of his hiſtory.

GIANOTTI, a performer on the double-baſe in the opera at Paris, from the year 1739 to 1767, who publiſhed, in 1759, a treatiſe built on the principles of Rameau, entitled "Guide du Compoſiteur," the Compoſer's Guide; a work much eſteemed by the followers of Rameau. The author of this tract having been long in the practice of explaining the ſyſtem of the fundamental baſe to his ſcholars, has drawn up his own work in a clear and intelligible manner.

GIANNUTI, in *Geography*, a ſmall iſland in the Mediterranean ſea, near the coaſt of Italy. N. lat. 42° 24'. E. long. 11° 20'.

GIANT, γίγας, a man of extraordinary, enormous ſtature and bulk.

The reality of giants, and of nations of giants, is much controverted among the learned. Travellers, hiſtorians, and relations, both ſacred and profane, furniſh various inſtances of them; a great part of which naturaliſts and antiquaries ſet aſide.

Thoſe among the ancients who ſpeak of giants, as hiſtorians, and affirm there were ſuch beings, are Cæſar, de Bello Gallico, lib. i. Tacitus, de Morib. Germanor. and Annal. lib. ii. Florus, lib. iii. cap. 3 St. Auguſtine, de Civit. Dei. lib. xv cap. 9. and Saxo-Grammaticus, at the end of his preface: among the moderns, Hieron. Magius, Miſcellan. de Gigantibus; Chaſſagonus, de Gigantibus; Kircher, Mund. Subterran. lib. viii. ſect. ii. cap. 4. and ſo many others, that Stephanus, in his notes on Saxo-Grammaticus, affirms, nothing can be more extravagant than to deny or allegorize the authorities we have concerning them.

Dr. Derham obſerves, that though we read of giants before the flood, Gen. vi. 4. and more plainly after it, Numb. [illegible] ly probable the ſize of man has always [illegible]; [illegible] to the [illegible], [illegible] taking them for [illegible]; as to thoſe, [illegible] of a gi- [illegible]

Be this as it will, it is manifeſt, that in both theſe places giants are ſpoken of as rarities and wonders of the age, not of the common ſtature: and ſuch inſtances we have had in all ages. But it is not at all improbable, that the firſt men were of a ſtrength and ſtature ſuperior to thoſe of mankind at preſent, ſince they lived a much longer time; long life being commonly the effect of a ſtrong conſtitution. There are many fabulous relations: ſuch as we take to be that of Theutobocchus, who is ſaid to have been dug up anno 1613, and to have been higher than the trophies, and twenty-ſix feet in height: and no better we ſuppoſe the giants to have been, of whom Ol. Magnus gives an account in his fifth book; ſuch as Harthen and Starchater, among the men; and among the women, "reperta eſt (ſaith he) puella—in capite vulnerata, mortua, induta chlamyde purpurea longitudinis cubitorum 50, latitudinis inter humeros quatuor." Ol. Mag. Hiſt. lib. v. cap. 2.

But, as for the more credible relations of Goliah (whoſe height was ſix cubits and a ſpan, (1 Sam xvii 4.) which, according to biſhop Cumberland, is ſomewhat above eleven feet Engliſh, of Og, king of Baſan, (Deut. iii. 11.) whoſe bed was nine cubits long and four wide, of Maximinus the emperor (who was nine feet high), and others in the reign of Auguſtus and other Roman emperors, of about the ſame height; to which might be added the dimenſions of a ſkeleton, dug up in the place of a Roman camp, near St. Alban's, by an urn inſcribed Marcus Antoninus, of which an account is given by Mr. Cheſelden, who judged, by the dimenſions of the bones, that the perſon was eight feet high, Phil. Tranſ. N° 333; theſe antique examples and relations, we ſay, may be matched, nay outdone, with modern ones; of which we have divers in J. Ludolph. Comment. in Hiſt. Æthiop. lib. ii. cap. 2. ſect. 22. Magius, Conringius, D. Hakewel, and others; the laſt mentioned writer ſpeaks from Nannez, of porters and archers belonging to the emperor of China, fifteen feet high, and of others from Purchas, of ten and twelve feet high, and more. See that learned author's Apol. p. 208.

The exiſtence of a race of men above the common ſtature, on the coaſt of Patagonia in South America, has been the ſubject of diſpute for the two laſt centuries. In one century almoſt all navigators, of every country, affirmed that there were ſuch perſons; and in the next the fact is denied by the greater number, and their predeceſſors are treated as timid or boaſting fabuliſts. The Ynca Garcilaſſo de la Vega, in his hiſtory of Peru, relates, that according to a tradition univerſally received, a number of veſſels or junks came to St. Helena with a company of giants on board, of a ſtature ſo enormous, that the natives of the country were not higher than their knees; that their eyes were as broad as the bottom of a plate, and their limbs proportionably large. But theſe are fables, ſimilar to thoſe relative to the ſame ſubject in other parts of the world. See Giants' *bones*.

Turner, the naturaliſt, reports that he had ſeen, near the river Plata, on the coaſt of Braſil, a race of giants, who went ſtark naked, one of whom was twelve feet high; but he acknowledges that he ſaw no others ſo tall. The ocular witneſſes on the affirmative ſide of the queſtion are, Magellan, Loaiſa, Sarmiento, and Nodal, among the Spaniards; Cavendiſh, Hawkins, and Knivet, among the Engliſh; Sebald, De Noort, Le Maire, and Spilberg, among the Dutch; and among the French, thoſe who went in the expedition from Marſeilles and St Maloes, in the year 1704.

Knivet affirms that he meaſured ſeveral dead bodies, which he found buried at Port Deſire, which were from fourteen to ſixteen ſpans high; and that he had frequently ſeen at Braſil one of the Patagonians, who, though a youth, meaſured no leſs than thirteen ſpans; and that the Engliſh priſoners at Braſil aſſured him, that they had ſeen many men of the ſame gigantic ſtature upon the coaſts of the ſtrait: this account is alſo confirmed by Sebal de Weſt, and Oliver de Noort. Aris

Claſz, a commiſſary on board Le Maire's fleet, declares that he found, in the ſepulchres on the coaſt of Patagonia, the bones of men who were between ten and eleven feet high. Nodal and ſir Richard Hawkins merely relate, that theſe ſavages were a head taller than the inhabitants of Europe, and of ſuch a ſtature, that the people on board their veſſels called them giants.

Thoſe who bear teſtimony to the contrary, are Winter, the Dutch admiral Hermite, Froger in De Gennes's Narrative, and ſir John Narborough. Sir Francis Drake alſo is ſilent with reſpect to the ſtature of the inhabitants of Patagonia; but Winter poſitively affirms, that the accounts of their being giants are falſehoods invented by the Spaniards. Narborough meaſured the ſkulls and the print of the feet of the ſavages on the coaſt of the ſtrait of Magellan, which, he ſays, were of the common ſize: and he had often ſeen companies of them at Port St. Julian, who were neither taller nor bigger than other men. However, it may be obſerved in general, that the greater part of theſe who hold the affirmative in this queſtion, ſpeak of people that inhabited the deſert coaſts of Patagonia to the eaſt and weſt; and that, on the contrary, thoſe who hold the negative, ſpeak of thoſe who inhabit the ſtrait upon the ſides of the utmoſt point of America to the north and ſouth. Frezier relates, not from his own knowledge, but from the teſtimony of eye-witneſſes, that there was, at a conſiderable diſtance within the country from the coaſt of Chili, an Indian nation, called by their neighbours Caucohues, who ſometimes came down to the Spaniſh ſettlements, that were more than nine feet high, and were the ſame race with the Patagonians who live on the eaſtern coaſt. It appears from various relations, that the inhabitants of the two borders of the ſtrait are of the common ſtature, and that the race, diſtinguiſhed by the name of Patagonians, make their conſtant reſidence upon the deſert coaſts, ſcarcely acceſſible to any but themſelves; and when European ſhips frequented the ſtrait, they removed and ſettled in the interior part of the country: however, the current teſtimony of late navigators, particularly commodore Byron, captain Wallis, and captain Carteret, will put an end to the doubts that have been hitherto entertained of the exiſtence of ſuch perſons. Commodore Byron, who viſited the coaſt of Patagonia, in 1764, ſpeaks of the inhabitants as of a gigantic ſtature; but he did not meaſure any of them, and only concluded, by the proportion of their ſtature to his own and that of his companions, that they could not be leſs than ſix and a half, or ſeven feet in height, and proportionably ſtrong and bulky. Captain Wallis had an interview with theſe people in 1766, and found, by meaſuring them, that the ſtature of the greater part of them was from five feet ten inches to ſix feet, though there were ſome who were ſix feet five and ſix feet ſix inches, and one who was ſix feet ſeven inches. Captain Carteret, who attended captain Wallis on this occaſion, confirms the above account in his letter to Dr. Maty. See Phil. Tranſ. vol. lx. art. 2. p. 20, &c. See Hawkeſworth's Voyage, vol. ii. Introd. and p. 28. 154.

Giants, *Rebel*, in *Ancient Mythology*, were the ſons of Terra, or the Earth, by Cœlus, who made war againſt Jupiter and the celeſtial deities, to avenge the defeat of the Titans. Theſe giants are repreſented as of an enormous height and ſize, having a wild and dreadful aſpect, and poſſeſſed of ſtrength proportioned to their bulk: each of them had a hundred hands, and ſerpents inſtead of legs. Being determined to dethrone Jupiter, they reared Mount Oſſa upon Pelion, and Olympus upon Oſſa, and from thence attacked the gods with huge rocks, ſome of which fell into the ſea and became iſlands, and others fell on the earth and formed mountains. Jupiter ſummoned a council of the gods, and being informed that it was neceſſary to obtain the aſſiſtance of ſome mortal, with the advice of Pallas he called up Hercules, and with the aid of this hero, exterminated the giants Enceladus, Polybotes, Alcyon, Porphyrion, the two ſons of Alœus, Ephialtus, Othus, Eurytus, Clytius, Tythyus, Pallas, Hippolitus, Agrius, Thoon, and Typhon, the laſt of whom it was more difficult to vanquiſh than all the others. Jupiter having thus gained a complete victory, caſt the rebels down to Tartarus, where they were to receive the full puniſhment of their enormous crimes: according to the account of ſome of the poets, he buried them alive under Mount Etna and different iſlands.

For the explication of this fable, ſome have ſuppoſed that Jupiter (for whoſe hiſtory, ſee Jupiter) deſtroyed the robbers that infeſted Theſſaly, and that theſe are the pretended giants; for we have already obſerved (in the preceding article) that the appellation "Nephilim," occurring in ſcripture, and tranſlated giants, ſignifies people addicted to all kinds of licentiouſneſs and violence, or robbers and ruffians. Jupiter, when he left Crete to viſit the other parts of Greece, uſually reſided on mount Olympus, where he had probably built a ſtrong citadel. This mount Olympus, highly elevated, was afterwards taken for heaven itſelf, and the moſt ancient poets, eſpecially Homer, ſo deſcribe it. The banditti now mentioned, determined in their attack on that prince, beſiege him in his citadel, which afterwards gave riſe to the fiction of their having attempted to ſcale heaven, and of their having made an aſſault upon it. It is added, that with this view they piled Oſſa upon Pelion, importing, as it is conjectured, that they had fortified theſe two mountains, which are alſo in Theſſaly, and at no great diſtance from Olympus, whither they retired after their excurſions, and kept Jupiter's garriſon in awe. For other particulars, ſee Banier's Mythology, vol. iii. See alſo Titans.

Giants' *Bones*, a name too haſtily given by the vulgar to certain bones and parts of ſkeletons, of an enormous ſize, found in England and other places. Of all the numbers of theſe, which have been publicly ſhewn about as wonders in nature, not one but has proved, on examination, a bone of an elephant, or elſe of a whale, or of ſome other terreſtrial or aquatic animal now perhaps extinct; the firſt, however, is uſually the caſe, as the bones of elephants are much more frequently found buried in the earth than thoſe of the whale.

Sir Hans Sloane mentions a vertebra of the loin of a whale ſent him from Oxfordſhire, where it was dug up under ground, and afterwards uſed as a ſtool to ſit upon, and vulgarly ſuppoſed part of a human back-bone. Now, if the whole ſize of the body had been calculated from this piece, the account would have preſented ſuch a ſize as would have far exceeded all the fabulous ſtories of giants' ſkeletons extant in the world.

Many ſkeletons of this kind have been found which have been called the ſkeletons of giants: ſuch are thoſe of Philoſtratus, which are ſaid to be the bones of men of twelve, twenty, and even thirty cubits high; that found in a mountain of Crete, and mentioned by Plato and Pliny, forty-ſix cubits high; another of ſixty cubits, found near Tangier in Mauritania, mentioned by Plutarch and Strabo, and ſuppoſed to be the ſkeleton of Anteus; the ſkeleton of Pallas, the ſon of Evander, found in Rome, and ſaid to be taller than the walls of that city; another, found in England in 1171, fifty feet long. St. Auſtin alleges, in proof of the exiſtence of giants before the flood, a grinder tooth, which he ſaw on the ſhores of Utica, which was in reality that of an elephant. The tooth in the church of St. Chriſtopher, at Hiſpulia, and the ſhoulder bone of St. Chriſtopher, preſerved in a church at Venice, are of the ſame kind. The tooth preſerved and ſhewn at Antwerp is only the grinder of an elephant; and another, belonging to a ſkeleton which was dug up near Tunis in 1630, was ſent to the learned Pierefc, who took the impreſſion of it in wax, and comparing it with the tooth of an elephant ſhewn near the place, found it to be of the ſame ſhape and ſize. Sir Hans Sloane has given an accurate and learned account of ſeveral other miſtakes on this ſubject, for which we muſt refer to the Philoſ. Tranſact. N° 404. However, Monſ. Le Cat, in a memoir read before the Academy of Sciences at Rouen, recites a number of inſtances, in which ſkeletons, or parts of ſkeletons, of an uncommon magnitude, have been found; theſe have been examined by anatomiſts, he ſays, and have been by them reputed real bones; and hence he infers the exiſtence of giants.

GIANTS *Cauſeway*, a name given in the county of Antrim, on the north coaſt of Ireland, to a vaſt quantity of that kind of baſaltes, (ſee BASALTES,) which ſtands in columns, and runs out a great way into the ſea.

The ignorance of the vulgar as to the nature of this ſtone, has occaſioned this great pile of it to be ſuppoſed artificial and the work of giants, once inhabitants there. But whoever conſiders this amazing ſeries of columns, will be ſoon convinced no human hands could have formed them, and will find an accuracy in their figures greater than could have been expected from the moſt curious hand. The length of the ſeveral columns, and their joints ſo regularly placed in ſeries, and the niceneſs of their articulations, by which no ſpace or vacuity is left between, are wonderful.

This cauſeway forms a kind of mole, or quay, projecting from the baſe of a ſteep promontory ſome hundred feet into the ſea; and the perpendicular columns of which it is formed exhibit an appearance not unlike a ſolid honey-comb. The ſingle columns are irregular priſms of from four to eight ſides; but the pentagonal and hexagonal are by far the moſt numerous, and, when examined, they are found juſt ſuch as muſt neceſſarily be required in the places where they ſtand to fill up between others, ſo as to leave no vacuity. Each of theſe columns is ſeparable into a ſeries of joints, each of which is ſo well fitted to the place, that the joining appears only a crack or crevice in the ſtone: yet theſe are regularly articulated, there being always a convexity on one part, and a ſocket in the other to receive it, ſo that the joints cannot ſlip off from one another; beſides which, the angles of one frequently ſhoot over thoſe of the other, ſo that they are completely locked together, and can rarely be ſeparated without a fracture of ſome of their parts. The depth of the concavity is generally about three or four inches. Theſe hollows are of great uſe to the neighbouring poor, for they make a kind of ſalt pans of them, and thus very eaſily procure themſelves a kind of bay-ſalt in ſummer. They fill theſe little baſons with ſea-water at high tides, and the heat of the ſun and of the ſtone contributing greatly to the evaporation, as well as the ſhallowneſs of the baſon, the whole humidity is found evaporated in the time of four tides, and they take out the ſalt ready for uſe. The length of thoſe joints is various; they are from eight to four and twenty inches long, and for the moſt part longer towards the bottom of the column; they are generally from fifteen to twenty inches in diameter.

The triangular and ſquare columns are fewer in number than the others, but they ſtand principally in the inner part of the large ſeries, and are ſeldom ſeen, unleſs ſearched after by a curious eye.

The regular figure of the ſtone, compoſing this cauſeway, is not more wonderful than its quantity. The whole country for many miles being full of it, and a vaſt maſs running far into the ſea: for, beſides what vulgarly goes by the name of the Giants Cauſeway, which is itſelf of vaſt extent, there are great numbers of the ſame pillars at diſtances in other places.

There are two other ſmaller and imperfect cauſeways to the left hand of the great one, and farther in the ſea, a great number of rocks ſhew themſelves at low water, which appear plainly all to conſiſt of the ſame ſort of columns. In going up the hill from the cauſeway there are found, in different places, a vaſt number of the ſame columns; but theſe do not ſtand erect, but are laid ſlanting upwards in different angles and directions. Beyond this hill, eaſtward, alſo, at ſeveral diſtances, there ſtand a great number of the ſame pillars, placed ſtraight and erect, and in cluſters of different ſizes. Theſe are ſeen ſcattered, as it were, over the ſeveral parts of the hills.

One parcel of them is much admired, and called by the country people the looms of the organs. It ſtands in an elegant form, and faces the bottom of the hill. The columns, of which this cluſter conſiſts, are about fifty in number, and they are ſo nicely put together, that the talleſt ſtand in the middle, and the ſhorter gradually on each ſide of it to the end, ſo that they look like the pipes of a church organ viewed from the front. The talleſt one of all theſe, which ſtands exactly in the centre, is forty feet high, and conſiſts of forty-four diſtinct joints.

What is emphatically called the Giants Cauſeway is, in fact, a ſmall portion of that vaſt baſaltic area, of which the promontories of Bengore and Fairhead conſiſt, and which extends over a great part of the neighbouring country. Theſe two great promontories, which have been examined by Hamilton and lately by Dr. Richardſon, ſtand at the diſtance of eight miles from each other, and are the leading features of the whole coaſt of Antrim. The former of them, ſituated about ſeven miles Weſt of Ballycaſtle, repreſents itſelf at a diſtance, and in profile, as an extenſive headland, running out from the coaſt a conſiderable length into the ſea; but, ſtrictly ſpeaking, it is made up of a number of leſſer capes and bays, the whole of which forms what the ſeamen denominate the headland of Bengore. Theſe capes are compoſed of a variety of different ranges of pillars and a great number of ſtrata, which, from the abruptneſs of the coaſt, are very conſpicuous, and form an unrivalled pile of natural architecture, in which all the neat regularity and elegance of art is united to the wild magnificence of nature. The promontory of Fairhead raiſes its lofty ſummit more than 500 feet above the ſea, forming the eaſtern termination of Ballycaſtle bay. It preſents to view a vaſt compact maſs of rude columnar ſtones, the forms of which are extremely groſs, many of them being near 150 feet in length, and of a coarſe texture. At the baſe of theſe gigantic columns lies a wild waſte of natural ruins, of an enormous ſize, which, in the courſe of ſucceſſive ages, have been tumbled down from their foundation by ſtorms, or ſome more powerful operations of nature. The maſſive bodies have ſometimes withſtood the ſhock of their fall, and often lie in groups and clumps of pillars, reſembling many of the varieties of artificial ruins, and forming a very novel and ſtriking landſcape. Beſides theſe two promontories, there are ſeveral other parts of the county of Antrim which exhibit a ſimilar columnar baſaltic ſtructure. Thus the mountain of Dunmull, between Coleraine and the river Buſh, abounds in ſuch baſalt, particularly at the craigs of Iſlamore, where two different ranges of columns may be diſcovered; they may be ſeen alſo at Dunluce-hill, near the caſtle of Dunluce; in the bed of the river Buſh, near the bridge of Buſh-mills; on the ſummit of the mountain of Croaghmore; in many parts of the high land over Ballintoy; in the iſland of Raghery, oppoſite Ballycaſtle, and various other places, through an extent of coaſt about fifteen miles in length and two in breadth. Beyond this tract, which abounds in perfect pillars, an attentive obſerver will be able to trace the ſame materials and ſtratification in very diſtant parts of the country, as far as the northern ſhore of Loughneagh, and the mountains of the county of Derry; in many places of which imperfect columnar forms may be obſerved; ſo that the great cauſe which generated this ſpecies of ſtone has been exerted through a ſpace of more than forty miles in length and twenty in breadth; that is, through above eight hundred ſquare miles.

Of the different varieties obſervable in the columns that compoſe the Giants Cauſeway and thoſe of the other parts of the coaſt, the following comparative view has been given by Mr. Hamilton. 1. With reſpect to form and magnitude: the pillars of the cauſeway are comparatively ſmall, not very much exceeding one foot in breadth and thirty in length; ſharply defined, neat in their articulation, with convex or concave terminations to each joint. In many of the capes and hills they are of larger ſize, more imperfect and irregular in their figure and articulations, having often flat terminations to their joints. At Fairhead they are of a gigantic magnitude, ſometimes exceeding five feet in breadth and a hundred in length; often apparently deſtitute of joints altogether. 2. With reſpect to ſituation: the pillars of the Giants Cauſeway ſtand on the level of the beach, from whence they may be traced, through all degrees of elevation, to the ſummit of the higheſt grounds in the neighbourhood, as at the old fort of Dunmull, and on the top of Croaghmore, ſix hundred feet at leaſt above the level of the ſea. 3. With reſpect to diſpoſition and arrangement: at the cauſeway, and in moſt other places, they ſtand perpendicular to the horizon; in ſome of the capes, and particularly near Uſhet harbour in the iſle of Raghery, they lie in an oblique poſition; at Doon-point, in the ſame iſland, and along the Ballintoy ſhore, they form a variety of regular curves. 4. With regard to colour and grain: the Giants Cauſeway baſalt is blackiſh, cloſe, and uniform; its varieties of colour are blue, reddiſh, grey; and of grain, all that can be ſuppoſed from extreme fineneſs to the coarſe granulated appearance of a ſtone, which reſembles imperfect granite abounding in cryſtals of ſhorl, chiefly black, though ſometimes of various colours. 5. With reſpect to texture: though the Giants Cauſeway baſalt be in general compact and homogeneous, yet the upper joint of each pillar, where it can with certainty be aſcertained, is always rudely formed and cellular. The groſs pillars alſo, in the capes and mountains frequently abound in theſe air-holes through all their parts, which ſometimes contain fine clay and other apparently foreign bodies: and the irregular baſalt beginning where the pillars ceaſe, or lying over them, is, in general, extremely honey-combed, containing in its cells cryſtals of zeolite, little morſels of fine brown clay, ſometimes very pure ſteatite, and in a few inſtances bits of agate.

The inland pillars, upon the whole, differ from thoſe which run into the ſea, and are called the cauſeway, only in the following particulars; ſome of the inland pillars are much larger than thoſe of the cauſeway, being two feet and a half in diameter, and among theſe there are only found ſuch as have three, four, five, and ſix ſides, none of them having yet been found to have ſeven or eight ſides, as many of thoſe of the cauſeway itſelf have. And, finally theſe inland pillars, though compoſed of as many joints as thoſe of the cauſeway, yet have not that curious articulation of the ball and ſocket, but are only joined by the laying one ſmooth ſurface on another; ſo that a joint of a ſingle column may be ſlipped off from the reſt, by a conſiderable force preſſing againſt it. There is ſomething like this obſervable alſo in ſome of the columns of the cauſeway itſelf; for among the numbers which are jointed by the ball and ſocket, there are ſome which only adhere by being applied ſurface to ſurface. This is found only in a few of the columns, however, and they always ſtand within the cluſters, and are compoſed of leſs than ſeven ſides. In theſe alſo the joint is not made by the application of two horizontal planes, but by ſuch as ſlant, ſo that it looks very like the breaking of an entrochus or aſteria.

The joints, as we ſee the pillars above the ſurface, are uſually as many in number as the pillar is feet high; but they are not regularly each of a foot long, for they are ſhorteſt at the upper part of the columns, and run gradually longer and longer as they approach the baſe. This is obſerved both in the inland columns, and in thoſe of the cauſeway; but though the length of the joints differs, their convexities and hollows are much the ſame in all parts of the column.

There are other baſaltic columns, ſimilar to thoſe above deſcribed, in our own iſland; particularly at Staffa, one of the weſtern iſlands of Scotland; in the mountain of Caderidris, near Dolgelly, in Merionethſhire; where they probably form a group as in other places. Mr. Strange has given an account of two groups of priſmatic baſaltine columns, which he diſcovered in the Venetian ſtate in Italy; one in Monte Roſſo, about ſeven miles nearly ſouth from Padua, and the other in Monte del Diavolo, near San Giovanni Illarime, about ten miles north-weſt of Vicenza. The form of the latter is nearly circular, reſembling that of the Giants' Cauſeway; that of the former approaching more to an oblong or oval figure: the columns of San Giovanni are much about the ſame ſize, and meaſure about a foot in diameter; thoſe of Monte Roſſo are very unequal, ſome being a foot, while others ſcarcely exceed three inches in diameter: thoſe of both theſe Venetian groups manifeſt all the varieties of priſmatic forms obſervable in the Giants' Cauſeway, and other ſuch groups; but they are commonly of five, ſix, or ſeven ſides, and the hexagonal form ſeems moſtly to prevail. The texture of the former ſort is ſolid and uniform; the ſurface ſmooth, and the internal parts of a dark iron-grey colour; thoſe of Monte Roſſo have a rough and knotty ſurface; and, when broken, manifeſt a variegated colour, and unequal texture of parts; reſembling an inferior ſort of granite, of which the mountain is formed, and which ſerves as a baſe for this range of columns. Other groups of articulated baſaltine columns have alſo been obſerved in the province of Velay and Auvergne in France; particularly by M. De Varennes, at Blaud near Langeac, and by M. Deſmarets, near le Mont d'Or; and M. Sage mentions another near St. Alcon, in the ſame province. Kircher has long ago deſcribed a group of the ſame columns near Viterbo in Italy. Mundus Subterran. lib. viii. § i. cap. 9, &c. And Mr. Strange mentions another at Caſtel Nuovo, in the Euganean hills, about four miles ſouth-weſt of that of Monte Roſſo.

For the various controverſies with regard to the origin of theſe baſaltic columns, and of the fletz-trap-rocks in general, ſee TRAP.

GIANTS' *Head*, in *Geography*, a cape on the eaſt coaſt of the iſland of St. Chriſtopher, a little to the eaſt of Ragged Point.

GIAR, a town of Perſia, in the province of Farſiſtan; 70 miles E. of Schiras.

GIAR, *Al.* See DSJAR.

GIAR *Alnahar*, in *Botany*, a name given by Avicenna, Serapion, and the reſt of the Arabian writers, to the potamogeiton of thoſe times. This is tranſlated by ſome the water-ruſh, but that is founded on an error: it is certain that the plant thus called by the Arabians was very different from the potamogeiton of our times. Avicenna tells us, it had flowers reſembling thoſe of the water-lily; and it ſeems either to have been the ſagitta aquatica or water arrow-head, or elſe the butomus, or ſome of the ſmaller ſpecies of nymphæa.

GIARAF, CAPE, in *Geography*, a cape on the coaſt of Tripoli. N. lat. 34°. E. long. 11°.

GIARDINI, FELICE, in *Biography*, in many reſpects the greateſt performer on the violin during the laſt century. He was a native of Piedmont; and when a boy was a choiriſter in the Duomo at Milan, under Paladini, of whom he learned ſinging, the harpſichord, and compoſition; but having previouſly manifeſted a diſpoſition and partiality for the violin, his father recalled him to Turin, in order to receive inſtructions on that inſtrument of the famous Somis. But though his preference of the violin, upon which he ſoon became the greateſt performer in Europe, ſeems a lucky circumſtance, yet he had talents which would have made him a ſuperior harpſichord player, had he continued to practiſe that inſtrument; but he uſed to ſay, that he was perfectly cured of that vanity at Paris, by the performance of Madame de S. Maur, a ſcholar of Rameau, who played in ſuch a manner, as not only made him aſhamed of his own performance, but determined him never to touch the inſtrument again in ſerious practice. He went to Rome early in his life, and afterwards to Naples, where, having obtained a place among ripienos in the opera orcheſtra, he uſed to flouriſh and change paſſages much more frequently than he ought to have done. "However," ſays Giardini, of whom we had this account, "I acquired great reputation among the ignorant for my impertinence; yet one night, during the opera, Jomelli, who had compoſed it, came into the orcheſtra, and ſeating himſelf cloſe by me, I determined to give the maeſtro di cappella a touch of my taſte and execution; and in the ſymphony of the next ſong, which was in a pathetic ſtyle, I gave looſe to my fingers and fancy; for which I was rewarded by the compoſer with a—violent ſlap in the face; which," adds Giardini, "was the beſt leſſon I ever received from a great maſter in my life." Jomelli, after this, was however very kind, in a different way, to this young and wonderful muſician.

Giardini came to England in the ſpring of 1750. His firſt public performance in London, at which we were preſent, was at a benefit concert for old Cuzzoni, who ſung in it with a thin cracked voice, which almoſt frightened out of the little theatre in the Hay-market the ſons of thoſe who had perhaps heard her at the great theatre in the ſame ſtreet, with extacy. But when Giardini played a ſolo and concerto, though there was very little company, the applauſe was ſo loud, long, and furious, as nothing but that beſtowed on Garrick had ever equalled. We had met him the night before at a private concert, with Guadagni and Fraſi, at the houſe of Napthali Franks, eſq. who was himſelf one of the beſt dilettanti performers on the violin at that time; and we were all equally ſurpriſed and delighted with the various powers of Giardini at ſo early a period of his life; when, beſides ſolos of his own compoſition of the moſt brilliant kind, he played ſeveral of Tartini's, in manuſcript, at ſight, and at five or ſix feet diſtance from the notes, as well as if he had never practiſed any thing elſe. His tone; bow; execution; graceful carriage of himſelf and his inſtrument; performing a MS. piece of a young compoſer in the room, he declared that Giardini had ſo improved it as to make it better than he intended, or had imagined it to be in the warm moments of conception; and laſtly, playing variations extempore, during half an hour, upon a new but extraordinary kind of birth-day minuet, which accidentally lay on the harpſichord—all this threw into the utmoſt aſtoniſhment the whole company, who had never been accuſtomed to hear better performers than Feſting, Brown, and Collet! Of his academy, ſcholars, manner of leading at the opera and oratorio, performance in private concerts, compoſitions vocal and inſtrumental, we ſhall ſay nothing here, leſt our praiſe ſhould be too much for others, and too little for ourſelves.

He ſoon got poſſeſſion of all the poſts of honour in this country. He was engaged and careſſed at moſt of the private concerts of the principal nobility, gentry, and foreign miniſters; at the Caſtle and King's-Arms concert in the city; and in 1754, he was placed at the head of the opera band; in which he introduced a new diſcipline, and a new ſtyle of playing, much ſuperior in itſelf, and more congenial with the poetry and muſic of Italy, than the languid manner of his predeceſſor Feſting; who, except one or two ſeaſons, when Veracini was at the head of the orcheſtra, had led the opera band from the time that Caſtrucci was diſmiſſed, till the arrival of Mingotti.

In 1756, on the failure and flight of the *Impreſario* or undertaker of the opera, Vaneſchi, the Mingotti, and Giardini joined their intereſts, and acquired for a while the ſovereignty of the opera kingdom, by which gratification of their ambition, theſe two great performers were ſoon brought to the brink of ruin, as others had been before them.

But though great applauſe was acquired, and appearances were favourable, yet the profits to the managers were ſo far from ſolid, that they found themſelves involved at the end of the ſeaſon in ſuch difficulties, that they were glad to reſign their ſhort-lived honours, and ſhrink into a private ſtation.

Giardini, while in the opera management, beſides arranging paſticcios, ſet ſeveral entire dramas; but though he had ſo great a hand on his inſtrument, ſo much fancy in his cadences and ſolos, yet he had not ſufficient force or variety to ſupply a whole evening's entertainment at the Lyric theatre. Yet after he had reſigned his throne in the orcheſtra, he frequently threw in a ſingle air or rondeau into the operas of other maſters, which was more applauded than all the reſt of the drama; of this kind were the favourite airs of "Voi amanti," and "Ah non ſo perche tu ſei, &c."

In 1762, on Mattei quitting the management of the opera, in ſpite of former miſcarriages, Giardini and Mingotti again reſumed the reins of opera government. But after ſtruggling two years againſt the ſtream, during the decline of Mingotti's favour, and after an inauſpicious ſeaſon, at the end of 1763, Giardini and his partner again abdicated their thrones. From this period, Giardini, always hovering over his former Lyric kingdom, without the power of invading it, or bringing about a reſtoration, was forced to content himſelf with teaching ladies of rank and faſhion to ſing, and the produce of a great annual benefit. He continued here, unrivalled, as a leader, a ſolo player, and a compoſer for his inſtrument, ſtill augmenting the importance of his inſtrument and our national partiality for the taſte of his country, till the admirable productions and great performers of Germany began to form a Teütonic intereſt and Germanic body here, which, before Giardini's departure from London, became very formidable rivals to him and his Roman legion.

At the end of 1784, he went to Italy, and reſided a conſiderable time at Naples, with ſir William Hamilton, one of his firſt ſcholars on the violin after his arrival in England.

Remaining on the continent till the ſummer of 1789, Giardini returned to this country, bringing with him a female pupil and her whole family, attempting a burletta opera at the little theatre in the Haymarket, while the great opera-houſe, which had been burned down, was rebuilding; but his *prima donna* not being approved, their ſpeculation failed, and he had her and her whole family on his hands. During his abſence the public had learned to do without him, and reconciled themſelves to his loſs; his health, hand and eyes were impaired; he was dropſical, his legs were of an enormous ſize, and little of his former ſuperiority on his inſtrument remained, but his fine tone. He compoſed quartets that pleaſed very much, but in which he never played any other part in public than the tenor. The ſtyle of muſic was changed; he printed many of his old compoſitions which uſed to pleaſe; but now could gain neither purchaſers nor hearers, ſo that about the year 1793, he went to Peterſburg with his burletta troop; which ſeems to have pleaſed as little there and at Moſcow, as in London; and he is ſaid to have died in this laſt city in great wretchedneſs and poverty!

But before we try to account for this melancholy termination of ſo brilliant a career, let us endeavour to do juſtice to his profeſſional abilities.

It is the buſineſs of every artiſt to endeavour to arrive at the head of his profeſſion during the age in which he lives, but no one can be expected to aſpire at ſuperiority over all mankind, paſt, preſent, and to come. Homer, our own Shakeſpeare, and Milton, have, perhaps, ſucceeded in that wiſh, if ever they formed it, and Dryden and Pope have gained two out of three of theſe eras. If Giardini has been ſurpaſſed by a few in taſte, expreſſion, and execution, his tone and graceful manner of playing are ſtill unrivalled, nor does any one, of all the admirable and great performers on the violin, ſurpaſs all others ſo much at preſent, as Giardini did, when at his beſt, all the violiniſts in Europe.

That a man with ſuch talents and intellects as art and nature ſcarcely ever allowed to the ſame individual, who might have realized 40 or 50,000*l.*, ſhould, by extravagance, caprice, and a total want of benevolence and rectitude of heart, die a beggar, unfriended and unpitied, is ſcarcely credible! It is painful to probe the private character of ſuch a man; yet it ſhould not be concealed. Truth and morality require it to be recorded. The kings of Egypt uſed to be tried after their deceaſe.

And if young muſicians of great talents, who are prone to deviate from propriety of conduct, ſhould chance to read this article, it may ſerve as a beacon, and remind them of the poſſibility of ſurviving favour and talents, however great, and terminating their exiſtence in miſery and mortification.

A reſpectable profeſſor, who, from Giardini's firſt arrival in England, was conſtantly attached to him, and a ſincere admirer of his talents, his wit, and even the ingenuity of his ſpleen and ſpite; before he quitted this country in 1784, delineated his character in the following manner, a copy of which came lately to our hands, accidentally.

Sketch of the private character of a great muſician.—"There exiſts a man who would rather gain half a crown by ſuperior ſubtilty and cunning, than a guinea by uſual and fair means; who is of ſo difficult a commerce, that the utmoſt circumſpection, attention, and complaiſance, can only prevent an open rupture, but never put him off his guard, or warm his heart with the fainteſt glow of friendſhip; ſo capricious and ſplenetic, that he has had diſagreements and quarrels with all the firſt perſonages, as well as profeſſors of the ſame art, in the nation, with whom he has had any intercourſe; yet ſuch are his talents, and entertaining qualities, that, in a ſhort time, all elſe is forgotten, and thoſe whom he had offended, are as ready to court his acquaintance as ever; though his rank in his profeſſion and great abilities ſhould ſet him above the envy and petulance of indigent inferiority; yet the ſucceſs of any one of his acquaintance is as torturing and intolerable to his mind, as the gout or ſtone could be to his body. He can bear no muſician who does not ſolely depend on his favour, whom he can lift up and put down with a *coup de baguette*, bring into light, or extinguiſh, at pleaſure. He ſeems, himſelf, to deſpiſe all favour from ſuperiors or even equals, yet he is conſtantly at war with favourites of every kind, public and private. His diſpoſition is ſo truly diabolical, that, preferring the evil principle of the Manicheans to the good of the Chriſtians, if it is a matter of indifference to his intereſt, whether he ſhall ſerve or injure an individual, he would always chuſe the latter. He has conſtantly trifled with fortune as well as favour, and having, in the courſe of his life, acquired great ſums, is indigent, and though ſo much courted, has not one friend; with the brighteſt intellects, and the cleareſt head for buſineſs, his temper renders it ſo impoſſible for any enterprize to thrive under his direction, that the moſt favourable and auſpicious beginnings conſtantly ended in enmity and misfortune. He is as inveterate and powerful an enemy to the opera, oratorio, pantheon, and public and private concerts, when they are not under his direction, as an ex-miniſter uſually is to the government; and yet, notwithſtanding the attractions of his performances, abilities as a compoſer, and experience as a manager, ſo much are his tricks and tyranny held in abhorrence by patentees and proprietors, that they would ſhut their ſhops, rather than open them by his aſſiſtance. His intereſt is now as totally annihilated in the nation, as that of the Stuart family, who, whatever convulſions or revolutions were to happen in the ſtate, would never be called into power."

GIARECAN, in *Geography*, a town of Grand Bucharia; 45 miles N. of Veſhgerd.

GIARGA, a town of the iſland of Corſica; nine miles E. of Calvi.

GIARITCHAS, a group of ſmall iſlands, among the Moluccas. N. lat. 0° 3'. E. long. 127° 18'.

GIARMAL, a town of Hungary; 20 miles E.S.E. of Levens.

GIAROLA, in *Ornithology*. See Alauda *italica*.

GIAROLO, a name by which a ſmall bird of the ſnipe kind, remarkable for its white tail, is known in the markets of Italy. Aldrovandus has called it the *cinclus tertius*. See Tringa *ochropus*.

GIARUD, in *Geography*, a town of Perſia, in the province of Kerman; 20 miles W. of Rauand.

GIARURA, a town of the kingdom of Candahar; 25 miles S.W. of Candahar.

GIASAN, a town of Perſia, in the province of Segeſtan; 25 miles N.E. of Kin.

GIAT, a town of France, in the department of the Puy-de-Dôme; 27 miles W. of Clermont.

GIAVENNA, a town of France, in the department of the Po, ſituated at the foot of the Cottian Alps, near the Sangou; ſurrounded with an ancient wall having four gates, and diſtinguiſhed by its agreeable ſituation and ſalubrious air; 15 miles W. of Turin.

GIAUF, Al, a diſtrict of Egypt, in the S.E. part of the Delta.

GIAVI, a town of the iſland of Sardinia; 21 miles E.S.E. of Algeri.

GIAUKIRI, a town of Aſiatic Turkey, in Natolia, anciently "Sigeum," chiefly inhabited by Greeks.

GIAZA, a town of Italy, in the Veroneſe; 14 miles N.N.E. of Verona.

GIB, in *Agriculture*, a ſort of ſtick with a hook at the end, which is ſometimes uſeful in making and repairing hedges, and for various other purpoſes.

Gib, in *Mechanics*. See Crane.

Gibs, or *Tokings*, in *Mining*, are pieces of wood from two to four or more feet long, with a bird's-mouth or notch cut in each end, that are placed as ſtruts between the four upright poles, at the corners of ſquare or rectangular ſhafts, which are ſupported with wood, inſtead of being ginged or bricked.

GIBAU, in *Geography*, a town of Moravia, in the circle of Olmutz; eight miles N.E. of Olmutz.

GIBBAWAYS, an Indian tribe reſiding in Upper Canada, on the E. ſide of Detroit river, oppoſite to fort Gibraltar.

GIBBEN, a town of the duchy of Courland; 32 miles N.E. of Piltyn.

GIBBETHON, in *Scripture Geography*, a city of Dan, allotted to the Levites (Joſh. xxi. 23.); probably the ſame as *Gabbata*; 12 miles from Eleutheropolis. Here they ſhewed the tomb of the prophet Habbakuk.

GIBBON, Edward, in *Biography*, was born at Putney in 1737. His father was a gentleman of fortune, and ſome years member of parliament. The ſubject of this article was a very delicate and ſickly child, inſomuch that his parents had but little hope of rearing him. From nine years of age to twelve, he was under the tuition of Dr. Woodeſon at Kingſton-upon-Thames. Here he acquired the elements of claſſical learning, and he mentions his twelfth year as particularly "propitious to the growth of his intellectual ſtature," becauſe at this period he read a variety of Engliſh books of poetry, romance, hiſtory and travels. "He then went to Weſtminſter ſchool, but his ill ſtate of health prevented him from making a regular progreſs in the ſtudies of the place. For ſeveral years he was chiefly the object of medical care, till at length, and, as it were, very ſuddenly, his conſtitution acquired firmneſs, and his father immediately ſent him, as gentleman-commoner, to Magdalen college, Oxford. He was probably ill prepared to receive the benefits of an univerſity education, and he ſtigmatiſes the fourteen months that he ſpent there as the moſt idle and unprofitable of his whole life. To a total neglect of religious inſtruction he has attributed a very remarkable incident which took place at this time. He had from an early age been addicted to diſputation on topics of divinity. His leiſure from other purſuits induced him to turn his attention to the controverſies between the Papiſts and Proteſtants. His mind was overſet by the arguments of the former, and in 1753 he had an interview with a popiſh prieſt in London, when he ſolemnly abjured the errors of Proteſtantiſm. He immediately wrote an elaborate letter to his father, in which he avowed the change in his ſentiments, and juſtified the meaſure which he had taken. With all the zeal of a new convert he has ſince declared, "I am proud of an honeſt ſacrifice of intereſt to conſcience: I can never bluſh if my tender mind was entangled in the ſophiſtry that ſeduced the acute and manly underſtandings of Chillingworth and Bayle." He was ſent by his father to Lauſanne, and placed with a Calviniſt miniſter, by whoſe judicious efforts, aided by his own ſound reaſon and mature reflections, his faith in the Romiſh articles gradually gave way, and on Chriſtmas day 1754, he received the ſacrament in the Proteſtant church. During the time he ſpent at Lauſanne, he laid the foundation of that knowledge in the languages, and in the art of logic, which enabled him to make ſo conſpicuous a figure in the literary world. To the "Hiſtory of the Decline and Fall of the Roman empire," we have had occaſion frequently to recur for an elucidation of facts, we may therefore be allowed to ſpeak ſomewhat at large of the author of that work. His ruling paſſion, that of reading, completely developed itſelf in Switzerland, and he wanted no excitements to induſtry, from a tutor. Belles lettres, and the hiſtory of man, and the human mind, were his favourite objects of ſtudy; for the mathematics he had no inclination, and what he did not, and perhaps could not purſue, he was ready to condemn, and congratulated himſelf that he eſcaped from them "before his mind was hardened by the habit of rigid demonſtration, ſo deſtructive of the finer feelings of moral evidence." That this view of the effect of mathematical ſtudies was unjuſt, might be proved from a variety of inſtances in which the ableſt mathematicians have been equally celebrated for their fine taſte and excellent judgment in other branches of literature. In the year 1758 he returned from Lauſanne to London, where he was kindly received by his father, and he found in a mother-in-law, a new relative, who in time conciliated his good will and confidence. He now began laying the foundation of a copious library, and ſoon ſet about preparations for appearing before the public as an author. In 1761, he printed his "Eſſai ſur l'Etude de la Litterature," in one volume 12mo. It was a very reſpectable juvenile performance, and was highly praiſed in the foreign journals. At home it obtained but a ſmall ſhare of public notice. While he was compoſing this work, at leaſt before it was publiſhed, he was engaged in the military profeſſion, which was but ill calculated for a perſon of his turn. The peace, in 1763, ſet him free from a commiſſion which he had held in the militia, and he immediately paid a viſit to Paris, and having ſpent ſome months in that capital, he went to Lauſanne, where he paſſed a year in cultivating ſociety, and in collecting materials for a profitable journey into Italy. This he undertook in 1765, and it was, as he ſat muſing amidſt the ruins of the capitol, while the friars were ſinging veſpers in the temple of Jupiter, that the idea of writing his great work, *viz.* "The Hiſtory of the Decline and Fall of this City," ruſhed into his mind. He had, previouſly to this, proceeded ſome way in another intereſting deſign, and compoſed, in the French language, the firſt book of a Hiſtory of the Swiſs liberty; but this, perhaps on account of its ſtyle, was condemned by a literary ſociety of foreigners in London, to whom it was read, and he committed it to the flames. In 1767, he aſſiſted in compiling a critical work, entitled "Memoires Litteraires de la Grande Bretagne," the ſucceſs of which was but trifling. In 1770 he publiſhed, in his native tongue, a pamphlet, entitled "Critical Obſervations on the ſixth book of the Æneid," which was intended as a refutation of Dr. Warburton's hypotheſis concerning the meaning of the deſcent of Æneas; and in the ſame year, by the death of his father, he ſucceeded to an eſtate conſiderably involved, and from the perplexities of which he ſcarcely ever extricated himſelf. His circumſtances were, however, well ſuited to the taſk he had undertaken as an author: for he thought himſelf, that had he been either much poorer or much richer, he ſhould never have accompliſhed it. Leiſure and books were neceſſary on the one hand; on the other, the ſtimulus of a handſome increaſe of property. His acquaintance was large, but he compenſated the hours devoted to them by early riſing and cloſe application. In 1774, he was, through the intereſt of Mr. Eliot, introduced to a ſeat in parliament, which he occupied during eight years, and gave, ſays he, many a ſilent vote in ſupport of the rights, though not, perhaps, the intereſt of the mother country. Early in 1776 the firſt volume of his "Hiſtory" made its appearance; its ſucceſs was very great, and far ſurpaſſed the moſt ſanguine expectations of the author: "The firſt impreſſion," ſays he, "was exhauſted in a few days; a ſecond and a third edition were ſcarcely adequate to the demand, and the bookſeller's property was twice invaded by the pirates of Dublin." It was received with general applauſe, but the praiſes of none were ſo keenly reliſhed by Gibbon, as thoſe of the two celebrated hiſtorians, Hume and Robertſon, who, inſtead of viewing his riſing fame with jealouſy, promoted it with liberal commendation. In the midſt of his triumph, his two chapters, concerning the growth and progreſs of Chriſtianity, raiſed a ſtorm againſt him, which, as he had not foreſeen, he regarded with ſome alarm He was attacked on all ſides, but as he profeſſed to have written only as a hiſtorian, he declined entering the liſts as a controverſialiſt. In one inſtance his fidelity, as an hiſtorian, was attacked; here he felt that he was called on for a "Vindication," in which it was admitted that he ſucceſsfully repelled the principal charges, and returned them on his antagoniſt. It was ſuggeſted, in the two chapters referred to, that the progreſs of Chriſtianity was peculiarly favoured by ſecondary cauſes, and of courſe that its origin was not divine: though this theory had not been deſtitute of advocates among ſincere believers in the truth of the Chriſtian ſyſtem, yet there is little doubt that Gibbon was an unbeliever, and he wrote in this part of his work under the maſk of a friend. His pretenſions were unveiled by many excellent writers, who ranked high in the eſtabliſhed church, and by others who were not in the church, but who were equally alive to the ſpread of ſceptical principles, and active in oppoſing their propagation. After he had reſumed his work, he was ſolicited by miniſters to write an anſwer to the manifeſto of the court of France, on its declaration of hoſtilities. On this occaſion he publiſhed his "Memoire Juſtificatif;" it was written in French, and much admired for its ſtyle and its reaſoning, and was delivered, as a ſtate paper, to the courts of Europe. For this ſervice he was rewarded with the appointment of one of the Lords of Trade, by which a handſome addition was made to his income, and little to his engagements. In 1781 the ſecond and third volumes of his Hiſtory appeared, which ſupported the reputation which he had already acquired. Upon the diſſolution of lord North's miniſtry, the board of Trade was aboliſhed, as occaſioning only an uſeleſs expence to the ſtate. The defalcation in Mr. Gibbon's income no longer permitted him to ſupport the ſame ſtyle of living in his own country, and he removed his reſidence to Lauſanne: here, in an elegant retreat, he finiſhed his Hiſtory, in three other quarto volumes, which were publiſhed in 1788. It was with real regret that he diſmiſſed an occupation, which had given to many years of his life that zeſt which an intereſting object of purſuit can alone impart. He came to England to ſuperintend the printing of his work, and then returned to Lauſanne, to ſpend, as he hoped, the remainder of his days; but the ſtorms of the French revolution, which menaced the quiet and happy regions of Switzerland, gradually looſened his attachment to Lauſanne, and he began to look towards England for a refuge. He regarded the events that were taking place in France with the utmoſt abhorrence, and he either was, from habit, or had become ſo from the occurrences of the times, a decided enemy to every ſpecies of public reform. He avowed his aſſent to Mr. Burke's creed, which he had vindicated in his "Reflections:" "I admire," ſays he, "his eloquence, I approve his politics, I adore his chivalry, and I can almoſt excuſe his reverence for church eſtabliſhments." Mr. Gibbon returned to England in 1793, but after a few months reſidence his attention was forcibly called to the progreſs of a diſeaſe, which had ſubſiſted in a ſmall degree for thirty years, and which now terminated his exiſtence, Jan. 16, 1794. He has characterized himſelf in the following words: "I am endowed with a chearful temper, a moderate ſenſibility, and a natural diſpoſition to repoſe rather than activity; ſome miſchievous appetites and habits have, perhaps, been corrected by philoſophy or time. The love of ſtudy ſupplies each day, each hour, with a perpetual ſource of independent and rational pleaſure." "He was," ſays his biographer, "eaſy in ſociety, and fond of it; he was beloved by his friends, and had, in an eminent degree, the manners and habits of a gentleman. Early indulgence and habit had made the conveniences and elegances of cultured life eſſential to his comfort, and he was not one who could have been content with the conſciouſneſs of mental ſuperiority in an humble ſtate. His great work, which will long be a monument to his fame, is a performance of vaſt and accurate reſearch, and of enlarged and philoſophical thinking: it abounds in ſplendid paſſages, and its ſtyle diſplays a thorough maſtery of the whole compaſs of the Engliſh language." After his death two quarto volumes of his miſcellaneous works were publiſhed by lord Sheffield, containing, among other things, memoirs of his life and writings, compoſed by himſelf; to which the reader is referred for more particulars relating to this celebrated man.

GIBBONS, Orlando, without exception, the beſt compoſer for the church during the reign of king James I. and though not bleſt with longevity, yet, during his ſhort life, he contributed amply to the muſic of the church, which he enriched with numerous compoſitions, that are ſtill freſh and in conſtant uſe among the beſt productions within its pale.

This excellent muſician, a native of Cambridge, was brother of Edward Gibbons, bachelor of Muſic, organiſt of Briſtol, gentleman of the Chapel Royal, and maſter of Mathew Lock; and of Ellis Gibbons, author of two madrigals in "the Triumphs of Oriana," who is ſtiled by Ant. Wood, "the admirable organiſt of Saliſbury." In 1604, at the age of twenty-one, Orlando was appointed organiſt of the Chapel Royal, in the room of Arthur Cock. In 1622, he was honoured at Oxford with a doctor's degree in muſic, at the ſame time as his friend Dr. Heyther, when both were countenanced and favoured with indulgencies in the univerſity in conſequence of letters from the learned Camden, who recommended them with friendly zeal to its notice. According to Ant. Wood, the academical exerciſe in ſix or more parts, performed at this time for Heyther's degree, was compoſed by Orlando Gibbons, "as one or more eminent muſicians then living had ſeveral times told him." So that *grown-gentlemen*, as well as boys, through idleneſs or ignorance, are ſometimes reduced to the humiliating neceſſity of having recourſe to the charity of friends, before they can exhibit an exerciſe.

A manuſcript copy of the exerciſe performed for Dr. Heyther's degree, is ſaid to have been found, ſigned with the name of Orlando Gibbons. It is an anthem for eight voices, taken from the forty-ſeventh pſalm; and appears to be the very ſame compoſition as the anthem of Orlando

Gibbons, to the words "O clap your hands together all ye people." Printed in Boyce's Cath. Muſ. vol. ii. p. 59.

The harmony in Gibbons's ſervice in F, printed by Dr. Boyce, is pure, clear, and grateful; and the melody more accented and flowing than we have found in any choral muſic of equal antiquity.

The two parts in one, of the *Gloria Patri*, though they may be the cauſe of ſome confuſion in the words, diſcover no reſtraint or ſtiffneſs in the melody, which continues to move with the ſame freedom, as if no *canon* had exiſtence. And though the *puriſts*, on account of the confuſion ariſing from all the parts ſinging different words at the ſame time, pronounce the ſtyle, in which his full anthems are compoſed, to be vicious; yet the lovers of fugue, ingenious contrivance, and rich, ſimple, and pleaſing harmony, muſt regard them as admirable productions, *alla Paleſtrina*, a ſtyle in which Tallis and Bird acquired ſo much renown.

Beſides his admirable choral compoſitions, O. Gibbons was author of melodies in two parts to the hymns and ſpiritual ſongs of the church, tranſlated by George Withers, and of ſeveral other works which are mentioned elſewhere. See FANTASIA and PARTHENIA.

Dr. Tudway, in the dedication of the firſt volume of his manuſcript "Collection of the moſt celebrated Services and Anthems uſed in the Church of England," addreſſed to Lord Harley, for whom it was made; after a juſt and warm eulogium on the abilities of Tallis and Bird, ſays that "none of the later compoſers could ever make appear ſo exalted a faculty in compoſitions for the church, except that moſt excellent artiſt, Orlando Gibbons, organiſt and ſervant to king Charles I. whoſe whole ſervice, with ſeveral anthems, are the moſt perfect pieces of church compoſitions which have appeared ſince the time of Tallis and Bird; the air ſo ſolemn, the fugues and other embelliſhments ſo juſt and naturally taken, as muſt warm the heart of any one, who is endued with a ſoul fitted for divine raptures." To this encomium every candid judge of harmony will readily ſubſcribe; but when the doctor tells us, that the celebrated ſervice in F was compoſed by Orlando Gibbons in 1635, he furniſhes no very favourable proof of his knowledge in chronology; as it is recorded on the monument erected to his memory by his widow, that he died ten years before that period. For in 1625, being commanded, *ex officio*, to attend the ſolemnity of the marriage of his royal maſter, Charles I. with the princeſs Henrietta of France, at Canterbury, for which occaſion he had compoſed the muſic, he was ſeized with the ſmall-pox, and dying on Whitſunday, in the ſame year, was buried in that cathedral.

GIBBONS, *Dr.* CHRISTOPHER, was the ſon of Orlando Gibbons, and ſcholar of his uncle Ellis Gibbons, organiſt of Briſtol. He had been honoured with the notice of Charles I. and was of his chapel. At the reſtoration, beſides being appointed principal organiſt of the Chapel Royal, private organiſt to his majeſty, and organiſt of Weſtminſter Abbey, he obtained his doctor's degree in muſic at Oxford, in conſequence of a letter written by his majeſty Charles II. himſelf, in his behalf, which is inſerted by Ant. Wood in the Faſti Oxon, vol. ii. Col. 158; who ſays, that he completed his degree in an act celebrated in St. Mary's church, July 11, 1664.

The compoſitions of this maſter, which were not numerous, ſeem never to have enjoyed a great degree of favour; and though ſome of them are preſerved in the Muſeum collection, they have long ceaſed to be performed in our cathedrals. His abilities on the organ, however, muſt have been conſiderable, to entitle him to the ſtations he filled, at a time when the ſtyle of playing that inſtrument was ſo much more complicated and elaborate than at preſent. Dr. Blow, who, in ſinging and compoſition, was educated by Captain Cook, is ſaid to have been a ſcholar on the organ of Dr. Chriſtopher Gibbons, who died 1676.

Orlando Gibbons had two brothers, Edward and Ellis, the one organiſt of Briſtol, and the other of Saliſbury. Edward was a Cambridge bachelor of muſic, and incorporated at Oxford, 1592. Beſides being organiſt of Briſtol, he was prieſt-vicar, ſub-chanter, and maſter of the choiriſters in that cathedral. He was ſworn a gentleman of the chapel, March 21, 1604, and was the maſter of Matthew Lock. In the Triumphs of Oriana, there are two madrigals, the one in five, and the other in ſix parts, compoſed by Ellis Gibbons. Wood ſtyles him the admired organiſt of Saliſbury. Of Edward Gibbons, it is ſaid, that in the time of the rebellion he aſſiſted king Charles I. with the ſum of one thouſand pounds; for which inſtance of his loyalty, he was afterwards very ſeverely treated by thoſe in power, who deprived him of a conſiderable eſtate, and thruſt him and three grand-children out of his houſe, though he was more than fourſcore years of age.

GIBBOSITY, in *Surgery*. See SPINE, *Curvature of*.

GIBBOUS, in *Aſtronomy*, is uſed in reference to the enlightened parts of the moon, while ſhe is moving from full to the firſt quarter, and from the laſt quarter to full again; for all that time the dark part appears horned, or falcated, and the light one bunched out, convex, or gibbous.

GIBBOUS *fiſh*, *gibboſus piſcis*, in *Ichthyology*, a name given by Mr. Ray to the fiſh called by the Dutch *kromrugh*. It is a ſmooth fiſh without ſcales, its belly is white, its fins and tail black. It grows to a conſiderable ſize, ſometimes to four feet. It is caught all over the Eaſt Indies, near the ſea ſhores, and is very firm, and much eſteemed at table. It has its name from the remarkable riſing of its back, which is like that of the perch, but much higher. Ray's Ichthyolog Append. p. 4.

GIBBY, in *Geography*, a cluſter of ſmall iſlands, in the Eaſt Indian ſea, about twelve leagues in circumference, well inhabited, ſituated on the equator. E. long. 126° 5′.

GIBE', a town of Arabia, in the province of Nedſjed; 130 miles E. N. E. of Hajar.

GIBEAH, in *Scripture Geography*, a city of Benjamin, the birth-place of Saul, the firſt king of Iſrael. (Joſh. xviii. 24 Ezra ii. 26. Nehem. vii. 30.) Gibeah was about two leagues N. from Jeruſalem. In Jerome's time it was entirely deſtroyed.

GIBEL-EL-TOR, a mountain of Paleſtine, anciently called *Mount Tabor*, which ſee.

GIBELET, or GABYLE, a ſea-port of Syria, anciently called "Gabala" and "Gabulon," ſituated on the coaſt of the Mediterranean, at the mouth of the river Jebilee; 12 miles S.S.W. of Tripoli.

GIBELIN, a town of Paleſtine; eight miles E. of Gaza.

GIBELINS, GIBELLINS, *Gibellings*, or *Ghibelins*, a famous faction in Italy, oppoſite to another called the Guelphs.

The Guelphs and Gibelins ravaged and laid waſte Italy for a long ſeries of years: ſo that the hiſtory of that country, for the ſpace of three centuries, is only a detail of their mutual violences and mortal wars.

The Guelphs ſtrenuouſly aſſerted the power of the ſee of Rome, as the Gibelins did the emperor's right of ſovereignty.

We have but a very obſcure account of their origin, and the reaſon of their names: the generality of authors affirm, that they aroſe about the year 1240, upon the emperor Frederic the IId's being excommunicated by pope Gregory IX.

That prince, ſay they, making a tour among the cities of Italy, gave the name Gibelins to ſuch as he found well affected to him; and that of Guelphs to thoſe who adhered to the pope. But as to the reaſon and ſignification of theſe words, there is a deep ſilence; Gibelin might be poſſibly formed of *gebieter, imperator;* whence *gebieteriſch, imperioſe.* Of *gebieter,* the Italians might make, by corruption, Gibelin; ſo that Gibelins, in this light, ſhould be the ſame with Imperiales, or ſuch as followed the emperor's party.

By the way, ſome writers maintain, that the two factions aroſe ten years before; though ſtill under the ſame pope and emperor.

Other hiſtorians relate, that Conrad III. marching into Italy, in the year 1139, againſt the Neapolitans, Roger, count of Naples and Sicily, in order to defend his ſtates, called to his aſſiſtance Guelph duke of Bavaria; and that one day, when the two armies were ready to join in battle, the Bavarians cried out in High Dutch, *hie, Guelph!* or, as others ſay, in Flemiſh, *hier, Guelph!* that is, *here, Guelph!* and that the Imperialiſts anſwered on their ſide, with the words *hie,* or *hier, Gibelin! here, Gibelin!* calling the emperor by the name of the place where he had been bred.

Hornius refers the names to the war in 1140, between Henry the Proud, duke of Bavaria and Saxony, and Conrad III. duke of Suabia; the two princes preparing to engage near the town of Winſberg, the Bavarians began to cry out Guelph, which was the name of duke Henry's brother; and the partiſans of the emperor Weibelingen, which was the name of the place where that prince was born and bred, in the duchy of Wirtemberg, whoſe ſurname he bore: from which Weibelingen the Italians at length formed Gibelin.

This account is confirmed by Martin Cruſius: "Initium Gibelinæ (Wibelinæ à patria Conradi regis) et Welficæ concertationis." Conrad being of Weibelingen, that word, ſays Cruſius, gave riſe to *gibellingue,* and that to *gibelling, Gibelins, Gibellini.*

Platina, on the other hand, aſſures us, that the name Gibelins aroſe from that of a German at Piſtoya; whoſe brother, named Guelph, gave likewiſe his name to the oppoſite faction: the two brethren, it ſeems, bearing an irreconcileable hatred. Others maintain, that the emperor gave the appellation Gibelins to thoſe of his party, from the German word *gipffe',* ſignifying *ridge,* or *top;* becauſe the empire reſted on them, as the rafters of a houſe leans on the ridge, which joins them a-top.

Karus, a learned canon of Straſbourg, in the lives of the emperors of the houſe of Brunſwick, is of the ſecond opinion above related: in a battle, ſays he, between Welff, or Guelff, and Frederic, the army of the firſt crying out, *hie, Welf, hie, Welf!* the ſecond commanded his to cry out *hie, Gibeling! hie, Gibeling!* the name of his birth-place: and the French and Lombards aſking the ſignification of thoſe words, they were anſwered, that by *Welff* was meant the pope's party; and, by *Gibelin,* the emperor's.

Yet others contend, that the word Gibelin is only a ſoftening of the word *gibertin,* or *guibertin;* and that it aroſe from Guipert, an antipope, ſet up by the emperor Henry III. in the year 1080.

Among many other conjectures, Maimbourg, in his Hiſt. de la Decad. de l'Emp. advances another opinion, that the two factions, and their names, aroſe from a quarrel between two very ancient and illuſtrious houſes on the confines of Germany, that of the Henrys of Gibeling, and that of the Guelphs of Adorf. See Machiavel.

It is ſaid by ſome, that the Gibelins, when driven out of Italy long after the year 1229, at which period the conteſt between them and the Guelphs ran very high, and ſettled at Amſterdam, were the inventors of the mercantile practice of re-change, or re-exchange, on bills of exchange, on account of the damages and charges they were put to, and the intereſt of the money of their bills proteſted, which had been given to them for the effects they had been obliged to leave behind them. Anderſon's Hiſt. Commerce, vol. i. p. 110. See GUELPHS.

GIBELLO, in *Geography,* a town of the duchy of Parma, on the right bank of the Po; 16 miles N.W. of Parma. N. lat. 45° 1'. E. long. 10° 7'.

GIBEON, in *Scripture Geography,* the capital city of the Gibeonites, who availed themſelves of the oaths of Joſhua, and of the elders of Iſrael, on an artful repreſentation which they made of their belonging to a remote country. (Joſh. ix.) Joſhua and the elders made an unadviſed league with them; but upon a diſcovery of their miſtake, they ſpared their lives, and condemned them to the ſervile office of carrying wood and water to the tabernacle, and other work of a ſimilar kind, in token of their puſillanimity and duplicity, as ſlaves and captives. In this ſtate of ſervitude they remained till the entire diſperſion of the Jewiſh nation, A.M. 2553. The Gibeonites were deſcended from the Hivites, the old inhabitants of the country, and poſſeſſed four cities, *viz.* Cephira, Beeroth, Kirjath-jearim, and Gibeon, the capital, afterwards given to Benjamin, excepting Kirjath-jearim, which was aſſigned to Judah. The Gibeonites ſubmitted to the burthens impoſed upon them by Joſhua, and continued faithful to the Iſraelites. Nevertheleſs Saul deſtroyed a very great number of them (2 Sam. xxi. 1, 2, 3, &c.); but God, as a puniſhment of his cruelty, in the reign of David, cauſed a great famine, which laſted three years (A. M. 2983. B. C. 1017); and David was informed by the prophets, that this calamity would continue as long as that cruelty, which Saul had exerciſed againſt the Gibeonites, remained unretaliated. The Gibeonites, being aſked what ſatisfaction they required, anſwered, "Seven of Saul's ſons will we put to death, to avenge the blood of our brethren." Accordingly the Gibeonites crucified them in the beginning of ſpring, when, in Paleſtine, the barley-harveſt commenced. From this time we find no mention of the Gibeonites, as forming a ſeparate people. But they were probably included among the "Nethinim," who were public ſlaves appointed for the ſervice of the temple. (1 Chron. ix. 2.)

Gibeon was ſeated on an eminence, as appears by its name, denoting a hill; it was 40 furlongs N. from Jeruſalem, according to Joſephus. It is called "Gabæa" (ſee 2 Sam. v. 25, compared with 1 Chron. xiv. 16.) We find mention of the fountain and pool of Gibeon. (2 Sam. ii. 13.) The tabernacle and altar of burnt offerings, made by Moſes in the wilderneſs, were removed to Gibeon. (1 Chron. xxi. 29, 30.) When Solomon was ſeated on the throne, he went to ſacrifice at Gibeon, becauſe this was the moſt conſiderable of all the high places where ſacrifices were then tolerated, the temple not being yet built. (1 Kings, iii. 4.)

GIBERT, BALTHASAR, in *Biography,* was born at Aix in 1662. He was educated partly at Paris and partly at Soiſſons. At the age of twenty-two he was appointed to teach philoſophy at the college of Beauvais, and in 1688 he obtained the profeſſorſhip of rhetoric in the college of Mazarin at Paris, which office he filled with great reputation more than fifty years. He was a zealous defender of the privileges of the univerſity, of which he was ſeveral times choſen rector. He obtained other preferments connected with the univerſity, but on account of his oppoſition to the revocation of an appeal made by the univerſity againſt the bull Unigenitus, the court, in 1740, exiled him to Auxerre. He died in the following year at the age of ſeventy-nine. He was author of many works, in which are diſplayed much erudition and ſolidity of judgment, but the ſtyle is ſomewhat involved. Among his publications are "De la veritable Eloquence;" "Reflexions ſur la Rhetorique;" "Jugemens des Savans ſur les Auteurs qui ont traitè de la Rhetorique," in three volumes 12mo. Moreri.

GIBERTI, Giammateo, a very learned prelate of the church of Rome, was born at Palermo towards the cloſe of the fifteenth century. He viſited Rome when he was but twelve years of age, where he was diſtinguiſhed for the brilliancy of his talents, and was introduced to pope Leo X. who entertained a great regard for him. He had a thirſt for polite literatute, but was, at an early age, taken from the purſuit, and placed in the ſervice of a perſon of high rank. By pope Clement VII. he was employed in ſome very important legations to the king of France and other potentates. In 1523 he obtained from his patron the government of Tivoli, and in the following year he was created biſhop of Verona: he was not, however, allowed to take poſſeſſion of his ſee, but was kept at Rome as the adviſer and friend of the pope. In 1527 Giberti was given as one of the hoſtages by the pope to the Imperial army, on which occaſion he underwent much ill treatment, and was more than once threatened with a ſhameful death. He was, at length, through the interpoſition of his friend, Cardinal Pompeo Colonna, reſtored to his liberty, and retired to his biſhopric, on which he continued to reſide till his death, except when occaſionally ſummoned to Rome by Paul III. He died in 1543, and his works, which were numerous, have been publiſhed collectively; they chiefly conſiſt of his conſtitutions and regulations for the government of his church, which under his direction became a model of eccleſiaſtical diſcipline. He eradicated many abuſes, and was profuſe in alms to the poor. He was the patron of learned men who reſorted to his palace, among whom was the celebrated poet Flaminio. He printed at his own expence, and under his own eye, ſeveral works of the fathers, and in order to render his editions correct, he entertained ſeveral Greek copyiſts. Moreri.

GIBET, or Gibbet, a machine in manner of a gallows whereon notorious criminals, after execution, are hung in irons, or chains: as ſpectacles, in terrorem.

The word in French, *gibet*, properly denotes what we call *gallows*: it is ſuppoſed to come originally from the Arabic *gibel*, *mount*, *elevation of ground;* by reaſon gibets are uſually placed on hills, or eminences.

GIBLETS, the offals or entrails of a gooſe; including the heart and liver, with the feet, gizzard, &c.

The word is ſuppoſed to be formed of *goblets*, from the French *gobeau*, *mouthful*.

Giblets make a conſiderable article in cookery: they boil giblets, ſtew giblets, make ragouts of giblets, giblet-pies, &c.

GIBLIEN, in *Geography*, a town of Egypt, on the left bank of the Nile; 14 miles N. of Aſna.

GIBLOS, a city on the coaſt of Phœnicia, between Tripoli and Berytus; called alſo *Byblos*, which ſee.

GIBON, a town of the iſland of Cuba; 22 miles N.N.E. of Bayamo.

GIBRALEON, a town of Spain, in the province of Seville, on the river Odiel, with a harbour for ſmall fiſhing veſſels; containing about 150 houſes in two pariſhes, and ſituated about 10 miles from the Atlantic; 44 miles W. of Seville. N. lat. 37° 20′. W. long. 7° 1′.

GIBRALTAR, derived from *Gebel*, an arabic word ſignifying mountain, and *Tarik*, the name of a Mooriſh general, who conquered Spain and diſembarked here in the year 712, is a town of Spain, in the province of Andaluſia, but belonging to Great Britain, ſituated on a rock, at the ſouthern extremity of Europe, and reckoned one of the keys of Spain. This rock forms a promontory from Spain into the ſea, oppoſite another promontory extending from Africa, bounding a narrow ſea, which unites the Atlantic with the Mediterranean, called in Latin "Fretum Herculaneum, or Gaditaneum," and in Engliſh the *Straits of Gibraltar*. The length is about eight leagues, and the breadth, in the narroweſt parts, nearly five. On theſe two promontories are placed the famous mountains of Calpe in Europe, and Abila in Africa, known to the ancients by the name of the pillars of Hercules. From the top of the promontory of Calpe, the eye commands an extent of 40 leagues, two ſeas, and five kingdoms, *viz.* Seville and Granada, in Spain, and Barbary, Fez, and Morocco, in Africa. In endeavouring to trace the town mentioned by Mela, Strabo, and Pliny, under the names of Calpe, Cartheya, Melaria, Belo, and Beſipo, and alſo the promontory of Juno, ſituated from eaſt to weſt on the ſhore of the ſtraits, no veſtige is perceived, except the mountain and ſcite of Cartheya; which latter city paſſed from the poſſeſſion of the Phœnicians to that of the Carthaginians, and is now reduced to a mere heap of ruins, ſcarcely diſcernible in the bay of Gibraltar, where the Carthaginian tower was alſo ſituated. This ground is now occupied by a mean farm. On caſting your eyes over the kingdoms of Granada and Seville, you ſee the lofty ridges of the deſert del Cuervo, as well as the mountains of Hogen and Sanorra, and towards the eaſt, oppoſite to Gibraltar, the new town of Algeziras. In the middle of this incloſure you diſtinguiſh the ruins of Great Cartheya; at a ſhort diſtance, on a little hill, the town of St. Roche is ſituated; on the eaſt you perceive the chain of mountains, called the Sierra de Ronda, abounding in fruits and aromatic plants. Near theſe ſtood the town of Munda, ſo celebrated in Roman hiſtory as the ſcene of the battle between the ſons of Pompey and Auguſtus, when they were diſputing the empire of the world. The objects which bound the horizon on the right are the Sierra Neveda, and the Alpujarras; on which the ſnow lies all the year. The mountains ſupply a number of fountains and rivulets of clear water, forming the ſources of the Xenil and the Darro; rivers which water the city of Granada and give fertility to the rich province of Andaluſia.

The promontory on the European ſide is joined to Spain by an iſthmus, or neck of land, ſo narrow, that from ſome aſpects the rock has the appearance of an iſland. The length of the iſthmus is about 200 paces; acroſs which the Spaniards have drawn a line and fortified it, to prevent the garriſon from having any communication with the country.

The form of the rocky mountain, on which the fortreſs of Gibraltar is built, is oblong; its ſummit is a ſharp craggy ridge, extending nearly from N. to S., almoſt three miles, and in breadth no where exceeding $\frac{3}{4}$ of a mile. The line of its ridge is undulated, and the two extremes are ſomewhat higher than the centre. The ſummit of the Sugar-loaf, which is the higheſt point towards the ſouth, is elevated to the height of 1439 feet; the Rock-mortar, which is the higheſt eminence to the north, is 1350 feet; and the Signal-houſe, which is nearly the central point between theſe two, is 1276 feet above the level of the ſea. The weſtern ſide of the mountain forms a ſeries of rugged ſlopes, interſperſed with abrupt precipices. Its northern extremity is perfectly perpendicular, except towards the N. W., where what are called the Lines intervene, and a narrow paſſage of ground that leads to the iſthmus, and is entirely covered with fortification. The eaſtern ſide of the mountain moſtly conſiſts of a range of precipices; but a bank of ſand, riſing from the Mediterranean in a rapid acclivity, covers a third of its perpendicular height. Its ſouthern extremity falls in a rapid ſlope from the ſummit of the Sugar-loaf into a rocky flat of conſiderable extent, called Windmill Hill. The principal maſs of the mountain rock conſiſts of a grey, denſe marble; the different beds of which preſent to Spain a face of 1350 feet of perpendicular height, in a conical form. Theſe beds, or ſtrata, are of various thickneſs, from 20 to upwards of 40 feet, dipping in a direction from eaſt to weſt, nearly at an angle of 35 degrees. In ſome parts of the ſolid maſs of this rock, we find teſtaceous bodies entirely tranſmuted into the conſtituent matter of the rock, and their interior hollows filled up with calcareous ſpar; but theſe do not occur often in its compoſition, and its beds are not ſeparated by any intermediate ſtrata. This rock is ſuffering a ſlow, but conſtant depoſition; and the uncovered parts of it preſent holes of various ſizes, hollowed out of the ſolid rock, and apparently formed by the attrition of gravel or pebble, ſet in motion by the rapidity of rivers or currents in the ſea; whence it is preſumed, that, however high the ſurface of this rock may now be elevated above the level of the ſea, it has once been the bed of agitated waters. On the weſt ſide of the mountain, towards its baſe, ſtrata occur, which are of a different kind from the mountain rock. (See Major Imrie's mineralogical Deſcription of Gibraltar in the Tranſactions of the Royal Society of Edinburgh, vol. iv.)

The firſt, or higheſt, forms the ſegment of a circle, its convex ſide being towards the mountain, and its ſlope being in that direction. This ſtratum conſiſts of a number of thin beds; the outward one, which is the thinneſt, is in a ſtate of decompoſition, and is mouldering down into a blackiſh-brown or ferruginous coloured earth. The beds below this increaſe progreſſively in breadth to 17 inches, where the ſtratification reſts upon a rock of an argillaceous nature. This laſt bed, which is 17 inches thick, conſiſts of quartz of a blackiſh-blue colour, in the ſepta or cracks of which are found quartz cryſtals, colourleſs and perfectly tranſparent. Theſe cryſtals are compoſed of 18 planes, diſpoſed in hexangular columns, terminated at both extremities by hexangular pyramids. The largeſt ſeen by major Imrie, did not exceed one-fourth of an inch in length; they generally adhere to the rock by the ſides of the column, but are detached without difficulty. Their great degree of tranſparency has obtained for them the name of "Gibraltar diamonds." The rock is completely beſet with batteries, thrown up at all points, where the aſcent could not be rendered completely inacceſſible; ſo that from Europa Point, which advances fartheſt into the ſea on the ſouth ſide, to the higheſt part of the rock, which is that of the north (at about two miles diſtance from the other), there is not a ſingle point, which is not put into a defenſible condition. On the ſide neareſt Spain, the internal fortifications, made ſince the time Gibraltar was beſieged by the combined armies of France and Spain, are aſtoniſhing. Theſe improvements are principally owing to general O'Hara, the late governor; a great number of workmen having been employed about it, for eight years, at an immenſe expence. In order to form ſome idea of the labour expended on theſe fortifications, it will be ſufficient to obſerve, that the excavations effected by the force of gun-powder, in the centre of the mountain, and in the ſolid rock, form vaults of ſuch height and extent, that during a ſiege they are capable of containing the whole garriſon. Theſe caverns, of which the moſt conſiderable is the hall of St. George, communicate with the other batteries, eſtabliſhed along the mountains by a winding road, paſſable on horſe-back. On returning towards Europa Point, as you enter the town, your attention is engaged by conſiderable fortifications, barracks, magazines, and batteries, placed wherever the nature of the ground would admit. On the higheſt point of land the tower of St. George was built, under the directions of general O'Hara, who intended to raiſe it to a ſufficient height for commanding the whole of Cadiz, and obſerving all that paſſed in that port; but the undertaking, being diſapproved by the Britiſh government, was left in an unfiniſhed ſtate. Along the mountain are ſeveral grottos, or natural excavations, the moſt famous of which is that of St. Michael; the height of the entrance being 437½ (varas) yards above the level of the ſea. The cavern below is at leaſt 70 feet, and contains columns of cryſtallizations and ſtalactites, reſembling all the orders of architecture. About 100 paces from its gate is another beautiful cavern, 65 varas ſquare, and the vault 21 varas high. On the right is a ſecond excavation, adorned with caprices of nature ſimilar to thoſe of the former, but ſo regularly diſpoſed, that it has the appearance of a temple. Perhaps this was formerly uſed for conſulting ſome oracle, probably that of Hercules, who was the principal divinity of the place, as well as of the cave in the promontory of Ampeluſia, on the coaſt of Africa. From the entry of this cavern you diſcover the whole of the bay of Gibraltar, two leagues acroſs from eaſt to weſt, and three from north to ſouth. You alſo command a view of the country-houſes, the flower and kitchen gardens, which the inhabitants have formed one above the other, on the ſide of the mountain, up to the royal road, and the public walk, extending for about half a mile from the town of Gibraltar to the new town on the ſouth. The Engliſh have ſpared no pains in covering the rock with trees and flowers, in ſupporting the earth with walls and props, in cutting a number of roads through the ſolid rock, and in making them paſſable on horſe-back and in carriages up to the very ſummit. They have even ſome artificial meadows for their flocks. From the grotto of St. Michael, ſituated on the ſouthern part of the mountain, at an almoſt equal diſtance, the Signal tower and the Sugar loaf, the entrance of which is 5000 feet above the level of the ſea, you diſcover the magazines, the batteries, the new town; on the ſouth, the marine hoſpital, which is a handſome and convenient building. The view extends over a number of country-houſes, to ſome of which beautiful gardens are attached; in time theſe new buildings will form a town as conſiderable as that of Gibraltar. Near theſe are eight magnificent ciſterns, large enough to contain 40,000 tons of water, and bomb-proof; they receive all the water which flows down the ſide of the mountain, previouſly purified in coppers erected for the purpoſe. On the ſouth ſide you perceive a number of mountains, called Tarfes; and near them formerly ſtood a very ancient tower, with a ciſtern and well. In a cave not far diſtant ſeveral ſtones have been found with human bones above the common ſize, ſo ſtrongly incruſted in them as to form one ſolid maſs. (See *Foſſile* Bones.) From Europa Point to the gate on the land-ſide are ſeveral moles, which facilitate the unloading of ſhips, and enable them to caſt anchor in ſecurity. Before you arrive at the ſouth gate you obſerve a handſome, large, ſquare, ſurrounded with trees, now called the Field of Mars, formerly the Red Sand; of ſuch a ſize, that the 6000 men, uſually compoſing the garriſon, can perform their manœuvres without inconvenience. Here the guard always muſters, and on Sundays and holidays they make it the grand parade.

The prevailing forms of religion in this promontory are the Catholic, that of the church of England, and the Jewiſh, each of which has its own burying ground, among the ſandy earth of the mountain.

The town of Gibraltar is on the weſt ſide at the foot of the mountain; it is large, well built, fortified with ſtrong walls, baſtions, and works to cover them; a large fort protects and maſks the mole, built in the form of a bridge, 300 feet long; a church is built near it; and on the land ſide is another mole, which covers the part fortified by a fort with a tower, and two or three breaſt-works, thrown up in front. On entering the town by the ſouth gate, you perceive on the left an edifice, containing the library of the officers of the garriſon; conſiſting chiefly of the works of modern authors. The governor's houſe is built on the ground formerly occupied by the convent of Franciſcans; to which is attached a beautiful garden, which, on Thurſday and Sunday evenings, during the ſummer, is the promenade of the officers of the garriſon and inhabitants of the city. The principal ſtreet into which you enter on leaving the governor's houſe, is the reſidence of the merchants, and on the right is the Catholic chapel, rebuilt in an excellent ſtyle of architecture; this ſtreet extends almoſt through the whole length of the city, being more than half a mile long, and on each ſide it has handſome flat pavements, and a number of ſhops from one end to the other. All the houſes are built in the Engliſh ſtyle, with ſmall doors, flat roofs, and enormous bow windows, behind which the prime goods of all ſorts are expoſed to ſale. The inhabitants are chiefly military; the commerce with Africa is neither certain nor regular; and although the contraband trade with Spain, both in money and goods, is one of the principal branches of trade, that cannot be ſufficient (ſays La Borde) to indemnify England for a million and a half of piaſtres, which on an average it coſts annually to maintain this point in the Mediterranean, where in other reſpects the duties collected are very ſmall. This place is advantageouſly ſituated for victualling the fleets, and the protection of the coaſt of Africa, from whence the Engliſh procure their corn, and as a place of refuge for their privateers and ſloops of war. The port is a key to the Mediterranean and to the Atlantic; conſuls from all the ſtates of Europe and North America uſually reſide there. The Americans, as well as the Swedes, Danes, and Dutch, in time of peace, carry on a direct commerce with Gibraltar, by ſupplying themſelves with the articles they want, and leaving in exchange ſnuff, cod, pitch, and tar, maſts, rum, maize, rice, flour, ſugar, pepper, ginger, cotton, aniſeed, and the other articles of commerce, which they procure from Aſia, Africa, and Europe. The coaſts of Granada, Seville, and Catalonia, furniſh wine, and Africa wax and freſh meat in great quantities; they alſo import from Spain brandy, raiſins, almonds, oranges, lemons, ſilks, ſalt, &c. which the veſſels from the north carry back in exchange. Gibraltar contains altogether 9000 inhabitants, including eight regiments, amounting to 6000 men; ſo that this place is rather a military colony than a commercial eſtabliſhment. The population of Gibraltar extends one mile to the ſouth, and nearly as much towards the top of the mountain; and if we may judge from the new buildings lately erected, it is certainly increaſing. All the houſes are painted black on the outſide, with white borders or ledges, ſhewing the number of ſtories, which are generally two or three. This mode is well ſuited to a country where the reflection of the ſun is ſo violent. The police is well conducted; no beggars are to be found here; the ſtreets are preſerved clean and ſalubrious; and though they are all well lighted at night, no one is allowed to walk without a lanthorn, and a permiſſion from the general; ſentinels requiring anſwers to their challenges being ſtationed in the town, as well as patroles and watchmen. All forms of religion are tolerated without inconvenience, and the number of Jews, who live here more ſecurely than in any other part of Europe, is very conſiderable. Gibraltar has a theatre, which, though ſmall, is well laid out and adorned with taſte. For want of regular actors, the officers of the garriſon perform, during the greater part of the year, a number of Engliſh plays.

On the oppoſite ſide of the ſtraits of Gibraltar is the town of Ceuta. The traveller, who wiſhes to croſs over into Africa, may take advantage of the N.W. winds, and of the ſmall veſſels which are continually paſſing and repaſſing.

The origin and foundation of this town are loſt in the obſcurity of time. It is certain, however, that the Phœnicians, the Egyptians, and other ancient people, landed at Gibraltar; and the name of the pillars of Hercules, by which this place was known, is nothing more than a tradition preſerved among the Phœnicians, who peopled this coaſt, and brought their gods and religious worſhip with them. But it is not known whether the ſtraits or columns exiſted in the remoteſt antiquity, and if the inſcription "non plus ultra" meant that nothing was more wonderful than the ſeparation of the two continents, or, as is more probable, that no one had dared to navigate beyond this point. However this be, it is probable that the firſt navigators of the Mediterranean landed at Gibraltar, or its environs. This opinion is ſupported by the authority of Pomponius Mela, who, being born at Cadiz, may be ſuppoſed to feel more intereſt than others in whatever related to this coaſt. The Moors ſeized on Gibraltar in the eighth century, and held it without interruption till the fourteenth, when, in the year 1310, it was taken from them by Perez de Guzman; but they retook it in the year 1332, and held it till the year 1462, when it was retaken by the Spaniards, and it has continued in the hands of the Chriſtians from that time. The Engliſh took it from the Spaniards during the war of the ſucceſſion in Spain; the fort ſurrendered to the united fleet of England and Holland under ſir George Rook, in 1704; and the allies took poſſeſſion of it in the name of Charles III. The place was ceded to the Engliſh by the treaties of Utrecht and Seville; it was beſieged at ſeveral times without ſucceſs. Since the Engliſh have been maſters of the place it has been ſo much improved and ſtrengthened, as probably to bid defiance to the utmoſt efforts of an enemy. In the courſe of the American war, the Spaniards again beſieged it; but their memorable attack with floating batteries of upwards of 200 cannon, in ſhips of all ſizes, terminated only in diſappointment, in the deſtruction of the ſhips and men employed, and in the immortal honour of the brave defenders: 16 miles N. of Ceuta, 70 S. of Seville. N. lat. 36° 4′ 44″. W. long. 5° 19′ 46″.

GIBRALTAR, an ancient town of South America, in the government of Caraccas, and province of Venezuela, ſituated on the E. coaſt of the lake Maracaybo. The country in its vicinity is well watered with rivers, and furniſhes cocoa of the beſt quality, and very large cedars. The beſt Spaniſh tobacco is produced here, called Tobago de Maraſaibo, from which is made the valuable ſnuff, vulgarly called "Mackaba" ſnuff. The air is very inſalubrious in the rainy ſeaſon, and therefore the merchants and planters retire at that time to Maracaybo, or Merida; 100 miles S.S.E. of Maracaybo. N. lat. 10° 4′ W. long. 67° 36′.

GIBRALTAR *Point*, is the weſtern extremity of a ſandbank, in Upper Canada, which forms the harbour of York, and upon which block-houſes are erected for its defence. There is another place of this name on the ſide of lake Memphramagog, in the town of Bolton, in Upper Canada.

GIBRIN, a town of Syria; 10 miles S.E. of Aleppo.

GIBSON, RICHARD, in *Biography*, the Dwarf, was placed by a lady at Mortlake, to whom he was page, with Francis de Clyne to learn to paint, both in water and in oil; but he informed himſelf more by ſtudying the works of Lely, and gained conſiderable reputation.

GIBSON, EDWARD, in *Biography*, was born at Bampton, in Weſtmoreland, in the year 1669. He received the early part of his education at the free-ſchool in his native town, and at the age of ſeventeen he was ſent to Queen's college, Oxford. In 1691 he was admitted to the degree of B. A., and in the ſame year, having already applied himſelf moſt diligently to the ſtudy of the northern languages, he publiſhed a new edition of William Drummond's Polemo-Middiana, and James V. of Scotland's Cantilena Ruſtica, quarto, illuſtrated with notes. In 1692, he gave a tranſlation in the Latin language, together with the original, of the "Chronicon Saxonicum;" likewiſe a work entitled "Librorum Manuſcriptorum in duabus inſignibus Bibliothecis, altera Dugdaliana Oxonii, Catalogus," with a dedication to Dr. Tenniſon, afterwards archbiſhop of Canterbury, which proved the foundation of the author's ſubſequent fortune under the auſpices of that prelate. He next publiſhed a correct edition of Quintilian "De arte Oratoria;" and a new edition of Somner's treatiſe on the Roman ports and forts in Kent. In 1694 Mr. Gibſon commenced A.M., and ſhortly afterwards was elected fellow of his college, and admitted into deacon's and prieſt's orders. In 1695 he publiſhed an Engliſh tranſlation of "Camden's Britannia." This work was patronized by lord Somers, who offered Mr. Gibſon a living in the iſle of Thanet, which he declined, on account of ill-health, and in the following year he was appointed librarian at Lambeth, by the archbiſhop, Dr. Tenniſon, who received him into his family, and who appointed him morning preacher at Lambeth church. His publications about this period were, "Vita Thomæ Bodleii, Equitis Aurati," together with "Hiſtoria Bibliothecæ Bodleianæ:" alſo, "Reliquiæ Spelmannianæ; being the poſthumous works of ſir Henry Spelman, relating to the Laws and Antiquities of England, together with the Life of the Author." He was now appointed domeſtic chaplain to the archbiſhop, through whoſe means he obtained the lectureſhip of St. Martin's in the Fields, and was preſented to the rectory of Stiſted in Eſſex. His promotion in the church went on rapidly, but it did not render him indifferent to the cauſe of literature, and in 1713 he publiſhed his celebrated work, entitled "Codex Juris Eccleſiaſtici Anglicani; or the ſtatutes, conſtitution, canons, rubricks, and articles of the church of England, methodically digeſted under their proper Heads, &c." The ſcheme of church power vindicated in this volume was excepted againſt, not only by diſſenters, but by the ſoundeſt and moſt conſtitutional lawyers within the pale of the church; who maintained that the principles and claims advanced in it would be ſufficient, if acted upon, in their utmoſt extent, to eſtabliſh a ſacerdotal empire, which muſt draw all power to itſelf, and render the civil magiſtrate its miniſter and dependent. In 1715 our author, who had taken his degree of D.D., was conſecrated biſhop of Lincoln, and in 1723 he was tranſlated to the ſee of London. In this ſituation, on account of the weak health of Dr. Wake, then archbiſhop of Canterbury, almoſt every thing relating to the affairs of the church was confided to him. His great zeal for the eſtabliſhed religion, and his oppoſition to the diſſenters, who were endeavouring to obtain the repeal of the Corporation and Teſt acts, leſſened him in the eſtimation of the prime miniſter, ſir Robert Walpole; and he was, about the ſame time, rendered obnoxious to men in power, by ſeveral attacks on the principles in his "Codex," which the authors contended were inimical to the civil conſtitution of this country, and favourable to a ſpirit of intolerance and perſecution. Of theſe attacks, one of the moſt able was conducted by the recorder of Briſtol, afterwards Mr. Juſtice Foſter, at the deſire of lord Hardwicke, lord chief-juſtice of the court of king's bench. Biſhop Gibſon's conſtitution was naturally ſtrong and vigorous, but he exerciſed it with almoſt inceſſant labours, ſo that, at length, it might be ſaid to be fairly worn out by his ſtudies and exertions. For ſome time before he died, he became ſenſible that his end was approaching, and in 1748 he breathed his laſt at Bath, being in his ſeventy-ninth year. Beſides the works already enumerated, the biſhop was author of ſeveral others, highly eſteemed by the learned. He wrote and publiſhed many paſtoral letters, addreſſed to the clergy and laity of his dioceſe, intended to oppoſe the growth of infidelity and enthuſiaſm: ſome viſitation charges, occaſional ſermons, and ſmall tracts againſt the prevailing vices of the age. Theſe ſmaller pieces have been frequently reprinted, and it is ſaid that the biſhop received more real ſatisfaction on account of the repeated demand for his practical works, than from the honours conferred on him by his larger and more learned treatiſes. He poſſeſſed the ſocial principles in an eminent degree, and his beneficence and charity were very extenſively, though privately, exerciſed. An inſtance of liberality is recorded, which redounds greatly to his honour: Dr. Crow had left him by his will 2500*l.* which biſhop Gibſon freely gave to Dr. Crow's own relations, who were in indigent circumſtances. Biog. Brit.

GID, or GIDDY, in *Rural Economy*, a morbid condition occurring in ſheep and ſome other animals, in which there is a conſtant vertigo or turning round. The affection is generally conſidered as a kind of hydrocephalus, or encyſted collection of watery matter in the head, between the dura and pia mater.

It has, however, been ſuggeſted by ſome as depending upon a worm or maggot under the horn on either ſide of the head; in ſupport of which Mr. Collins has been informed of cows having the diſeaſe, and being cured by having a perforation made near the horn, and the worm or maggot taken out; but this is no doubt another ſort of diſorder.

Some farmers conſider this complaint as the moſt common among ſheep that are richly fed, and know it by the name of the *ſturdy evil*, the cure being attempted by the uſe of ſmall bleeding and aſſafœtida; and in order to guard againſt a relapſe, the ſheep ſhould be put into a hilly or elevated paſture.

Among the graziers in the county of Lincoln the diſeaſe is known by the terms *ſturdy*, and *bladder on the brain*, and in its remedy a ſort of trepanning proceſs is had recourſe to, by which great numbers of ſheep are ſuppoſed to be ſaved. The perſon who performs the operation raiſes the ſcalp with a ſtrong hooked knife juſt over the part affected, to the extent of about half a crown piece, after which, nearly the ſame extent of the ſkull-bone is elevated, letting it hang as by a hinge on one ſide; then by means of a quill, cut ſlanting to a point, in the form of a ſpear, and hacked on each ſide, the bladder is ſought for and brought out whole, the bone being immediately put down again, and covered with a plaſter.

The South Down ſheep farmers, when the animals are affected in this way, ſay they are *pateriſh*.

Various other modes of cure have been propoſed, but they do not ſeem worthy of much attention. See SHEEP.

GIDDA, in *Ancient Geography*, See JIDDA.

GIDDATOOR, in *Geography*, a town of Hindooſtan, in the circar of Cicacole; 16 miles S.W. of Coſſimcotta.

GIDDINESS, in *Medicine*, a ſenſation as if the objects ſurrounding the perſon were in a ſtate of circumgyration, or whirling motion, accompanied with an inability to maintain the erect poſture, or to move forward in a ſtraight line: in technical language this is denominated *Vertigo*; which ſee.

GIDDRI, in *Geography*, a town of Albania; 8 miles N. of Aleſſio.

GIDEA, a river of Sweden, which riſes in the Lappmark of Aſele, and traverſing Angermanland, runs into the gulf of Bothnia. N. lat. 16° 20′. E. long. 18° 54′.

GIDELI, a town of Candahar; 50 miles S.E. of Cabul.

GIDID, a town of Africa, in Dar-fûr, nearly S.E. and about 22 miles from Cobbé, on the road from Cobbé to Ril. This town has a competent ſupply of water; and yet the Fukkara, who poſſeſs it, are ſuppoſed to be ſo deſtitute of hoſpitality, that they will hardly furniſh a traveller ſufficient to allay his thirſt. In this town are many houſes, and ſome of them belong to merchants who derive their origin from the eaſtward.—Alſo, a town of Nubia; 35 miles S. of Gerri.

GIDI-SHEHRI, a town of Aſiatic Turkey, in Natolia; 8 miles S. of Beiſheh[illegible].

GIDOLA, a town of [illegible]ſſia, in the government of Wiburg; 20 miles N. of Wiburg.

GIECH, a town of Germany, in the biſhopric of Bamberg; 7 miles N. of Bamberg.

GIEDKULISZKI, a town of Samogitia; 24 miles S. of Roſienne.

GIEDROYCE, a town of Lithuania, in the palatinate of Wilna; 24 miles N.N.W. of Wilna.

GIEDUNGEN, a town of Norway, in the dioceſe of Chriſtianſtadt; 18 miles N.W. of Stavanger.

GIEGUZIN, a town of Lithuania; 15 miles S. of Wilkomiers.

GIEK, in *Botany*, the Ceylon name of a ſmall fruit, deſcribed by Gærtner v. 2. 486. t. 180, of which nothing more is known. The nucleus is ſingularly pitted, like a *Rubus*, but if the figure be in all points correct, it cannot be a grain of the fruit of that genus. The internal parts, which were decayed, might have aſcertained ſomething deciſive, eſpecially the ſituation of the embryo.

GIELLUM, in *Geography*, a town of Norway, in the dioceſe of Aggerhuus; 53 miles N. of Chriſtiania.

GIEN, a town of France, and principal place of a diſtrict, in the department of the Loiret, ſeated on the Loire; 32 miles S.E. of Orleans. The place contains 5117, and the canton 11,366 inhabitants, on a territory of 410 kiliometres, in 11 communes. N. lat. 48° 45′. E. long. 10° 13′.

GIENÉ. See KENÉ.

GIENSOR, a town of Africa; 10 miles S. of Tripoli.

GIER, a river of France, which runs into the Rhône, 12 miles below Lyons.

GIERACE, a town of Naples, in Calabria Ultra, the ſee of a biſhop, ſuffragan of Reggio; containing 13 churches, and 4 monaſteries. Near it are ſome ſulphureous baths; 34 miles N. of Reggio. N. lat. 38° 6′. E. long. 16° 30′.—Alſo, a town of Sicily, in the valley of Demona; 30 miles S.W. of Miſtretta. N. lat. 37° 48′. E. long. 14° 22′.

GIERANONY, a town of Lithuania, in the palatinate of Wilna; 20 miles N.E. of Lida.

GIERGA, a town of Bengal; 48 miles S.E. of Doeſa.

GIESIM, a town of Nubia, between Sennaar and Abyſſinia; 100 miles E.S.E. of Sennaar. N. lat. 13° 16′. E. long. 35° 15′.

GIESSEN, a ſtrong town of Germany, in the principality of Upper Heſſe, ſituated in a fertile country, on the Lahn. It is defended by a good citadel and arſenal. An univerſity was founded here in the year 1605; 36 miles N.E. of Mentz. N. lat. 50° 35′. E. long. 8 43′.

GIEZIN, a town of Samogitia; 22 miles E.S.E. of Roſienne.

GIFFÆ, a term in *Surgery*, ſignifying ſwellings behind the ears.

GIFFEN, HUBERT, in *Biography*, a lawyer and philologiſt, was a native of Gueldres in France. He ſtudied at different univerſities, as thoſe at Louvain, Paris, and Orleans, and in 1567 he took his degrees in the law. He went to Venice in the train of the French ambaſſador, and from thence to Germany, and taught philoſophy and juriſprudence at Straſburg, Altdorf, and Ingolſtadt. He was educated in the principles of Proteſtantiſm, which he renounced for the Catholic religion previouſly to his being invited to the imperial court, where the emperor Rodolph beſtowed upon him ſome important offices. Being ſent into Bohemia, he died at Prague in the year 1604, being about ſeventy years of age. His principal works are "Comment. de Imp. Juſtiano:" "Index Hiſt. Rerum Romanorum;" and notes and comments upon Ariſtotle's politics, ethics; alſo upon Lucretius. Moreri. Bayle.

GIFFT-MEHL, the name given by the German chemiſts and metallurgiſts to the firſt appearance of arſenic, or the grey flowers ariſing from the roaſting of cobalt, and ſticking to the long wooden funnel, which they carry from the furnaces.

The word gifft-mehl is German, and ſignifies poiſonous meal or flour.

GIFHORN, in *Geography*, a town of Germany, in the principality of Luneburg-Zell, ſeated on the Allier; 19 miles E. of Zell.

GIFONI, a town of Naples, in Principato Citra; 7 miles E. N. E. of Salerno.

GIFT, or GRANT, in *Law*, a method of transferring perſonal property, anſwering in ſome meaſure to the conveyances of real eſtates. Gifts and grants are thus to be diſtinguiſhed from each other, that *gifts* are always gratuitous, whereas *grants* are upon ſome conſideration or equivalent. With regard to their ſubject-matter, they may be divided into gifts or grants of chatttels *real*, and gifts or grants of chattels *perſonal*. Under the former claſs may be included all leaſes for years of land, aſſignments, and ſurrenders of theſe leaſes; and all the other methods of conveying an eſtate leſs than freehold; though theſe very ſeldom carry the outward appearance of a gift, however freely beſtowed; being uſually expreſſed to be made in conſideration of blood, or natural affection, or of five or ten ſhillings nominally paid to the grantor; and in caſe of leaſes, always reſerving a rent, though it be but a pepper-corn:—any of which conſiderations will, in the eye of the law, convert the gift, if executed, into a grant; if not executed, into a contract.

Grants or gifts of chattels *perſonal* are the act of transferring the right and the poſſeſſion of them; whereby one man renounces, and another man immediately acquires, all title and intereſt therein: which may be done either in writing or by word of mouth, atteſted by ſufficient evidence (Park. § 57.), of which the delivery of poſſeſſion is the ſtrongeſt and the moſt eſſential. But this conveyance, when merely voluntary, is ſomewhat ſuſpicious; and is uſually conſtrued to be fraudulent, if creditors or others become ſufferers thereby. And, particularly, by ſtatute 3 Hen. VII. c. 4. all deeds of gift of goods, made in truſt to the uſe of the donor, ſhall be void; becauſe otherwiſe perſons might be tempted to commit treaſon or felony, without danger of forfeiture; and the creditors of the donor might alſo be defrauded of their right. And by ſtatute 13 Eliz. c. 5. every grant or gift of chattels, as well as lands, with an intent to defraud creditors or others (3 Rep. 82), ſhall be void, as againſt ſuch perſons to whom ſuch fraud would be prejudicial: but, as againſt the grantor himſelf, ſhall ſtand good and effectual; and all perſons partakers in, or privy to, ſuch fraudulent grants, ſhall forfeit the whole value of the goods, one moiety to the king, and another moiety to the party grieved; and alſo, upon conviction, ſhall ſuffer impriſonment for half a year.

A true and proper gift or grant is always accompanied with delivery of poſſeſſion, and takes effect immediately; as if A. gives to B. 100*l.* or a flock of ſheep, and puts him in poſſeſſion of them directly, it is then a gift executed in the donee; and it is not in the donor's power to retract it, though he did it without any conſideration or recompence (Jenk. 109.): unleſs it be prejudicial to creditors; or the donor were under any legal incapacity, as infancy, coverture, dureſs, or the like; or if he were drawn in, circumvented, or impoſed upon by falſe pretences, ebriety, or ſurprize. But if the gift does not take effect, by delivery of immediate poſſeſſion, it is then not properly a gift, but a contract; and this a man cannot be compelled to perform, but upon good and ſufficient conſideration. See CONTRACT.

The conveyance by *gift*, "donatio," is properly applied to the creation of an eſtate-tail, as feoffment is to an eſtate in fee, and leaſe to that of an eſtate for life or years. It differs in nothing from a feoffment, but in the nature of the eſtate paſſing by it; for the operative words of conveyance in this caſe are *do* or *dedi* (Weſt. Symbol. 256.); and gifts in tail are equally imperfect without livery of ſeiſin, as feoffments in fee-ſimple. (Litt. § 59.) See FEOFFMENT. This is the only diſtinction which Littleton ſeems to take, when he ſays (§ 57), "it is to be underſtood, that there is feoffor and feoffee, donor and donee, leſſor and leſſee;" *viz.* feoffor is applied to a feoffment in fee-ſimple, donor to a gift in tail, and leſſor to a leaſe for life, or for years, or at will. In common acceptation gifts are frequently confounded with grants. (See GRANT.) Blackſt. Com. B. ii.

GIFT-*day*, in *Rural Economy*, is a term implying a boon-day, or a day's work given from the tenant to the lord, or from neighbour to neighbour.

GIFTS, *New Year's*. See STRÆNÆ.

GIG, FISH. See FISH-*gig*.

GIGA, *Ital.* GIGUE, *Fr.* a jig, the name of a gay dance, and of its tune. The Cruſca Dict. defines this word from Dante, par. 14. *ſtrumento muſicale di corde;* a muſical inſtrument with ſtrings. The Cruſca, likewiſe, ſays, that it is an inſtrumental movement, ſo called.—Walther's derivation from Geige, *Germ.* a violin, or fiddle, comprehends both the tune and the inſtrument upon which, originally, it was moſt frequently played. The time of the *ggia*, or jig, is always quick, and in triplets of $\frac{6}{8}$, $\frac{9}{8}$, or $\frac{12}{8}$. Corelli's jigs were long in favour; but, being in the ſame time as moſt of our old country-dances, they are almoſt all become vulgar, except the *gighe* in his 5th ſolo, and 11th ſonata, op. ii^{da}.

Rouſſeau ſays that *gigues* are now wholly out of faſhion in Italy and France; but the movement is only improved by new and more elegant paſſages: for, whatever is played quick, in triplets of 6, 9, or 12 quavers in a bar, is ſtill a *giga*, or jig.

GIGAIA, GIGHA, *Gia*, or *Gigo*, in *Geography*, one of the ſmaller weſtern iſlands of Scotland, about 7 miles long and 2½ broad, partly rocky and partly arable, ſituated in N. lat. 55° 36'. W. long. 5° 43', and ſeparated from the peninſula of Cantyre, or Kintyre, by a channel 3½ miles broad. There are no trees in this iſland; but oaks are ſometimes dug up in the moraſſes. Near its centre is Dun-clifs, a high ſteep rock, flat at top, which appears to have been a ſtrong fortification. At Kilchattan is a rude column, 16 feet high, 4 broad, and 8 inches thick, and near it is a cairn. On the weſtern ſhore, which is bold and rocky, there are two remarkable caves; and on the S. coaſt is a ſubterraneous paſſage 133 feet in length. Between the projecting points and ſunk rocks on the E. coaſt are creeks, in which veſſels may be ſafely moored. This iſland contains 592 inhabitants.

About 1½ mile S. from Gigha, is the iſland Caray, or Cara, near a mile long and half a mile broad, containing 22 inhabitants. The ſhores are every where high and rocky, except at the N. E. end, where is the only landing place. The Mull of Cara, at the S. end, is a perpendicular rock 167 feet high. At the N. E. end, the ſoil is a mixture of ſhells, ſand, and common mould; the reſt of the iſland, at the ſurface, is a ſtratum of peat earth. Between Gigha and Cara is Gigulum, a ſmall uninhabited iſland.

GIGANTES, a cluſter of ſmall iſlands among the Philippines, N. W. of Sibu. N. lat. 11° 42'. E. long. 123° 20'.

GIGANTIC. See GIANT.

GIGANTIC *Order*, in *Architecture*, a name given by Scamozzi and others to the Tuſcan order.

GIGANTOMACHIA, the battle of the giants againſt the fabulous gods of the ancient heathens. See GIANT.

The word is Greek, γιγαντομαχια, formed of γιγας, γιγαντος, *giant;* and μαχη, *combat*, of μαχομαι, *pugno, I fight.*

Several of the poets have compoſed gigantomachias: that of Scarron is the fineſt of all his pieces.

GIGANTOPHONTES, is a name given to Minerva, on account of the aſſiſtance which ſhe gave to Jupiter in his conteſt with the giants.

GIGAY, in *Geography*, a ſmall iſland of the Hebrides, on the E. coaſt of Barray, yielding tolerable paſture, but difficult of acceſs.

GIGERI. See JIJEL.

GIGERIÆ, a term uſed by ſome writers to expreſs the offals of poultry of any kind, including the inteſtines, extremities, and whatever elſe is thrown away before the dreſſing. See GIBLETS.

GIGG, GIGA, or *Jig*, in *Muſic* and *Dancing*. See GIGA.

GIGGS, among *Farriers*, ſmall bladders or bliſters on the inſide of a horſe's lips. They muſt be laid open, and cleanſed with ſalt and vinegar, or alum-water.

GIGGE, in the *Manufacture of Flax*, denotes a hole made in the earth, where fire is made to dry the flax laid over it.

GIGGEO, ANTHONY, in *Biography*, a learned Italian, who flouriſhed in the early part of the ſeventeenth century, and was admitted to the degree of doctor by the Ambroſian college at Milan. He was author of many learned works, but that on which his reputation is chiefly eſtabliſhed, was entitled "Theſaurus Linguæ Arabicæ, ſeu Lexicon Arabico-Latinum;" publiſhed in four volumes folio, in 1632. As a recompence for the learning and induſtry which it exhibited, pope Urban VIII. nominated the author to an honourable poſt in a college at Rome; but he died before he could enter upon its functions, or enjoy its emoluments. Gen. Biog.

GIGLIO, or ISOLE DEL GIGLIO, in *Geography*, a ſmall iſland in the Mediterranean, near the coaſt of Italy, anciently called *Ægilum*, or *Igilum*. N. lat. 42° 28′. E. long. 10° 53′.

GIGMILLS, a kind of fulling mills, for fulling and burling of woollen cloth, prohibited, anno 5 and 6 Ed. VI. c. 22.

GIGNEE, in *Geography*, a town of France, in the department of the Herault, and chief place of a canton, in the diſtrict of Lodéve, ſeated on the Herault; 10 miles S. E. of Lodéve. The place contains 2785, and the canton 13,632 inhabitants, on a territory of 290 kiliometres, in 21 communes. N. lat. 43° 39′. E. long. 3° 38′.

GIGNY, a town of France, in the department of the Jura, on the Surain; 7 miles S. W. of Orgelet.

GIGO. See GIGAIA.

GIGOT, in the *Manege*, a branch after the form of a gigot, or leg, is a branch, the lower part of which is round, and called in French *gargouille*.

GIHON, in *Geography*. See JIHON and AMU.

GIHON, in *Scripture Geography*, a fountain, weſt of Jeruſalem, where Solomon was anointed king by Zadok and Nathan. The upper channel of Gihon was ordered, by Hezekiah, to be conveyed into Jeruſalem, for the advantage of the waters; 1 Kings, i. 33. 2 Chron. xxxiii. 30.—Alſo, the name of one of the four rivers, whoſe ſources were in Paradiſe, Gen. ii. 13. The Arabians believed this to be the Oxus, a river which riſes in the mountains of Imaus, and runs from eaſt to weſt; and after winding much, returns, and diſcharges itſelf into the Caſpian ſea, weſtward. This river ſeparates the provinces of the Turks and Perſians. Modern geographers call the Oxus, *Amu;* which ſee. The Arabians name it Gehon, and Neher-Balkh, the river of Balk, becauſe it paſſes through that city. Calvin, Scaliger, and others, think that Gihon is the moſt weſtern channel of the two made by the Tigris and Euphrates, when, after their conflux, they ſeparate again to enter the ſea. Others again maintain that Piſon is the weſtern channel, and that Gihon is the eaſtern. This is the opinion of Bochart and Huetius. (See EDEN.) Others ſuppoſe the Gihon to be the *Araxes;* which ſee.

GIJON, *Jixa* of the Romans, a conſiderable ſea-port town of Spain, in Aſturias, formerly the capital of this province, with an old caſtle, containing about 800 families, 18 miles N. of Oviedo. This inſecure port, conſtructed and maintained at a great expence, is reſorted to by the Engliſh for filberts and cheſnuts. N. lat. 43° 32′. W. long. 5° 42′.

GIKRI, a town of Hindooſtan, in the circar of Nagore; 15 miles S. E. of Catchwara.

GIL, *Iſland of*, an iſland of the North Pacific ocean, ſo called by ſignor Caamano, about 14 miles long and 6 broad, between Princeſs Royal's iſland and Pitt's Archipelago.

GILA, a river of New Mexico. See COLORADO.

GILACAN, a ſmall iſland in the North Pacific ocean, N. of the Catanduanes. N. lat. 14° 26′. E. long. 124° 27′.

GILARZA, a town of the iſland of Sardinia; 15 miles S. E. of Boſa.

GILATTELKE, a town of Tranſilvania, 14 miles N. of Clauſenburg.

GILBERGA, a town of Sweden, in Warmeland; 24 miles W. of Carlſtadt.

GILBERT, HUMPHREY, in *Biography*, deſcended from an ancient family in Devonſhire, was born about the year 1539. His mother, after becoming a widow, married Mr. Raleigh, by whom ſhe had ſir Walter; of courſe, Humphrey Gilbert and ſir Walter were half brothers, and, as we ſhall ſee, both became diſtinguiſhed in the annals of their country. The ſubject of the preſent article was educated at Eton, and from thence was ſent to Oxford to complete his ſtudies. He ſoon exhibited a turn of mind better adapted to an active than a literary life. He was early introduced to the court of Elizabeth, and there acquired that ardour of loyalty which ſeemed to be the ruling paſſion of thoſe who approached the queen. His firſt expedition as a warrior was at Havre, in 1563, after which he was ſent over to Ireland, to aſſiſt in quelling the diſorders in that country, and roſe to the chief command in the province of Munſter. In 1570 he received the honour of knighthood as a reward for his ſervices. In the following year ſir Humphrey Gilbert ſerved, as a burgeſs, in parliament, for Plymouth; and in 1572 he ſailed with a reinforcement to colonel Morgan, then acting in Flanders. He, about this period, became anxious for the advancement of maritime diſcovery, and the improvement and extenſion of trade and commerce; with theſe views, in 1576, he publiſhed "A Diſcourſe, to prove a paſſage by the north-weſt to the Eaſt Indies." He probably deſigned to make attempts for the diſcovery of this paſſage, but an anterior project was that of ſettling ſome of the countries in the northern part of the New World. In 1578 he obtained a patent from the crown for making ſettlements in the unoccupied lands of North America, and fitted out an expedition with which he ſailed for Newfoundland, where he continued a ſhort time, and returned without having effected any thing of importance. He, however, perſiſted in his deſign, and in 1583, in company with his brother, ſir Walter Raleigh, returned to Newfoundland, and took poſſeſſion, in the queen's name, of the harbour of St. John, and granted leaſes of the circumjacent country to thoſe of his company who choſe to take them. He carried out with him a Saxon miner, in hopes, no doubt, of finding gold, more than ſufficient to repay them for all their trouble and labour. This man pretended to have diſcovered a rich ſilver mine on the coaſt, and dug up ſome ore, which ſatisfied ſir Humphrey that the means of wealth were within their reach. He now fully expected that he could obtain from the queen the loan of ten thouſand pounds, to enable them to proſecute their diſcoveries, but his voyage was truly diſaſtrous; the largeſt ſhip was loſt in a ſtorm, with all the crew except twelve men, and the miner and the ore periſhed at the ſame time. He himſelf had fortunately gone on board a ſmall ſloop, for the purpoſe of exploring the coaſt. After this he refuſed to ſhift his ſtation to his larger remaining veſſel, being reſolved not to deſert the little crew with whom he had encountered ſo many dangers. He ſteered homeward, in the midſt of a tempeſtuous ſea, and on the ninth of September, when his ſmall bark was in the utmoſt danger of foundering, he was ſeen, by the crew of the other ſhip, ſitting in the ſtern of the veſſel, with a book in his hand, and he was heard to cry out, "Courage, my lads! we are as near heaven at ſea as at land." About midnight the bark was ſwallowed up by the ocean; the gallant knight and all his men periſhed with her. Though ſir Humphrey Gilbert did not effect a ſettlement at Newfoundland, yet the project

ject was ſoon after realized under his patent, ſo far as to be of great advantage to the fiſhery from this country. Biog. Brit.

Gilbert, or **Gilberd**, **William**, a phyſician, was born, in the year 1540, at Colcheſter, of which borough his father had been recorder. After ſtudying ſome time at Cambridge, he travelled abroad for farther improvement in thoſe branches of ſcience to which he was particularly addicted; and took the degree of doctor of phyſic in ſome foreign univerſity. He returned to his own country with a high character for philoſophical and chemical knowledge, and was made a member of the College of Phyſicians in London, where he ſettled about the year 1573. He practiſed with ſo much reputation and ſucceſs, that he at length became firſt phyſician to queen Elizabeth, in which office he continued during the life of that princeſs. The vacancies from the duties of his profeſſion he employed in the purſuit of philoſophical experiments, particularly relative to the magnet, and in theſe he was aſſiſted by a penſion from queen Elizabeth. We are informed of no other circumſtances concerning the life of this learned man, who died, unmarried, November 20, 1603, aged 63, and was buried in his native place, where a handſome monument was erected to his memory by his brothers. He left all his books, globes, mathematical inſtruments, and cabinet of minerals, to the College of Phyſicians. His picture, which repreſents him as of a tall ſtature and chearful countenance, is in the gallery over the ſchools at Oxford.

The capital work of Dr. Gilbert, entitled "De Magnete, Magneticiſque Corporibus et de Magno Magnete Tellure, Phyſiologia nova, plurimis et argumentis et experimentis demonſtrata," was firſt publiſhed at London in 1600, and has been reprinted in Germany. This is not only the earlieſt complete ſyſtem of magnetiſm, but alſo one of the firſt ſpecimens of a philoſophical ſyſtem built upon experiments, after the manner ſo much inſiſted on afterwards by the great lord Bacon. Aikin, Biog. Mem. of Med. Eloy.

Gilbert, **John**, the ſon of Mr. Thomas Gilbert, a gentleman poſſeſſing an eſtate of about 300*l.* a year, was born in the year 1724. His eldeſt brother had a liberal education, with a view to the bar, and became afterwards a member of parliament for Newcaſtle and Litchfield; but the ſubject of this article had only ſuch inſtruction as the obſcure village of Farley, in the neighbourhood of his father's houſe, could afford. At the age of twelve or thirteen years, he was bound apprentice to Mr. Bolton, father of the well-known and juſtly celebrated Matthew Bolton, of Soho, near Birmingham; between whom and Mr. Gilbert an intimacy ſubſiſted, as long as the latter lived. At the age of 19 he loſt his father; and as he died poſſeſſed of extenſive lime-works, they required attention. Accordingly Mr. Gilbert, in order to undertake the ſuperintendence of them, quitted his connection with Mr. Bolton, who very reluctantly parted with him, and devoted himſelf to the management of his own family concerns. Notwithſtanding the diſadvantages under which Mr. G. had laboured in early life, he poſſeſſed talents, which, matured by age and experience, could not fail of recommending him to notice. But the moſt remarkable circumſtance in the hiſtory of this ingenious perſon, and that indeed which has induced us to give a brief account of him, was his introduction to the duke of Bridgewater, at the time when he was projecting improvements of his collieries, in the neighbourhood of Mancheſter. Mr. Gilbert's brother was then ſteward to the duke; and deſired him to inſpect and examine his Grace's collieries at Worſley. After viewing the works, it immediately occurred to him, that if the coals on that part of the duke's eſtate could be brought to market in ſuch a populous town as Mancheſter, and for the ſupply of the numerous works in its vicinity, the colliery, which, in the ſtate it was at the time of his inſpection, yielded little profit, would become extremely valuable. It is ſaid, that he ſecluded himſelf altogether from company for two days, at the Bull inn at Mancheſter, to conſider how this might be done by water-carriage, as that by land was very expenſive, and, on account of the badneſs of the roads, very inconvenient, and almoſt impracticable. Having digeſted his ſcheme, he communicated it to the duke, who was no leſs ſtruck with the propoſition ſuggeſted by Mr. G. than the projector himſelf. Accordingly the work was ſoon after began. Mr. G.'s name has ſeldom occurred in connection with this very important and lucrative undertaking; and as he preceded Mr. Brindley in this buſineſs, of which we have ample and ſatisfactory evidence, we thought that juſtice required a candid and impartial ſtatement of the caſe. Mr. G. was ſo fortunate, in the proſecution of this work, as to find lime upon the duke's eſtate, which muſt otherwiſe have been brought by land from Buxton, at the diſtance of near 30 miles; and in a work of this great extent, this was no inconſiderable ſaving. The tunnel was entirely executed, as well as planned, by Mr. G.; who, being acquainted with Mr. Brindley as a neighbour, and knowing him to be a very ingenious and excellent mill-wright, engaged his aſſiſtance in the conduct and completion of this arduous undertaking, and introduced him to the duke for this purpoſe. The duke was ſo well ſatisfied with his agent and projector, that at firſt they lived together for two or three months in the year, and for ſeveral of the laſt years of Mr. Gilbert's life, he ſpent half his time with him. In June, 1757, he removed with his family to Worſley, that he might, with greater convenience, attend the proſecution of the buſineſs he had undertaken. As a farther evidence of the duke's regard for Mr. G. we may here add, that he gave his ſon, who was educated for the church, the ſecond beſt preferment at his diſpoſal, to the amount of about 1200*l.* per annum. We might mention many other concerns in which Mr. G. was engaged, and in which he had an opportunity of manifeſting his ſkill and judgment, in the conduct of canals, mines, and other improvements relating to rural economy. We ſhall merely add, that he is ſaid to have been the firſt perſon who ſuggeſted the uſe of gun-powder in obtaining rock-ſalt. Mr. G. was probably ſo modeſt and unaſſuming, that he did not, during his life-time, lay claim to the honour which belonged to him, with reſpect to the duke of Bridgewater's canals and collieries; and we have introduced his name into the Cyclopædia, in order to do him juſtice, without meaning to detract from the merit of his coadjutor and ſucceſſor, Mr. Brindley, to whom we have already paid ample and deſerved reſpect under his biographical article. Mr. Gilbert's general character commanded the eſteem of all who knew him, and his death, even after a prolonged life of about 73 years, which happened at Worſley, on the 4th of Auguſt, 1797, was, without doubt, regretted by his friends, and eſpecially by the noble duke, who was in the houſe at the time.

Gilbert's *Iſland*, in *Geography*, an iſland near the S.W. coaſt of Terra del Fuego. N. lat. 55° 13′. W. long. 71° 7′.

Gilbert's *Town*, a town of America, in the ſtate of Virginia, ſeated on the Shenando, 30 miles N. of Charlotteſville.

GILBERTINES, in *Eccleſiaſtical Hiſtory*, an order of religious, thus called from St. Gilbert, of Sempringham, in the county of Lincoln, who founded the ſame about the year 1148: the monks of which obſerved the rule of St. Auguſtine, and were accounted canons; and the nuns that of St. Benedict.

The founder of this order erected a double monaſtery, or rather two different ones, contiguous to each other, the one for men, the other for women, but parted by a very high wall.

St. Gilbert himſelf founded thirteen monaſteries of this order, *viz.* four for men alone, and nine for men and women together, which had in them ſeven hundred brethren, and fifteen hundred ſiſters. At the diſſolution there were about twenty-five houſes of this order in England and Wales.

GILBERTUS Anglicus, in *Biography*, the firſt practical writer on medicine, whom this country produced, is placed by Bale, (who calls him *Gilbertus Legleus*, and ſays he was phyſician to Hubert, archbiſhop of Canterbury,) in the reign of king John, about the year 1210. But Leland, without ſtating the grounds of his opinion, makes him more modern. Dr. Freind obſerves, that it is obvious, from the work by which he is principally known, (a "Compendium of Phyſic,") that he muſt have lived ſeveral years later in the thirteenth century, very probably in the beginning of the reign of Edward I.: "For he quotes Averrhöes," Dr. Freind remarks, "who reached to the cloſe of the twelfth century; and whoſe works could not have been tranſlated ſo early, and indeed were not tranſlated till the middle, at leaſt, of the thirteenth, as Bacon, a good voucher, informs us: and the mention he makes of a book, "de Speculis," which, without doubt, is that written by Bacon, and what he tranſcribes from Theodorick, concerning a leproſy, evidently ſhews that he lived low in this century, &c." (Hiſt. of Phyſic, vol. ii. p. 267.) According to Leland, he maintained a high character for his knowledge in philoſophy and phyſic, which he had acquired by great ſtudy and much travelling; and he was very ſucceſsful in his practice. His writings are principally compiled from thoſe of the Arabian phyſicians, like the works of his contemporaries in other nations; ſometimes, indeed, he tranſcribes whole chapters word for word, eſpecially from Rhazes. He is repreſented as the firſt Engliſh phyſician who ventured to expoſe the abſurd practices of the ſuperſtitious monks, who at that time engroſſed much of the treatment of diſeaſes, and is ſaid to have contraſted with them the methods recommended by the ancients. The principal work of Gilbert, entitled "Compendium Medicinæ tam morborum univerſalium quam particularium," was corrected by Michael Capella, and printed at Lyons in 1510; and afterwards at Geneva, in 1608, under the title of "Laurea Anglicana, ſeu Compendium totius Medicinæ." His other treatiſes were, "De viribus Aquarum:" "De Re Herbaria:" "Theſaurus Pauperum:" and "De tuenda valetudine." Eloy. Dict. Hiſt. Freind, loc. cit.

GILBING, in *Geography*, a town of Pruſſia, in Ermeland; 12 miles W. of Allenſtein.

GILBOA, in *Scripture Geography*, a mountain of Paleſtine, celebrated on account of the defeat and death of Saul, and his ſon Jonathan. (1 Sam. xxxi. 1, 2, 3.). Euſebius and Jerom place this mountain ſix miles from Bethſan, otherwiſe Scythopolis.

GILD, or Guild, originally ſignifies a fraternity, or company.

The word is formed from the Saxon *gildan*, *to pay*, becauſe every man was *gildare*, *i. e.* to pay ſomething towards the charge and ſupport of the company. Hence alſo our Guildhall, *q. d.* the hall of the ſociety or fraternity, where they meet, and make orders and laws among themſelves.

The origin of gilds, or guilds, is thus related: it being a law among the Saxons, that every freeman of fourteen years old ſhould find ſureties to keep the peace, or be committed; certain neighbours, conſiſting of ten families, entered into an aſſociation, and became bound for each other, either to produce him who committed an offence, or to make ſatisfaction to the injured party: that they might the better do this, they raiſed a ſum of money among themſelves, which they put into a common ſtock; and when one of their pledges had committed an offence, and was fled, then the other nine made ſatisfaction out of this ſtock, by payment of money, according to the offence.

Becauſe this aſſociation conſiſted of ten families, it was called a *decennary*; and from hence came out later kinds of fraternities.

But, as to the preciſe time when theſe guilds had their origin in England, there is nothing of certainty to be found; ſince they were in uſe long before any formal licence was granted them for ſuch meetings.

It ſeems to have been about the cloſe of the eleventh century, ſays Anderſon, in his Hiſtory of Commerce, vol. i. p. 70. that merchant-guilds, or fraternities, which were afterwards ſtyled corporations, came firſt into general uſe in many parts of Europe. Mr. Madox, in his Firma Burgi, chap. i. § 9. thinks, they were hardly known to our Saxon progenitors, and that they might be probably brought into England by the Normans; although they do not ſeem to have been very numerous in thoſe days. The French and Normans might probably borrow them from the free cities of Italy, where trade and manufactures were much earlier propagated, and where poſſibly ſuch communities were firſt in uſe. See Charters *of Community*, City, and Corporation.

Edward the Third, in the fourteenth year of his reign, granted licence to the men of Coventry to erect a merchant's gild and fraternity, of brethren and ſiſters, with a maſter, or warden; and that they might found chauntries, beſtow alms, do other works of piety, and conſtitute ordinances touching the ſame.

So Henry the Fourth, in his reign, granted a licence to found a gild of the Holy Croſs, at Stratford-upon-Avon.

Gild, in the royal boroughs of Scotland, is ſtill uſed for a company of merchants, who are freemen of the borough.

Every royal borough has a dean of gild, who is the next magiſtrate below the bailiff. He judges of controverſies among men concerning trade; diſputes between inhabitants touching buildings, lights, watercourſes, and other nuiſances; calls courts, at which his brethren of the gild are bound to attend; manages the common ſtock of the gild; and amerces, and collects fines.

Gild, or *Geld*, according to Camden, alſo ſignifies a tribute, or tax. See Geld.

Gild, according to Crompton, alſo ſignifies an amercement. As in foot-geld, which he interprets a preſtation within the foreſt.

Hence, to be quit of all manner of gild, is to be diſcharged of all manner of preſtations to be made for gathering ſheaves of corn, lamb, and wool, to the uſe of foreſters.

Gild, or *Geld*, is alſo uſed among our ancient writers for a compenſation, or mulct, for a fault committed. See Ungeld.

Hence, *weregeld* is the price of a man; *orfgeld* is the price of cattle; *angeld*, the ſingle value of a thing; *twigeld*, the double value, &c.

There are divers other words which end with *geld*, and ſhew the ſeveral kinds of payments; as *danegeld*, *vadgeld*, *ſenegeld*, *horngeld*, *ſotgeld*, *penigeld*, &c. which ſee.

Gild, or *Guild rents*, are rents payable to the crown by any gild, or fraternity; or ſuch rents as formerly belonged to religious gilds, and came to the crown at the general diſſolution: being ordered for ſale by the ſtat. 22 Car. II.

GILDABLE, or Geldable, denotes a perſon tributary, that is, liable to pay tax, or tribute.

Camden, dividing Suffolk into three parts, calls the firſt gildable, becauſe liable to tax; from which the two other parts were exempt, becauſe eccleſiæ donatæ.

Gildable is alſo explained in an ancient MS. to be that land or lordſhip which is *ſub diſtrictione curiæ vicecom.*

GILDAS, in *Biography*, ſurnamed the *Wiſe*, a Britiſh monk, and the moſt ancient Britiſh writer now extant, was born in the year 520. He is known among many authors by the name of Badonius, by which he is diſtinguiſhed from Gildas Albanius, who is ſaid to have lived at an earlier period. His ſurname Badonius is derived from a memorable victory gained by the Britons over the Saxons, at the hill of Badon, now Bath, about the time of his birth. Having been carefully educated according to the manners of the times he became monk of Bangor, where he diligently applied himſelf to the learning of that period, and particularly to the ſtudy of the ſcriptures, with a view of qualifying himſelf for the duties of a public preacher. He is ſaid to have viſited Ireland at the requeſt of Americus, afterwards king of the country, where he diſtinguiſhed himſelf by his zeal and ſucceſs in converting Pagans, confuting the hereſies of the age, eſtabliſhing monaſteries, and in reforming the corrupt ſtate of principles and manners which had become prevalent among the Chriſtians in that iſland. Upon his return to his native country he viſited the monaſtery of Lhancarvan, lately founded by a pious nobleman of South Wales, and endeavoured, by all the means in his power, to engage other perſons, eminent for rank and fortune, to follow his example. He ſpent ſome time in the northern parts of Britain; viſited France and Italy, and then returned home, where he acquired a high reputation as a moſt indefatigable preacher who never heſitated to cenſure the prevailing vices of the age. He is ſuppoſed to have died at the abbey of Bangor in the year 590; though, according to ſome writers, this event happened at Glaſtonbury, full twenty years prior to this. The chief work of this author is; "Epiſtola de Excidio Britanniæ, et Caſtigatione Ordinis Eccleſiaſtici," containing lamentations over the miſeries and almoſt total ruin of his countrymen, and very ſevere reproofs of the corruption and profligacy of manners in which all ranks were ſharers, and of which he drew a moſt alarming picture. This curious remain of Britiſh eccleſiaſtical antiquities was firſt printed by Polydore Virgil in 1525, from an imperfect copy. It was afterwards publiſhed in 1568 by John Joſſeline from another, and a more perfect manuſcript copy, but the beſt edition was publiſhed by Dr. Thomas Gale, in the firſt volume of his "Hiſtoriæ Britannicæ, Saxonicæ, &c." Gildas wrote ſeveral "Letters," of which there are numerous fragments in an old collection of canons preſerved among the MSS. in the Cottonian library. Other pieces have been aſcribed to him, but theſe are conſidered by the beſt judges, as not really his, among them is the "Hiſtoria de Geſtis Britonum." Moreri.

Gildas-*des-Bois*, *St.* in *Geography*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the diſtrict of Savenay. The place contains 859, and the canton 5527 inhabitants, on a territory of 235 kiliometres, in five communes.

GILDER. See Guilder.

GILDHALDA Teutonicorum was uſed for the fraternity of Eaſterling merchants in London; called alſo the *ſtillyard.*

GILD-HALL, *q. d. Gildæ aula*, the chief hall in the city of London. See Guild-*hall.*

GILD-MERCHANT, *Gilda Mercatoria*, was a certain privilege, or liberty, granted to merchants, whereby they were enabled, among other things, to hold certain pleas of land within their own precincts.

King John granted *gildam mercatoriam* to the burgeſſes of Nottingham.

It is held, that if the king grants to a ſet of men to have "gildam mercatoriam," a mercantile meeting or aſſembly, this is alone ſufficient to incorporate and eſtabliſh them for ever. 10 Rep. 30. 1 Roll. Abr. 513.

GILDING, or Guilding, the art, or act, of ſpreading or covering certain ſubſtances with gold, either in leaf or powder, or in amalgam with quickſilver. See an account of theſe preparaſions of gold under Gold.

The art of gilding was not unknown among the ancients, though it never arrived among them at the perfection to which the moderns have carried it. For this purpoſe the gold was beat into plates, with which the walls of apartments, diſhes, and other veſſels were covered. In early ages theſe plates were thick, ſo that this mode of gilding was very expenſive. (See the proceſs employed for gilding, in this manner, the horns of the ram brought by Neſtor, as an offering to Minerva, in Homer's Odyſſey, l. iii. v. 492.) In proceſs of time, however, the expence was much leſſened, becauſe the art was diſcovered of making theſe plates thinner, and of laying them on with a ſize.

Pliny aſſures us, that the firſt gilding ſeen at Rome was after the deſtruction of Carthage, under the cenſorſhip of Lucius Mummius, when they began to gild the ceilings of their temples and palaces; the Capitol being the firſt place on which this enrichment was beſtowed. But he adds, that luxury advanced on them ſo haſtily, that in a little time you might ſee all, even private and poor perſons, gild the very walls, vaults, &c. of their houſes. "When we cover our houſes with gold," ſays Seneca, (Epiſt. 115.) "what elſe do we than rejoice in deception? for we know, that coarſe wood is concealed under that gold." We need not doubt but that they had the ſame method with us, of beating gold, and reducing it into leaves; though, it ſhould ſeem, they did not carry it to the ſame height; if it be true, which Pliny relates, that they only made ſeven hundred and fifty leaves, four fingers ſquare, of a whole ounce. Indeed, he adds, that they could make more; that the thickeſt were called *bracteæ Prænestinæ*, on account of a ſtatue of the goddeſs Fortune at Præneſte, gilt with ſuch leaves; and that thoſe of the thinner ſort were called *bracteæ quæſtoriæ.*

The modern gilders alſo make uſe of gold leaves of divers thickneſſes; but there are ſome ſo fine, that a thouſand do not weigh above four or five drachms. The thickeſt leaves are uſed for gilding on iron, and other metals; and the thinneſt on wood. But we have another advantage above the ancients, in the manner of uſing and applying the gold: the ſecret of painting in oil, diſcovered of late ages, furniſhes us with means of gilding works that ſhall endure all the injuries of time and weather, which to the ancients was impracticable. They had no way to lay the gold on bodies that would not endure the fire but with whites of eggs, or ſize; neither of which will endure the water: ſo that they could only gild ſuch places as were ſheltered from the moiſture of the weather.

The Greeks called the compoſition on which they applied their gilding on wood, *leucophæum*, or *leucophorum*;

which is deſcribed as a ſort of glutinous compound earth, ſerving, in all probability, to make the gold ſtick, and bear poliſhing. But as to the particulars of this earth, its colour, ingredients, &c. the antiquaries and naturaliſts are not agreed.

There are ſeveral methods of gilding in uſe among us: viz. *gilding on an oily ſize; gilding on a water ſize; gilding by the fire*, which is peculiar to metals; *gilding of books*, &c.

We may diſtinguiſh, in general, two kinds of gilding, one with, and the other without, the application of heat. The firſt method is practiſed on thoſe ſubſtances, ſuch as wood, paper, leather, ſilk, lacquered and japanned ware, &c. which would be injured, and even deſtroyed at the temperature requiſite for the other ſort of gilding, which is employed on ſubſtances that are not liable to alteration by expoſure to a moderate heat, ſuch as metals, and ſometimes glaſs and porcelain.

There are two methods of gilding on wood, *viz.* oil-gilding, and burniſhed gilding.

Gilding *in oil, or an oily ſize*, is performed by cementing the gold to the ground by means of fat oil. Linſeed oil may be prepared for this purpoſe, by putting ſuch a quantity of it into a broad veſſel as may cover the bottom about an inch deep, and adding to it as much water as will riſe ſix inches or more above the bottom. Let the veſſel be expoſed to the ſun and rain, and the contents be occaſionally ſtirred for five or ſix weeks, till the oil appear of the conſiſtence of treacle. Then ſeparate the oil from the water, and place it in a long bottle, or ſeparating-funnel, uſed by the chemiſts, in ſuch heat as will render it perfectly fluid; pour off the clear part, and ſtrain the remainder through a funnel, and the whole will be fit for uſe. The water helps to clear and bleach the oil, and improve it in other reſpects.

In order to prepare the wood for gilding, it muſt firſt be covered or primed with two or three coatings of boiled linſeed oil and white lead, in order to fill up the pores, and conceal the irregularities of the ſurface, occaſioned by the veins in the wood. If greater nicety and perfection in the work be required, the wood ſhould be firſt rubbed with fiſh-ſkin, and then with Dutch ruſhes.

When the priming is dry, the next operation is that of ſizing the work, or laying upon it, by means of a bruſh, or a large pencil, a thin coat of gold ſize; care being taken that the bruſh or pencil be made to paſs into all the cavities and projecting parts, if the ſubject be carved. This gold ſize is prepared by grinding calcined red ochre with a due proportion of the fat, or thickeſt drying oil that can be procured, (the older the better); and this ſize, in order to fit it for working more freely, is to be mixed, previouſly to its being uſed, with a ſmall quantity of oil of turpentine, till it acquires a proper conſiſtence. Sometimes the work is ſized with fat oil, and the japanner's gold ſize (ſee Gold *Size*), ground alſo with ochre. If a high degree of perfection be required, the work ſhould be ſized a ſecond time, and ſome add a third ſizing, before the gold is laid on. In order to aſcertain its fitneſs for this purpoſe, it is touched with the finger; and if it feel ſomewhat adheſive or clammy, or, as the gilders call it, "tacky," but not ſo as to be brought off by the finger, it is in a fit ſtate for gilding. But if it be ſo clammy as to daub, or come off on being touched, it is not ſufficiently dry; or, if it has no clammineſs or ſticking quality, it is too dry, and muſt be ſized over again before it is gilt. When the gold ſize is good, it will be ſufficiently dry in about twelve hours for the application of the gold. In this proceſs, when the ſurface is ſufficiently large and plain to contain them, the gold leaves may be laid on entire, either by means of a ſquirrel's tail, or immediately from the paper which originally contained them, which laſt method, practiſed by thoſe who have acquired the neceſſary dexterity, is the ſimpleſt and moſt expeditious, as well as the beſt, for the perfection of the work. The leaves, being laid on the proper parts of the work, muſt be ſettled to the ground, by gently compreſſing thoſe, which ſeem to want it, with the ſquirrel's tail on a cotton ball; and if any part of the gold has flown off, or has been diſplaced, ſo as to leave any ſpot uncovered, a piece of another leaf, of a correſponding ſize and figure, muſt be laid upon it. When the parts are too ſmall to admit of laying on whole leaves, or when vacancies are left, after laying on whole leaves, which require to be covered with the ſlips or fragments of leaves, thoſe that are to be uſed are turned from the paper upon a cuſhion. (See Gilding *Cuſhion* and Cushion.) They are then cut into ſlips, of a proper ſize, by a blunt pallet-knife (ſee Gilding *Knife*); and each ſlip is taken up on the point of a fine bruſh, or by an inſtrument called the "tip," (ſee Gilding *Tip*,) which, being moiſtened by breathing upon it, will take up the leaves, or any fragments of them from the cuſhion. When theſe are thus applied to the parts of the work that were to be covered, they are gently preſſed down by the cotton ball, till they lie every where evenly upon the ground; and the gold will immediately adhere to the ſticky ſurface of the ſize. Where the work is very hollow, and ſmall pieces are wanted to cover parts that lie deep, they may be taken up, by the tip already mentioned, or the point of a fitch pencil, firſt breathed upon, and thus conveyed to, and ſettled in, their proper places. The whole of the work, being thus covered, ſhould be ſuffered to remain till it be dry, and it may then be bruſhed over by a camel's hair pencil, or ſoft hog's hair bruſh, in order to clear away any looſe particles of the gold leaf. If, after bruſhing, any defective parts appear, ſuch parts muſt be again ſized; and treated as before. The ſquirrel's tail uſed in gilding is cut ſhort, and ſometimes ſpread in the fan-faſhion, by means of a piece of wood formed like a pencil-ſtick, but broad at both ends, and ſplit to receive the tail; but it will equally ſerve in its own form, when the hair is cut to a proper length. The cotton ſhould alſo be formed into a ball, by tying it up in a piece of fine linen rag; for if it be uſed without the rag, the fibres adhere to the gold ſize, and embarraſs the work.

This ſort of gilding is chiefly uſed for domes, and the roofs of churches, courts, banqueting-houſes, &c. and for figures of plaſter, lead, &c. that are to ſtand expoſed to the weather.

This oil-gilding is the moſt ſimple and eaſy, leaſt expenſive, and moſt durable, as it will not be readily injured when expoſed to the open air; and it may be alſo cleaned with a little warm water and a ſoft bruſh; but, as it cannot be burniſhed, it wants the high luſtre which is produced by the method we ſhall next deſcribe.

Gilding, *Burniſhed*, or *in Diſtemper*, or *on Water-ſize*, is that kind of gilding which is generally uſed for picture frames, mouldings, ſtucco, and ſuch wooden works as are ſheltered from the weather, and not ſubject to dampneſs. In order to prepare the wood for this ſort of gilding, thoſe parts that admit of it ſhould be firſt well rubbed with fiſh-ſkin, and then with Dutch ruſhes. It ſhould then be carefully covered with ſtrong ſize, made of ſhreds, &c. of white leather, ſuch as that uſed by glovers, or clippings of parchment boiled in water, in the proportion of about a pound of the ſhreds or clippings, to ſix quarts of water, to the conſiſtence of a jelly, and then ſtrained through flannel while hot. When this coating is dry, eight or ten more muſt be applied, conſiſting of the ſame ſize, mixed with fine plaſter of Paris, or waſhed chalk, or powdered whiting; which mixture muſt be made by melting the ſize, and ſtrewing the whiting, &c. gradually into it, ſtirring them well together, that they may be thoroughly incorporated. This is laid on with a ſtiff bruſh, and oftener or ſeldomer repeated, according to the nature of the work; for pieces of ſculpture, ſeven or eight layers ſuffice: for flat, or ſmooth works, they uſe ten or twelve. In the latter caſe they are applied by drawing the bruſh or pencil over the work: in the former, by dabbing it ſmartly on, that the ſize may enter all the dents of the carving.

After the laſt coat is laid on, and before it be quite dry, a bruſh pencil, dipped in water, ſhould be paſſed over the whole, to ſmooth it, and take away any inequalities that may have been formed; and when it is dry, the parts that admit of it ſhould be again bruſhed over till they are perfectly even. The work ſhould then be repaired, by freeing all the cavities from the priming: after which a water poliſh ſhould be given to the parts deſigned to be burniſhed, by rubbing them gently with a fine linen rag moiſtened with water.

When the whole work is become quite dry, a moderately thick layer muſt be applied, compoſed of ſize and bole, or yellow ochre. Doſſie, in the Handmaid to the Arts, gives the following recipe for the ſimpleſt compoſitions, uſed as the proper cement or gilding ſize in this kind of gilding: "Take any quantity of bole armeniac, and add ſome water to it, that it may ſoak till it grow ſoft. Levigate it then on the ſtone, but not with more water than will prevent its being of a ſtiff conſiſtence, and add to it a little purified ſuet or tallow ſcraped; and grind them together. When this is wanted for uſe, dilute it to the conſiſtence of cream, by parchment or glovers' ſize, mixed with double its quantity of water, and made warm. Some melt the ſuet or tallow, and mix it previouſly with five or ſix times its weight of chalk before it is put to the bole, to facilitate their commixture, to which in this wet ſtate they are ſomewhat repugnant. It is alſo ſometimes practiſed to put ſoap ſuds to the bole; which will contribute to its uniting with the tallow." (See GOLD *Size*.) Let this compoſition be diluted with warm ſize mixed with two-thirds of water, and let it be ſpread with a bruſh over the whole of the work, and then ſuffered to dry; and then let the ſame mixture be applied in the ſame manner, at leaſt once more. After the laſt coat, it ſhould be rubbed in the parts to be burniſhed with a ſoft cloth, till it be perfectly even. Some add a little vermilion to the gilding ſize, and others colour the work, if carved, before it be laid on, with yellow and the glovers' ſize; to which a little vermilion, or red lead, ſhould be added. This laſt method is deſigned to give the appearance of gilding to the deeper and obſcure parts of the carving, where the gold cannot, or is not thought neceſſary to be laid on. But this practice is much diſuſed; and inſtead of it ſuch parts of the work are coloured after gilding; which operation is called "Matting."

The work being thus prepared ſhould be ſet in a poſition ſomewhat declining from the operator; who, having at hand a cup of clean water, and ſome hair pencils, moiſtens a part of the work, and then applies the gold leaf to the part ſo moiſtened in the manner already directed under the article *Oil*-GILDING, till it be completely covered, or till it be too dry to take the gold. This will immediately adhere on being preſſed with the cotton ball. The operator proceeds to moiſten the next part of the work, and apply the gold as before, repeating the operation till the whole is completed. If, in examining the work, any parts ſhould appear to need being repaired, they ſhould be moiſtened as before, and covered with the gold; but care ſhould be taken that no part be miſſed in the firſt operation, as it is not ſo eaſily mended as in oil-gilding: nor ſhould any drops of water be ſuffered to fall on the perfect part of the gilding, as the gold is very apt to turn black in this ſtate. The work being thus far gilt, when dry, and fit for the purpoſe, which it will uſually be in about twenty-four hours, remains, either to be burniſhed, or matted.

The proper period for this purpoſe can only be aſcertained by experience, and varies at different ſeaſons. The mode of diſtinguiſhing the fitneſs of the work to take the burniſh, is to try two or three particular parts at a diſtance from each other; and if theſe take the poliſh well, the whole may be concluded to be in a fit ſtate. But if the gold peel off, or be diſordered by the rubbing, the work muſt be deemed not ſufficiently dry; and if the gold bear the rubbing well, and yet receives the poliſh ſlowly, it is a proof of its being too dry, which ſhould be prevented by watching the proper time. For the work, when too dry, both requires much more labour to burniſh it, and fails at laſt of taking ſo fine a poliſh.

To burniſh it, is to ſmooth and poliſh it with a burniſher, which is uſually a dog's or wolf's tooth, or a blood-ſtone, an agate, or a pebble, or ſomething elſe very ſmooth, fitted in a handle for that purpoſe.

To mat, is to give it a light lick in the places not burniſhed, with a pencil dipped in ſize, wherein a little vermilion ſometimes has been mixed. This helps to preſerve it, and prevent its flawing, when handled. Or, it is to cover the hollow parts with a colour the neareſt in appearance to gold.

Some recommend for this purpoſe red lead, with a little vermilion ground with the white of an egg; but yellow ochre, or Dutch pink, with red lead, would better anſwer the end; or the *terra di Sienna*, very ſlightly burnt, or mixed with a little red lead, would have a much better effect, and be more durable than any other mixture ſo near the colour of gold in ſhade. Iſinglaſs ſize will likewiſe ſupply the place of the whites of eggs. This operation of matting ſuperſedes the neceſſity of yellowing, which is intended to give the appearance of gilding to the deeper and obſcure parts of the carving where the gold cannot, nor is thought neceſſary to be laid on.

The laſt thing is to apply a vermeil, or lacquer, in all the little lines and cavities; and to ſtop and amend any little faults with ſhell-gold.

The compoſition here called *vermeil*, is made of gum gutta, vermilion, and a little of ſome ruddy brown colour, ground together with Venice varniſh and oil of turpentine. Some gilders, in lieu of this, content themſelves with fine lacca, or dragon's-blood, with gum-water.

Sometimes, inſtead of burniſhing the gold, they burniſh the ground or compoſition laid on laſt before it; and content themſelves afterwards to waſh the part over with ſize. This method is chiefly practiſed for the hands, face, and other nudities in relievo; which, by this means, do not appear ſo very brilliant as the parts burniſhed; though much more ſo than the parts perfectly flat, or matted.

To gild a work, and yet preſerve white grounds, they apply a layer of Spaniſh white mixed with a weak fiſh-glue, on all the parts of the ground whereon the yellow, or the layer next under the gold, might run.

GILDING, *Japanners*, is performed by means of gold powder, or imitations of it, cemented to the ground by a kind of gold ſize: for the method of preparing which, ſee GOLD-*ſize*. This kind of gilding may be practiſed on almoſt any ſubſtance whatever, whether wood, metal, leather, or paper; nor is there any preparation neceſſary, beſides making the ſurface on which the ſize is to be laid, even, and perfectly clean. Then ſpread the japanner's ſize, mixed with a due proportion of oil of turpentine and vermilion, with a bruſh over the work, if the whole ſurface is to be gilt; or draw with it, by means of a pencil, the proper figure deſired, avoiding carefully any other parts; when it is almoſt dry, ſo as to be capable, by its clammineſs, of receiving the gold, dip a piece of waſh-leather wrapped round the finger in the gold powder, deſcribed under *Shell*-GOLD, and rub it lightly over the ſized work; or ſpread the powder with a ſoft camel's hair pencil; and with a camel's hair bruſh clear away the looſe powder, after the gilded ſurface is dry. When leaf gold is uſed, the method of ſizing muſt be the ſame as for the powders; but great care is neceſſary in laying them on, while the ſize is in a proper ſtate of dryneſs.

There is a *falſe kind* of gilding, in which a colour of gold is given by painting and varniſhes, without employing gold. Thus a very fine golden colour is given to braſs and to ſilver, by applying on theſe metals a gold coloured varniſh, which, being tranſparent, ſhews all the brilliancy of the metals underneath. Many ornaments of braſs are varniſhed in this manner, which is called *gold lacquering*, to diſtinguiſh them from thoſe that are really gilt. Silver leaves, thus varniſhed, are put upon leather, which is then called gilt leather; and many picture-frames have no other than this counterfeit gilding, which may be diſcovered by waſhing it with a little rectified ſpirit of wine; for the ſpirit will diſſolve the varniſh, and leave the ſilver leaf of its own whiteneſs. For plain picture frames, thick tin-foil may be uſed inſtead of ſilver; the tin leaf fixed on with glue is to be burniſhed, then poliſhed with emery and a fine linen cloth, and afterwards with putty applied in the ſame manner; being then lacquered over with the varniſh five or ſix times, it looks like burniſhed gold. (See LACQUERING.) Among the falſe gildings may alſo be reckoned thoſe which are made with thin leaves of copper or braſs, called Dutch leaf. In this manner are made all the kinds of what is called gilt paper. See GILDING *of Paper*.

GILDING *of Books*. There are various methods, with reſpect to the cement uſed, by which the edges of books or paper may be gilt. Strong gum-water or iſinglaſs ſize, or glover's-ſize may be employed; but as the gum-water, and weaker ſizes are apt to run beyond the edge, and thus cauſe the leaves to ſtick together, iſinglaſs, melted with the addition of ſome common proof ſpirit of wine, and a ſixth part of honey or ſugar-candy is much to be preferred; to which muſt be added a third of bole armeniac well powdered.

The following compoſition may be uſed for this purpoſe: Take bole armeniac, and ſugar-candy well powdered; mix them with the whites of eggs, beaten to an oily conſiſtence; and the cement will be fit for uſe. In applying any of theſe cements, the paper, in quires or in books, ſhould be well cut and poliſhed on the edges to be gilt; and well ſcrewed down by a preſs; in this ſtate it is to be bruſhed over, firſt with a little of the cement without the ſugar-candy or the bole; and when that is dry, either with the cement above given, or any other ſolution of gum or ſize with the proper proportion of the bole; after which it may be ſuffered to dry; and then water-poliſhed, by rubbing it with a fine linen rag ſlightly moiſtened. It is then fit for receiving the gold, provided it be moiſtened at that time; and the leaves may be then laid on, being cut according to the breadth which they are to cover, and preſſed cloſely down by a cotton ball; and after the gilding is thoroughly dry and firm, it may be poliſhed. See BOOK-*binding*, and GILDING *of Paper*.

GILDING *on china-ware*. The gold is very much valued on china-ware, and would be much more ſo, were it not that it is very liable to loſe its luſtre, and to rub off. The Chineſe have at preſent a method of preventing both theſe accidents, in a great meaſure, by means of a ſort of poliſhing, which they give it after it is laid on. They prepare for this purpoſe a fine piece of agate, which they poliſh on one ſurface in as perfect a manner as poſſible. With this they rub over the gold, as it lies on the porcelain, ſeveral times, when it firſt comes from the baking. This gives the gold a luſtre which it would not otherwiſe have, and fixes it down to the ware in ſuch a manner, that it cannot eaſily be got off. The principal miſchief to which gold thus laid on is ſubject, is the tarniſhing, or growing dull; this is remedied by the ſame ſort of means. They wet the veſſel, upon which they would revive the luſtre of the gold, in common clean water; and while it is wet, they rub it with the ſame poliſhed agate, adding a little fair water at times to keep it moiſt. If the gold has not been well laid on at firſt, this may poſſibly raiſe it or take it off in ſome places; but if it was originally put on with the help of this ſtone, as all the gold on porcelain now is, the rubbing it with it a ſecond time never gives it any ſcratches, but recovers its priſtine luſtre and beauty. It muſt be obſerved, that the rubbing with this ſtone muſt be all done one way, both in the firſt laying on the gold, and in the brightening of it up afterwards. This may ſerve as a method for us as well as the Chineſe, not only to recover the beauty of our tarniſhed gilt china-ware, but alſo to lay gold upon ſome of our home manufactures of this kind. Obſerv. ſur les Coutûmes de l'Aſie. See PORCELAIN.

GILDING *on enamel and glaſs*, is performed by burning or annealing, *i. e.* by producing a coheſion of the gold with the glaſs or enamel, by the intermediation of a flux, or by producing the like effect without any. In both theſe methods, the gold is made to adhere to the enamel or glaſs, in conſequence of the fuſion or approach to that ſtate, either of the flux uſed, or of the body of the enamel or glaſs itſelf, by which the gold is cemented to ſuch body. The flux, when any is uſed, may be either ſimple glaſs of borax, or any of the preparations of fluxes powdered (ſee FLUX); and the gold is uſed, either in the form of leaf gold, or in that of powder made mechanically, or by precipitation. (See GOLD *powder*.) When leaf gold is employed without any flux, the enamel or glaſs may be moiſtened with a very weak ſolution of gum arabic, and again dried. After being thus prepared, it ſhould be breathed upon till it becomes a little adheſive or ſticky, and then laid upon a ſufficient number of leaves of gold: when the gold is thus united to the enamel or glaſs by the cementing quality of the gum arabic, the work is ready for burning. If a flux be uſed, it ſhould be finely levigated, tempered with a very weak ſolution of gum arabic, and very thinly ſpread on the part of the work to be gilded: and when the gum water is almoſt dry, the leaf gold ſhould be laid on that part thus prepared for it, which is then in a ſtate proper for burning. In the preſent practice, the *aurum fulminans*, or precipitation of gold by alkaline ſalts, is made by thoſe who gild glaſs in the greateſt perfection; and the volatile alkali is employed for the precipitation by the chemiſt, who prepares it for this purpoſe. But when this kind of precipitate is choſen, the uſe of any flux muſt be avoided, and a very conſiderable degree of heat applied. The manner of uſing the precipitate powders of gold, the *aurum fulminans* excepted, as well as the leaf gold, may be varied, by adding to it or omitting any flux; but in what way ſoever the powder is uſed, it is to be tempered with the oil of ſpike, and worked as the enamel colours; and the quantity of flux, when any is uſed, may be a third of the weight of the gold. In caſes where the glaſs is very hard, or where the opportunity of a ſtrong heat cannot be conveniently obtained, the expedient of uſing a flux in the following manner may be adopted with great advantage. Grind glaſs of borax to a fine powder; and having tempered it with oil of ſpike, lay it on the glaſs where the gilding is to be made; then burn the glaſs with a degree of heat, that will cauſe the borax to run; and when it is cold, apply the precipitate or leaf gold, and burn it again, as in other caſes. After the work is burnt, if it be intended to be burniſhed, a proper luſtre may be given to it, by rubbing the gilded part with a dog's tooth, or with a fine agate, or iron burniſhers. Handmaid to the Arts, vol. i. p. 374, &c. See *Ruby* Glass.

Gold may be laid upon white earthen-ware or glaſs, by drawing your deſign, upon the veſſel to be gilt, with japanners' gold ſize, moiſtening the ſize, as you find neceſſary, with oil of turpentine. Set the work in a clean place to dry for about an hour, and then place it ſo near the fire that you could but juſt bear the heat of it with your hand for a few ſeconds. Let it remain there till it feels quite tacky or clammy: then, having procured a cuſhion and ſome leaf-gold, cut it into ſlips of the proper ſize, and lay it on with a little cotton-wool. When the gold is all on, put the work into an oven to be baked for two or three hours.

Drinking glaſſes, with gilt edges, have been much admired in this country; the beſt of theſe are brought from Germany: thoſe that are made in England, though equal in beauty to the foreign, being greatly inferior in the durability of the gilding. Dr. Lewis made ſeveral experiments with a view of diſcovering this art; from which he concludes, that the gold is cemented to them by means of an intervening matter, which will adhere to glaſs ſo as not eaſily to be rubbed off. He tried maſtich, and other reſinous bodies rubbed warm on the glaſs, and ſeveral ſpirituous varniſhes: but none of theſe were found to adhere ſufficiently to the glaſs. He recommends to the trial of the artiſts in this way the harder oil varniſhes: and glaſſes have been ſince prepared in England, probably on the principles which he has pointed out, with as durable gilding as thoſe brought from Bohemia and Thuringia.

M. Zeigler, in a German tranſlation of the "Commercium Philoſophico-Technicum," deſcribes a varniſh for this purpoſe, with the method of uſing it, which appeared from his experiments to be the beſt. This varniſh is prepared by boiling fine tranſparent amber, reduced to powder, in a braſs veſſel, to the cover of which a valve is fitted, with as much drying oil as will juſt cover it; and by diluting the above ſolution with four or five times its quantity of oil of turpentine. This varniſh may be made to dry ſooner, and acquires greater firmneſs by grinding it with a little white lead, or rather with a mixture of white lead and minium. It is to be applied very thin on the glaſs, and the gold leaf laid lightly on the varniſhed part; when the varniſh is thoroughly hardened, the gold may be burniſhed, by laying a piece of ſmooth paper between the tooth or ſteel burniſher, and the gold. This gilding, M. Zeigler obſerves, is durable, and of a fine luſtre. Com. Phil. Techn. p. 65, and 614.

Gilding *of figures and letters on paper*, and for the embelliſhment of manuſcripts, is performed with ſhell-gold, tempered with gum-water; or the characters may be drawn with a milky ſolution of gum-ammoniacum made in water, and gold-leaf applied upon them when almoſt dry, or if all or any part of them is become quite dry, they may be again ſufficiently moiſtened for receiving the gold by breathing on them. Letters raiſed from the ſurface of paper or parchment, in the manner of emboſſed work, ſuch as are ſeen on ancient manuſcripts, may be formed either by friction on a proper body with a ſolid piece of gold, or by leaf gold. The former method is practiſed by tempering pulverized cryſtal with ſtrong gum-water, and with this paſte forming the letters; when they are dry, they are rubbed with a piece of ſolid gold, as in poliſhing, and the letters will appear as if gilt with burniſhed gold. The letters are formed with an emboſſed figure, either of the ſeparate letters, or of whole words, cut in ſteel; and each letter of theſe ſtamps, when they are uſed, is anointed evenly with a feather dipped in oil. Then fill theſe concave letters with the above paſte, and ſtrike the ſtamps in a perpendicular direction on the paper or vellum, laid over ſome ſheets of paper.

When the emboſſed letters are formed with leaf gold, the following, or a ſimilar compoſition muſt be uſed. Thicken beaten whites of eggs with as much vermilion as is neceſſary to give them the conſiſtence of paſte; uſe the ſtamps as before; and when the letters are dry, moiſten them by a ſmall pencil with ſtrong gum-water: and when this is almoſt dry, cover the letters with leaf gold, preſſing it cloſe to every part of them with cotton or ſoft leather; after the gilding is dry, poliſh it with proper burniſhers. Com. Phil. Techn. p. 64. and Handmaid to the Arts, p. 450, &c.

Gilding *of live-fiſh*, as craw-fiſh, carps, &c. may be performed without injuring the fiſh, by means of a cement; which Mr. Hooke, in his poſthumous papers, directs to be prepared in the following manner: Put ſome Burgundy pitch into a new earthen pot, and warm the veſſel till it receives ſo much of the pitch as will ſtick round it; then ſtrew ſome finely powdered amber over the pitch when growing cold; add a mixture of three pounds of linſeed oil, and one of oil of turpentine: cover the veſſel, and boil the contained ingredients over a gentle fire; grind the mixture as it is wanted, with ſo much pumice-ſtone in fine powder as will reduce it to the conſiſtence of paint. When the fiſh has been wiped dry, this mixture is ſpread upon it, and the gold leaf laid over it, and gently preſſed down; after which, the fiſh may be immediately put into water, and the cement will harden, and be in no danger of falling off.

Gilding *on leather*. See Lacquering.

Gilding *of metals* may be done by cleaning the ſurface of the metal, and applying gold leaves to it, which, by means of rubbing with a poliſhed blood-ſtone, and a certain degree of heat, are made to adhere perfectly well. In this manner ſilver leaf is fixed and burniſhed upon braſs, in making French plate; and ſometimes alſo gold leaf is burniſhed upon copper and upon iron. For this purpoſe, the metal, being previouſly poliſhed and quite clean, is heated to about the temperature of melted lead, and covered with a double layer of gold leaf; then a blood-ſtone burniſher, applied gently at firſt, and gradually increaſing the preſſure, will cauſe the ſurfaces of gold and copper to touch each other in almoſt every point, and then adhere with a force proportioned to the completeneſs of the contact. The firſt layer being thus burniſhed, a ſecond is made to adhere in the ſame manner, and ſometimes a third, if the gilding is intended to be very ſolid. This method of gilding is tedious, and is ſubject to the almoſt impoſſibility of uſing a ſufficient preſſure without injuring the evenneſs of the gilded ſurface. In caſes where theſe objections do not apply, there cannot be a more effectual mode of gilding, as we perceive in the manufacture of gilt ſilver and copper wire. The bar, before it is committed to the wire-drawer, is plated with gold, by having ſeveral leaves of gold ſucceſſively burniſhed down upon it, and being then ſubjected to the ſtrong compreſſion that takes place in wire-drawing, the gold and the other metal become ſo perfectly united, as to form, in a manner, one ſubſtance. See Gold *Wire*.

Some metals, and particularly ſilver, may be gilt in the following manner: dip pieces of linen in the ſolution of gold by aqua regia, and then burn them to aſhes; rub theſe aſhes on the ſurface of the ſilver, well cleanſed from any unctuous matter, with a wet linen rag, dipped in ſalt water, and the particles of gold contained in them will thus be applied to the ſilver, and adhere to it, without the application of heat, or intervention of any other body. Burniſh the ſilver with a blood-ſtone, till it acquires the colour of gold. Moſt gilt ornaments on fans, ſnuff-boxes, and other toys of much ſhew and little value, are nothing but ſilver gilt in this manner. Beckmann (Hiſt. of Inventions, vol. i.) ſuggeſts, that this method of gilding, ſometimes called dry, and ſometimes cold gilding, is a German invention; and that foreigners, at leaſt the Engliſh, were firſt made acquainted with it about the end of the 17th century; for Robert Southwell deſcribes it in the Phil. Tranſ. for 1698, and ſays, that it was known to very few goldſmiths in Germany. See Gilding *of Metals by the fire*.

Gilding *on paper*, *parchment*, and *vellum*. There are various methods uſed for this purpoſe, according to the ſeveral ends which the gilding is deſigned to anſwer. But for the moſt part, ſize, properly ſo called, and gum-water, are uſed as the cements, and the powders are more generally employed than the leaf gold. See the three firſt articles in Gilding.

The gilding proper to be uſed with water-colours may be either with the leaf-gold or powder; the leaf-gold may be laid on the deſigned ground by means either of gum-water, or iſinglaſs ſize; obſerving, that the gum-water or ſize be of the weaker kind, and laid ſparingly on the ground, and that proper time be allowed for it to be dry; and then the gold is applied to it, as in the articles above recited; and it may be poliſhed, if neceſſary, by the dog's tooth, or other kind of burniſher. In gilding larger ſurfaces, it will be found uſeful to colour the ground with the gall-ſtone; and when colours are to be laid on the gilding, the gall of any beaſt bruſhed over the gold will adapt it for receiving the colours. When the gold powders are uſed along with paintings in water-colours, they are previouſly formed into ſhell-gold. The gilding proper for the coloured paper uſed in binding books, and for other ſuch purpoſes, is performed much in the ſame manner: only that the gum-water and ſize may be much ſtronger, and that they are generally conveyed to the ground by means of a wooden plate or print, or by an engraved roller, which make an impreſſion of the intended figure or deſign. In this kind of gilding, the japanner's goldſize may be alſo commodiouſly employed; and this ſhould be always uſed when the emboſſed appearance is wanted in the greateſt degree; and for this purpoſe it ſhould be thickened with yellow ochre, mixed with as much red-lead as the proper working of the print will admit. Inſtead of the genuine leaf-gold, or gold powder, the German powder, formed of the leaves called Dutch gold, is commonly uſed in this kind of gilding. The edges of books or paper are gilt in the manner directed under the article Book-*binding* and Gilding *of books*.

Gilding *on Thread and Wire*. See Gold-*thread*, and Gold-*wire*.

Gilding *on Wood*. See the three firſt articles in Gilding.

Gilding *on Metals by the Fire*. There are two ways of gilding by fire; *viz*. that with liquid gold, and that with leaf gold. For the latter, ſee Gilding *of Metals*, ſupra.

The former, technically called "water-gilding," is performed with gold amalgamated with mercury, in the proportion of about ſix or eight parts of mercury to one of gold.

In order to this operation, they heat ſome pure quickſilver in a clean crucible, and, when it is nearly boiling, put about a ſixth of its weight of fine gold in thin plates heated red-hot, and ſtir them gently about, till the gold be found melted and incorporated into a maſs with the mercury. It is then allowed to cool; and when cold, it is to be put in a piece of ſoft leather; and by gradual preſſure, the fluid part of the amalgam, conſiſting almoſt wholly of mercury, may be forced through the pores of the leather, while the gold, combined with about twice its weight of mercury, will remain behind, forming a yellowiſh ſilvery maſs, of the conſiſtence of ſoft butter. This, after having been bruiſed in a mortar, or ſhaken in a ſtrong phial with repeated portions of ſalt and water, till the water ceaſes to be fouled by it, is fit for uſe, and may be kept for any length of time, without injury, in a corked phial. It is of indiſpenſible importance that the materials of this amalgam ſhould be perfectly pure; and therefore, the mercury employed in the preparation of it ſhould be procured from the diſtillation of the red precipitate (nitrous red oxyd of mercury), either alone, or mixed with a little charcoal powder.

When ſilver is the metal to be gilt, it is prepared for the operation by ſoaking it in warm dilute muriatic acid, ſo that the ſurface may be rendered perfectly clean; it is next waſhed in clean water, which ſhould be two or three times changed, in order to free it from the whole of the acid; and being afterwards dried, and made moderately warm, a little gold-amalgam, alſo warm, is to be evenly ſpread upon the ſilver, to which it will immediately adhere. In applying the amalgam, the operator uſes a little knife, or a bruſh made of braſs wire, for the purpoſe; and giving the work a gentle heat before the fire, he dabs or ſpreads the amalgam with the bruſh farther and more evenly upon it.

Thus far advanced, the metal is ſet over the fire, upon a grate, or in a ſort of cage, under which is a pan of charcoal, yielding a heat juſt ſufficient for evaporating the mercury; by which means the mercury is raiſed in fumes, and leaves the gold alone adhering to the work; in proportion as the mercury, evaporating and flying off, diſcovers places where gold is wanting, they take care to ſupply them, by adding new pieces of amalgam with the knife or bruſh.

If a thicker gilding be required than can reſult from ſo much of the amalgam as is applied at once, the metal, after the firſt quantity has left its gold fixed on the ſurface, has more of the amalgam ſpread upon it. After the evaporation of the mercury from this, another quantity may be applied in the ſame manner. When the mercury is evaporated, ſo that the ſurface becomes uniformly of a pale yellow colour, the metal is made to undergo other operations, by which its colour and luſtre are heightened. For this purpoſe, it is firſt rubbed with a ſcratch bruſh, compoſed of fine braſs wire, till its ſurface is made clean and ſmooth, but the pale yellow colour ſtill remains; then it is covered over with a compoſition called gilding wax, and again expoſed to the fire till the wax be burnt off; and this application is repeated till the gold appears of a proper colour. This gilding wax is compoſed of bees' wax, mixed with the following ſubſtances;

viz. red ochre, verdigris, green vitriol, or alum. Thus the colour of the gilding is heightened by a perfect diſſipation of ſome mercury remaining after the former operation. The gilt ſurface is then covered over with a ſaline compoſition, conſiſting of equal quantities of nitre, ſal ammoniac, green vitriol, and verdigris, finely powdered, and mixed up into a paſte with water or urine; or, this is uſed inſtead of the gilding wax. The piece of metal thus covered is heated till the mixture ſmokes, and quenched in water or urine. This effect ſeems to be produced by the acid of nitre, which is diſengaged by the vitriolic acid of the alum, or other vitriolic ſalt, during the expoſure to heat, acting upon any particles of copper which may happen to lie on the gilded ſurface. If the colour of the gilding be not ſufficiently heightened by the firſt application, a ſucceeding one will complete the deſired effect. Some artiſts think they give an additional luſtre to their gilt work, by dipping it in a liquor prepared by boiling ſome yellow materials, as ſulphur, orpiment, or turmeric. The only advantage of this operation is, that a part of the yellow matter remains in ſome of the hollows of the carved work, in which the gilding is apt to be more imperfect, and to which it gives a rich and ſolid appearance.

Copper, and the alloys formed by its combinations with zinc, are gilded much in the ſame manner as ſilver; but their affinity for mercury being conſiderably leſs than that of ſilver, it is not eaſy to produce a complete adheſion of the amalgam of gold to the burniſhed ſurface of theſe metals by the ſame means, and with the ſame evenneſs as in the former caſe. Advantage is here taken of the nitric acid for facilitating the adheſion of the copper and mercury in the following manner. The piece of copper, *e. g.* a button, is firſt cleaned by ſteeping it in acid and ſubſequent waſhing, and it is then burniſhed in a lathe, or by other means: after this, it is dipped in a neutralized ſolution of nitrat of mercury, and in a few ſeconds, on account of the ſtrong affinity of nitric acid for copper, the mercurial ſalt is decompoſed. The copper takes the place of the mercury, and at the ſame time the mercury is depoſited in the metallic ſtate, on the ſurface of the copper, covering it entirely, and ſtrongly adhering to it. The gold amalgam is now applied, and the reſt of the proceſs is the ſame with that which has been already deſcribed. Thus a given quantity of gold may be made to cover a larger ſurface than in any other way of gilding on metals; five grains of gold completely gilding both the upper and under ſurfaces of 144 copper buttons, each of them an inch in diameter. (Phil. Mag. ix. 20.)

Iron cannot be gilt by amalgamation, unleſs it be previouſly coated with copper, by dipping it in a ſolution of blue vitriol, or rubbed with the vitriol itſelf a little moiſtened. Iron may alſo receive a golden coat from a ſaturated ſolution of gold in aqua regia, mixed with ſpirit of wine; becauſe the iron, having a greater affinity for the acid, precipitates the gold from it.

In the gilding of iron, or rather ſteel, by means of an amalgam, peculiar difficulties occur. If recourſe be had to the method of ſimple burniſhing down, the heat requiſite for this purpoſe will, in many caſes, bring the temper of the ſteel too low; on ſuch occaſions the mode already deſcribed of gilding copper is ſometimes practiſed: that is, the parts of the ſteel to be gilded are pencilled over with nitrat of mercury, by which they are covered with a ſlightly adhering coating of mercury; then the amalgam is applied, and the gilding finiſhed in the uſual way. The objections to this proceſs are, firſt, that a conſiderable heat is required, though inferior to that requiſite for burniſhing down; and, ſecondly, that even with all poſſible care, the gilding is apt to be rough and to ſcale off. A very conſiderable improvement on this method is to trace the figure of the gilding on the ſteel firſt of all with a bruſh charged with a ſtrong ſolution of ſulphated copper, in conſequence of which a pretty thick plate of this metal is depoſited on the ſteel to which it may be made to adhere with conſiderable firmneſs by means of the burniſher; thus the gilding is, in part, performed upon the copper.

A new method of gold gilding upon ſteel has lately been publiſhed (ſee Phil. Mag. xi. p. 144), poſſeſſing many advantages over the others, and capable of ultimately attaining a very high degree of perfection. This method depends upon the well-known fact, that if ſulphuric ether and nitro-muriat of gold are mixed together, the ether will, by degrees, ſeparate from the acid nearly the whole of the gold, and retain it for ſome time in ſolution in nearly a metallic ſtate. If ether, thus charged with gold, is ſpread, by means of a pen or fine bruſh, on the ſurface of highly poliſhed ſteel, the ether preſently evaporates, leaving the gold behind in cloſe contact with the ſteel, and the adheſion is conſiderably improved by the ſubſequent application of the burniſher. The dearneſs, and eſpecially the rapid volatility of ether, are objections of ſome moment, but may be got over by uſing the beſt oil of turpentine inſtead of the ether, which has nearly the ſame efficacy in decompoſing the nitro-muriat of gold, and is both cheaper, and not ſo very quickly evaporable.

On the ſubject of gilding by amalgamation, Dr. Lewis has the following remarks: "There are two principal inconveniencies in this buſineſs; one, that the workmen are expoſed to the fumes of the mercury, and generally, ſooner or later, have their health greatly impaired by them; the other, the loſs of the mercury; for though part of it is ſaid to be detained in the cavities made in the chimnies for that purpoſe, yet the greateſt part of it is loſt. From ſome trials I have made, it appeared that both theſe inconveniencies, particularly the firſt and moſt conſiderable one, might be in a good meaſure avoided, by means of a furnace of a due conſtruction."

If the communication of a furnace with its chimney, inſtead of being over the fire, is made under the grate, the aſh-pit door, or other apertures beneath the grate, cloſed, and the mouth of the furnace left open, the current of air, which otherwiſe would have entered beneath, enters now at the top, and paſſing down through the grate to the chimney, carries with it completely both the vapour of the fuel, and the fumes of ſuch matters as are placed upon it. The back part of the furnace ſhould be raiſed a little higher above the fire than the fore-part, and an iron plate laid over it, that the air may enter only at the front, where the workman ſtands, who will be thus effectually ſecured from the fumes, and from being incommoded by the heat, and at the ſame time have full liberty of introducing, inſpecting, and removing the work.

If ſuch a furnace is made of ſtrong forged (not milled) iron plate, it will be ſufficiently durable. The upper end of the chimney may reach above a foot and a half higher than the level of the fire; over this is to be placed a larger tube, leaving an interval of an inch, or more, all round between it and the chimney, and reaching to the height of ten or twelve feet; the higher the better. The external air, paſſing up between the chimney and the outer pipe, prevents the latter from being much heated, ſo that the mercurial fumes will condenſe againſt its ſides into running quickſilver, which falling down to the bottom, is there catched in a hollow rim, formed by turning inwards a portion of the lower part, and conveyed by a pipe at one ſide into a proper receiver.

Another method is mentioned by authors of gilding upon metals, and alſo upon earthen-ware and glaſs; which is, to fuſe gold with regulus of antimony, to pulverize this maſs, and ſpread the powder upon the piece to be gilt; afterwards to expoſe it to ſuch a fire that the regulus may be evaporated while the gold remains fixed. But Dr. Lewis mentions the following inconveniencies to which this method is ſubject: the powder does not adhere to the piece, and cannot be equally ſpread; part of the gold is diſſipated along with the regulus; glaſs is fuſible with the heat neceſſary for the evaporation of regulus of antimony; and copper is liable to be corroded by the regulus, and to have its ſurface rendered uneven. Lewis's Com. Phil. Techn. p. 77, &c. p. 81. 88. and 108. Macquer's Dict. Chem. Eng. edit. 1777; and Aikin's Dict. of Chemiſtry, art. GILDING.

GILDING *Cuſhion*, is formed by a few folds of flannel, or a quantity of tow or wool, ſecured on a piece of wood of any ſize from eight to fourteen inches ſquare by a light covering of leather, and faſtened tight round the edges. The ſurface ſhould be perfectly flat and even, and it is uſually furniſhed with a handle. See CUSHION.

GILDING *Knife*, a ſlip of the hollow Spaniſh cane, cut up to a ſmooth and ſharp edge, with a good penknife: this cane knife cuts the gold leaf better than one of ſteel, as it is apt to ſtick to this laſt. This knife may in all reſpects be the ſame as thoſe uſed in painting, called "pallet knives;" the blade of which may be four or ſix inches long, and ſomewhat more than half an inch in breadth, with a proportionable handle.

GILDING *Pallet*, a flat piece of wood, about three inches long, and an inch broad, covered with a piece of fine woollen cloth.

By breathing upon this pallet, to moiſten the cloth a little, and then clapping it gently down upon the gold leaf, this may be raiſed from the cuſhion, and conveyed to the work to be gilded.

GILDING *Tip*, a tool made by faſtening the long hairs of a ſquirrel's tail between two cards, and uſed for taking up the gold leaf after it is cut, and applying it to the article to be gilded.

GILDING *Wax*. See GILDING of *Metals*.

GILDO, in *Biography*, a powerful lord in Mauritania, ſerved the emperor Theodoſius, in his brother's revolt in 373, with ſo much fidelity, that he was raiſed to the chief command in Africa. During the reigns of Arcadius and Honorius he maintained a kind of independence, and ruled, at his pleaſure, the provinces under his command, which he oppreſſed by every ſpecies of tyranny. In the diſſenſions between the eaſtern and weſtern empires, he was perſuaded by the miniſter Eutropius to acknowledge Arcadius: for this he was condemned as a public enemy by the Roman ſenate. About the ſame time a deadly quarrel had ariſen between Gildo and his younger brother Maſcezel, in which the latter had taken refuge in the court of Honorius. Gildo, with a brutality that can never be ſufficiently execrated, ſatiated his diſappointed vengeance upon the two children of his brother, whom he barbarouſly murdered. Maſcezel, anxious for revenge, landed a body of troops in Africa, and encamped in the face of a numerous army of Moors collected by Gildo. Theſe, intimidated by the ſuperior diſcipline of the Europeans, fled almoſt without a blow. Gildo eſcaped to the ſea-ſhore, where he embarked for a foreign country, but, being driven back by adverſe winds, he was ſeized by the inhabitants and thrown into a dungeon. There a voluntary death ſaved him from the cruel fate, which his conſcience told him he might expect from his injured brother. The revolt of Gildo, ſays the hiſtorian, was conſidered as an event of ſo much importance to the empire, that the poet Claudian made the "Gildonic war" the ſubject of one of his panegyrics, to the honour of Stilicho, who was the commander in it, againſt the ſubject of this article. Gibbon. Univer. Hiſt.

GILEAD, *Balm of*. See BALSAM.

GILEAD, *Falſe Balm of*, in *Botany*. See DRACOCEPHALUM.

GILEAD, in *Scripture Geography*, mountains of Paleſtine, which lay E. of Jordan, and ſeparated the lands of Ammon, Moab, Reuben, Gad, and Manaſſeh from Arabia Deſerta. According to Euſebius mount Gilead reached from Libanus northward to the kingdom of the Amorites, which was ceded to the tribe of Reuben; ſo that it muſt have extended above 70 leagues from north to ſouth. This mountain, or rather chain of hills, was much celebrated for its excellent balm. Jer. viii. 22. xlvi. 11. li. 8. Gen. xxxvii. 25. See BALSAM. Gilead derived its name from Gael-haed, *q. d.* the heap of witneſs, in reference to the heap of ſtones raiſed as a monument of the covenant between Jacob and Laban. Gen. xxxi 21.

GILES, in *Biography*, a learned Italian prelate, and cardinal of the ſixteenth century, diſtinguiſhed himſelf by the progreſs which he made in different branches of literature; and was appointed profeſſor of philoſophy, and then of theology, in his order, that of the hermits of Auguſtine. In 1507, he was raiſed to the poſt of general of his order, and was employed by pope Julius II. to open the council aſſembled at the Lateran in the year 1512; and, in 1517, was ſent legate into Germany by Leo X., on which occaſion he was promoted to the office of cardinal. After this he was ſent into Spain, and employed in many difficult negociations. He was nominated biſhop of ſeveral important ſees at different periods, and alſo patriarch of Conſtantinople. He died at Rome in 1532, and left behind him a very high character for learning. He was, during his life, perpetually conſulted in difficulties that occurred to the literati in the Oriental as well as the Latin and Greek languages. He was the author of many works that bear teſtimony to his reputation, among theſe are, Remarks on the early Chapters of the Book of Geneſis, Commentaries on ſome of the Pſalms of David; Dialogues, Epiſtles, Poems, &c. In the third volume of "Ampliſſima Collectio veterum Monumentorum," many letters of this prelate and his correſpondents are inſerted, which contain numerous facts as well relating to his own hiſtory, as to that of the period in which he flouriſhed. Moreri.

GILFORD, in *Geography*, a ſmall poſt and market town of the county of Down, Ireland. The river Bann runs through the centre of it, over which there is a very handſome bridge, highly ornamented with hewn ſtone, of twenty-two arches. It is a handſome neat town, and the country about it is highly improved; the houſes are good, and chiefly inhabited by wealthy and reputable linen-drapers. The linen trade is carried on very extenſively here, and the cloth is as remarkable for the fineneſs of its texture, as the river is for giving it an excellent bleach. Nothing can exceed in beauty the vale from Banbridge to Moyallen through Gilford, on the borders of the Bann, for a continuance of ſix miles; the river in delightful meanders, the riſing grounds ſurrounding it adorned with woods, and the bottoms variegated with bleach-greens, afford views the moſt beautiful and pictureſque. Gilford is 62¼ miles N. from Dublin, and 11 miles from Armagh.

GILGAL, in *Scripture Geography*, a celebrated place, W. of Jordan, where the Iſraelites encamped after their paſſage of this river, and where a conſiderable city, famous for many events, was afterwards built. It was about a league from Jordan and from Jericho.

GILGE, in *Geography*, a town of Pruſſia, in the circle of

Samland ; 28 miles N.W. of Konigſberg.—Alſo, a river of Pruſſia, which branches off from the Memel about 7 miles below Tilſit, and runs into the Curiſch Haff, N. lat. 55° 10'. E. long. 21° 24'.

GILGEN, ST. a town of Auſtria, 10 miles N. W. of Efferding.—Alſo, a town of Stiria ; 5 miles N.N.E. of Marburg.

GILGENEAU, a town of Pruſſia, in Oberland ; 15 miles N.N.W. of Seldau.

GILGENBURG, a town of Pruſſia, in Oberland ; 60 miles E. of Culm. N. lat. 53° 17'. E. long. 19° 57.

GILGUL HAMMETHIN, a Hebrew phraſe, literally ſignifying the *rolling of the dead.* To conceive the uſe of this expreſſion it is to be obſerved, that the Jews have a tradition that, at the coming of the Meſſiah, no Iſraelite ſhall riſe any where but in the Holy Land. What, then, ſhall *become* of all the faithful interred in other parts ? Shall *they* periſh, and remain in the ſtate of death ?

No, ſay the Jewiſh doctors ; but God will dig them ſubterraneous canals, or cavities, through which they ſhall roll from their tombs to the Holy Land ; and, when they are arrived there, God will blow on them, and raiſe them again.

This imaginary paſſage of the carcaſes, or aſhes, of the Jews from their tombs to the Holy Land, by rolling underground, is what they call *gilgul hammethin*, the rolling of the dead.

GILIBERTIA, in *Botany*, named by Prof^{r}. Gmelin of Gottingen in his faulty edition of the Syſt. Nat. of Linnæus, v. 2. 682, in honour of John Emanuel Gilibert, author of a Flora Lithuanica, printed in 1781, octavo, which was ſuppreſſed by authority of the government of Poland, on account of its alleged imperfections, but which was reprinted by its author afterwards at Lyons, where he alſo edited various works of Linnæus.—Willd. Sp. Pl. v. 2. 551. (Quiviſia ; Cavan. Diſſ. 367. Juſſ. 264. Lamarck. Illuſtr. t. 302.)—Claſs and order, *Decandria Monogynia.* Nat. Ord. *Tribilatæ*, Linn. *Meliæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped, with four or five teeth, permanent. *Cor.* Petals four or five, ovate, obtuſe. Nectary of one leaf, cup-ſhaped, ſhorter than the petals, embracing the germen, with ten marginal teeth. *Stam.* Filaments none ; anthers eight or ten, ovate, erect, ſeſſile on the teeth of the nectary. *Piſt.* Germen ſuperior, globoſe, furrowed, ſhorter than the nectary ; ſtyle ſimple, riſing above the nectary ; ſtigma globoſe, thick, furrowed. *Peric.* Capſule ovate, coriaceous, ſplitting half way down into four acute recurved valves, with longitudinal central partitions, ſeparating it into four cells. *Seeds* one or two in each cell, ovate, ſmooth, affixed to the columella.

Eſſ. Ch. Calyx with four or five teeth. Petals four or five. Nectary cup-ſhaped, bearing the anthers on its margin. Capſule ovate, of four cells. Seeds moſtly ſolitary.

1. G. *decandra.* (Quiviſia decandra ; Cav. n. 531. t. 211.) —Leaves alternate, elliptic-lanceolate, undivided. Flowers five-cleft, decandrous, racemoſe.—Gathered by Commerſon in the iſland of Mauritius. An evergreen ſhrub, with numerous, alternate, zig-zag *branches. Leaves* alternate, ſtalked, an inch or inch and half long, elliptic-lanceolate, entire, more or leſs acute, ſmooth, with one rib and many tranſverſe veins, without ſtipulas. *Flowers* from five to nine in each axillary cluſter, with downy ſtalks and calyx. *Petals* white, elliptical, thrice as long as the calyx, ſilky at the back, each about a quarter of an inch in length. *Nectary* white, about half as long. The habit of the ſhrub and aſpect of the flowers, reſemble a *Limonia.*

2. G. *heterophylla.* (Quiviſia ovata ; Cav. n. 532. t. 212 ; and Qu. heterophylla ; n. 533. t. 213.)—Leaves obovate ; undivided, ſinuated, or pinnatifid. Flowers four-cleft, octandrous, ſomewhat umbellate.—Gathered by Commerſon in the iſlands of Bourbon and Mauritius. The *leaves* are rather ſmaller than in the laſt, and remarkable for their variety of ſhapes, being either obovate and blunt, or ſomewhat pointed, and either undivided, or more or leſs ſlightly waved or ſinuated, or deeply and accurately pinnatifid like an oak-leaf ; all theſe varieties are found on the ſame ſpecimen, nor can we ſeparate *Quiviſia ovata*, though all the leaves of one plant happened to be undivided, for the original ſpecimens accord in every other particular. The *flowers* are much ſmaller than in the firſt ſpecies, and grow from two to four together in rather an umbel, than a cluſter. *Capſule* the ſize of a pea, pointed, ſlightly ſilky

3. G. *oppoſitifolia.* (Quiviſia oppoſitifolia ; Cav. n. 534. t. 214.)—Leaves oppoſite, elliptical, undivided. Flowers ſomewhat umbellate.—Native of the Mauritius. *Leaves* broadly elliptical, obtuſe, uniform, two inches long, all nearly oppoſite, as well as the branches. We have not ſeen the *flowers.* The *fruit* is rather umbellate than racemoſe, the ſize of a large pea, furrowed, depreſſed, clothed with ſhining tawny down, and opening into four or five parts on the ſame branch.

4. G. *rutilans.*—Leaves alternate, ovate, pointed, undivided. Flowers ſomewhat racemoſe.—Gathered by Commerſon in the Mauritius with the former, but not deſcribed by Cavanilles or Willdenow. The *leaves* are almoſt as large as the laſt, but more pointed, often oblique, and always alternate. *Branches* zig-zag. *Cluſters* ſhort, racemoſe, though appearing like little umbels, about the length of the footſtalks, each of from three to ſix flowers, their ſtalks very ſlightly downy *Petals* ſilky at the back, a line long. *Fruit* of four cells, globoſe, four-furrowed, the ſize of a pea, clothed with ſhort, denſe, rigid, golden-coloured pubeſcence.

Commerſon, the only botaniſt who has gathered any ſpecies of this genus, ſeems to have intended naming the decandrous ones *Baretia*, and the octandrous *Ababella*, but they cannot be ſeparated on any botanical principle whatever. All go by the name of *Bois de Quivi* among the French in the iſlands of Mauritius and Bourbon, whence Cavanilles contrived his barbarous name *Quiviſia.* Of their qualities or uſes nothing is mentioned. The names of *Baretia* and *Ababella* were both intended to commemorate a young woman, who, being deſirous of ſailing round the world, put on men's cloaths, and engaged herſelf as a ſailor, her real ſex being concealed from all on board, except Commerſon, to whom ſhe devoted herſelf, paſſing as his ſervant. At length, on the arrival of the ſhip at Otaheite, the more intelligent natives diſcovered the ſecret which had eſcaped the penetration of her companions, to their no ſmall aſtoniſhment. Commerſon contrived the word *bonafidia* as a ſpecific name, to expreſs her fidelity. The Otaheitans, had they underſtood Latin, would probably have invented a better.

GILIMER, or GELIMAR, in *Biography*, laſt king of the Vandals in Africa, a deſcendant of Genſeric, ſucceeded to the throne of his depoſed couſin Hilderic. The emperor Juſtinian joined the cauſe of the dethroned ſovereign, and determined do annex the African provinces once more to the Roman tominions. Beliſarius was choſen to execute the deſign, who failed in 533. Zano, the brother of Gilimer, was, at this time, engaged in the conqueſt of Sardinia, by which circumſtance the force of the Vandals was divided, while a conſiderable party at home ſtill adhered to the late king Hilderic. Gilimer aſſembled his troops to reſiſt the invader, but being defeated with great ſlaughter he was glad to retire to the Numidian deſerts, having firſt exerciſed the tyrant's policy, by commanding the execution of Hilderic and his captive friends. Carthage ſubmitted to the victorious Beliſarius; but Gilimer collected his ſcattered forces, and being joined by Zano, who had returned from Sardinia, a ſecond action enſued, in which Zano loſt his life, and Gilimer again retreated. The loſs of the African provinces ſucceeded, and the defeated king was forced to take refuge in the inacceſſible mountains of the interior of Numidia. Even here, he was ſurrounded by a part of the Roman army under Pharus, and reduced to the utmoſt diſtreſs, which to him was peculiarly afflictive by its contraſt with the luxury and effeminacy in which he had been accuſtomed to live. So deplorable was his ſituation, that he is reported to have applied to Pharus for a lyre, a ſponge, and a loaf of bread: the firſt he ſaid was to ſooth his ſorrows; the ſecond to dry up his tears: the third he aſked as an humble delicacy, of which he had not taſted for a long time. His diſtreſſes at length obliged him to ſubmit to the conqueror; he deſcended from the mountains, and followed Beliſarius to Conſtantinople, marching in the train of his triumph; on which occaſion, he ſuffered neither tear nor ſigh to eſcape, but frequently exclaimed, in the language of Solomon, "Vanity of vanities, all is vanity!" The emperor received him with reſpect, and ſhewed him much attention and kindneſs: he would have raiſed the fallen monarch to the dignity of patrician, could he have been perſuaded to renounce the Arian doctrine, in which he had been educated. He was put in poſſeſſion of a large eſtate in Galatia, where, in the boſom of his family, he ended his days in peace. The extinction of the Vandal kingdom in the perſon of Gilimer is to be dated from the year 534. Gibbon. Univer. Hiſt.

GILION, in *Geography*, an iſland in the Eaſt-Indian ſea, about 36 miles in circumference. S. lat. 7° 6′. E. long. 114° 37′.

GILIS, St., a town of France, in the department of the Scheldt, and chief place of a canton, in the diſtrict of Termonde. The place contains 3228, and the canton 16,770 inhabitants, on a territory of 95 kiliometres, in ſix communes.

GILITZSTAIN, a town of the duchy of Carinthia; 10 miles E.N E. of St. Veit.

GILL, in *Agriculture*, a term ſometimes applied provincially to the pair of wheels and frame on which timber is conveyed.

Gill, John, in *Biography*, was born at Kettering, in Northamptonſhire, in 1697, and diſcovering, when very young, an uncommon capacity for learning, his father, who was a diſſenter of the Baptiſt perſuaſion, ſent him to a grammar-ſchool in the neighbourhood, where he ſoon outſtript his companions in claſſical attainments. When he was but eleven years of age he had read ſeveral of the common ſchool books in Latin, and made a conſiderable proficiency in the Greek. Owing to the narrow circumſtances of his parents he was put to buſineſs, but he did not fail to improve his leiſure moments by an attention to claſſical literature, ſo that by the time when he had attained his nineteenth year he had read all the Greek and Latin authors that had fallen in his way, and had diligently ſtudied logic, rhetoric, moral and natural philoſophy. He had likewiſe ſtudied Hebrew ſo as to be able to read the Old Teſtament in the original with pleaſure. In 1716 he was baptized, and ſoon after commenced preaching in private. He now removed to Higham Ferrers to proſecute a regular courſe of ſtudies under Mr. Davis, a man of conſiderable learning, and paſtor of a baptiſt church in that place. His ſtay here was ſhort, and after about a year he returned to his native town, and became aſſiſtant preacher to the congregation there; and in 1719 he received and accepted an invitation to become paſtor of a baptiſt congregation in Southwark. The duties of this ſituation he diſcharged with great fidelity and uſefulneſs more than half a century. He died in 1771 in the ſeventy-fourth year of his age. His ſentiments in religion were ſtrictly Calviniſtic; and his moral conduct was unimpeachable and truly exemplary. He was author of many works, particularly of "An Expoſition of the Old and New Teſtament;" in nine volumes folio: "A body of Divinity," in three volumes 4to.; "A Supplement to Mr. Whiſton's Eſſay towards reſtoring the true text of the Old Teſtament." In the year 1748, when he had publiſhed the third volume of his "Expoſition of the New Teſtament," the degree of doctor of divinity was conferred upon him by the univerſity of Aberdeen without his ſolicitation or knowledge: information of the fact was communicated to him by two of the learned profeſſors, who declared that his diploma was preſented to him, "on account of his great knowledge of the ſcriptures, of the oriental languages, and of Jewiſh antiquities, of his learned defence of the ſcriptures againſt Deiſts and infidels, and the reputation gained by his other works." Dr. Gill had, indeed, from the time of his ſettling in the metropolis, paid a moſt unwearied attention to the oriental languages: he had ſtudied the writings of the fathers, eccleſiaſtical hiſtory, the accounts of the rites and cuſtoms of the eaſtern nations, all which he knew were adapted to enrich his ſtores of biblical learning, and to qualify him for the duties of his profeſſion. Gen. Biog.

Gill, in *Botany*. See Glechoma.

Gill, in *Geography*, a townſhip of America, in the ſtate of Maſſachuſetts and county of Hampſhire, ſituated on the W. bank of Connecticut river, 90 miles from Boſton; containing 700 inhabitants.

Gill, or *Beck*, is a name in ſeveral Engliſh counties for a brook, rivulet, or ſmall ſtream of water.

Gill, a meaſure of ale or beer, is 1-4th of an ale pint = 8 8125 cubic Engliſh inches = 1.220779 wine gills = .0169084 cubic links.

Gill of wine, cyder, oil, &c. = 1-4th of a wine pint = 7.21875 cubic Engliſh inches = .8191490 ale gills = .0145307 cubic links.

Gill, Scotch meaſure, = 1-4th of a mutchkin = 1-16th of a Scotch pint, the cubic content of which varies much in different places. See *Scotch* Pint.

GILLAROO, Trout. See Trout.

GILLEM's Bay, in *Geography*, a bay on the S. coaſt of the iſland of St. Chriſtopher; two miles W. of Baſſeterre.

GILLE-LE-VICOMTE, St, a town of France, in the department of the North Coaſts; ſix miles N.N.E. of Guingamp.

GILLES-LES-BOUCHERIES, St, a town of France, in the department of the Gard, and chief place of a canton, in the diſtrict of Nimes; 10 miles S S.E. of Nimes. The place contains 5374, and the canton 6557 inhabitants, on a territory of 180 kiliometres, in two communes.

GILLES-SUR-VIC, St., a town of France, in the department of the Vendée, and chief place of a canton, in the diſtrict of Les Sables-d'Olonne; 13 miles N N.W. of this latter town. The place contains 780, and the canton 12,335 inhabitants, on a territory of 432½ kiliometres, in 17 communes.

GILLES, Peter, in *Biography*, was born at Albi in 1490, and became diſtinguiſhed as a ſcholar and traveller. Having acquired an extenſive knowledge of the learned languages and the philoſophy of the times, he ſet out on his travels with a view of making obſervations in natural hiſtory and antiquities. On his return he was introduced to the notice of George d'Armagnac, biſhop of Rhodes, who engaged him to compoſe his book "De Vi et Natura Animalium." This work, which conſiſted of extracts from Ælian and others, with obſervations of his own, he dedicated to Francis I., who ſent him to travel in the Levant, but without furniſhing him with proper ſupplies, ſo that he was reduced to great diſtreſs, and was obliged to enliſt in the troops of the ſultan Soliman II. for ſubſiſtence. He left Conſtantinople in 1550 and went to Rome, where he died 1555. He was author of two geographical works, "De Boſphoro Thracio," and "De Topographia Conſtantinopoleos," which are eſteemed for their learning; and alſo of ſome tranſlations from the Greek. Moreri.

GILLESAY, or GILLSAY, in *Geography*, one of the ſmaller Hebrides, between Lewis and North Uiſt. N. lat. 57° 45'. W. long. 6° 59'.

GILLESAY *Point*, a cape on the S.W. coaſt of the iſland of Celebes. S. lat. 5° 15'. E. long. 119° 48'.

GILLESKAAL, a town of Norway, in the dioceſe of Drontheim; 240 miles N. of Drontheim.

GILLETTE, a town of France, in the department of the Maritime Alps, and chief place of a canton, in the diſtrict of Puget-Theniers. The place contains 646, and the canton 1712 inhabitants, on a territory of 105 kiliometres, in four communes.

GILLIAN, GUISLAIN, or *Ghiſlain, St.*, a town of France, in the department of Jemmappe, ſituated on the river Haiſne and ſurrounded by marſhes, and deriving its name from a celebrated abbey founded in the year 651 by Guiſlain, the friend of St. Amand. Having been ſucceſſively in the poſſeſſion of the Dutch, the French, and the Spaniards, and of the allies, it was taken by the French in 1792. St. Gillian was called the key of Mons, and is diſtant three miles W. of it.

GILLIFREE. See JILLIFREE.

GILLINGHAM, a pariſh in the hundred of Chatham and Gillingham, Kent, England; is ſeated on the river Medway at the diſtance of two miles from the town of Chatham, and 32 from London. It contains 715 houſes and 4133 inhabitants, the greater part of whom are immediately or indirectly employed in the buſineſs connected with the neighbouring dock-yards. This village, though now deprived of its conſequence by the increaſe of Chatham, was formerly of much note. In the time of queen Elizabeth here were four quays, and twenty-ſeven ſhips and boats; the largeſt of theſe, however, was only twenty tons. The archbiſhops of Canterbury formerly had a palace here; one of whom, John Strafford, in the tenth year of Edward IIId's reign, obtained a charter for a weekly market, and an annual fair to continue eight days; but theſe have been long diſcontinued. William of Gillingham was a native of this place. He was a monk of Canterbury, in the time of king Richard II., and wrote a hiſtory of Britain; alſo one of his own monaſtery. Haſted's Hiſtory of Kent, vol. iv. 8vo.

GILLORI, an iſland on the coaſt of Weſt Florida, divided from Dauphin iſland by a very narrow channel, through which a boat cannot paſs without ſome difficulty; and between Gillori and the main land, on the weſt ſide of Mobile bay, there is a chain of ſmall iſlands and oyſter ſhells, through which is a paſſage of four feet, called "Paſſe au Heron."

GILLS, BRANCHIÆ, in *Ichthyology*. See FISH, *Organs of Reſpiration.*

GILLS, *Leaf of the.* See FOLIUM *branchiarum.*

GILLY-FLOWER, in *Gardening*, the common name of a fine fragrant flowery plant, common in gardens, &c. See DIANTHUS.

GILLY-FLOWER, *Queen's.* See HESPERIS.

GILLY-FLOWER, *Stock.* See CHEIRANTHUS.

GILLY-*Lough*, in *Geography*, a lake of Ireland, in the county of Sligo; and on the river by which its waters are diſcharged into the ſea ſtands the town of Sligo. This lake exhibits that variety of charming proſpects which bold hills, wooded lawns, and large iſlands clothed with verdure and crowned with trees, united with a great extent of water, cannot fail to produce. Beaufort.

GILMANTOWN, a poſt-town of America, in Strafford county, New Hampſhire, S.W. of lake Winnipiſcogee, and 52 miles N.W. of Portſmouth; incorporated in 1727, and containing 3752 inhabitants.

GILMARQUEY, a town of Hindooſtan, in Dowlatabad; 13 miles N.E. of Nander.

GILOH, or GELO, in *Scripture Geography*, a town of Paleſtine, ſituated in the mountains of the tribe of Judah. Joſh. xv. 51.

GILOLO, in *Geography*, one of the Molucca iſlands, in the Eaſt-Indian ocean, of conſiderable extent, and in its irregular form reſembling *Celebes*, which ſee. Its length is about 230 Britiſh miles, and the breadth of each limb ſeldom above 40. The ſhores are low; but the interior riſes to high peaks, perhaps of granite. This iſland is ſaid to have been once governed by one ſovereign, a ſheref from Mecca; but the ſultans of Ternate and Tidore now ſeem to ſhare it between them, the former poſſeſſing the northern part with Mortay, Bakian, Motir, and ſome Celebeſian iſlands, and part of Papua; while the ſultan of Tidore holds the ſouthern part with Myſol, and ſome other iſles. One of the chief towns is Tatanay, ſituated on a point or promontory of the eaſtern limb, faced with precipices, ſo as to be acceſſible only by ladders. Gilolo abounds with oxen, buffaloes, goats, deer, and wild hogs; but the ſheep are few. The bread-fruit and ſago-tree are common; and, in ſpite of the Dutch extermination, there are probably cloves and nutmegs. The natives are induſtrious, particularly in weaving; but their exertions are ſuppreſſed by Batavian jealouſy. The equinoctial runs through the ſouthern part of the iſland. E. long. 128°.

GILP LOCH, in Argyleſhire, Scotland, is a kind of gulf branching from Loch Fine on its W. ſide, which is navigable for veſſels to the entrance of the Crinan canal, through which they paſs to Loch Crinan, and the Iriſh ſea. See CANAL.

GILPIN, BERNARD, in *Biography*, was born at Kentmire, in Weſtmoreland, in the year 1517. He was deſtined by his parents for the church, and educated with that view. At ſixteen years of age he was entered at Queen's college, Oxford, where he became diſtinguiſhed for the diligence with which he applied to his academical ſtudies. He was led to think for himſelf, and freely, by the writings of Eraſmus; and as he determined to apply himſelf to the ſtudy of theology, he ſet about acquiring a thorough knowledge of the Greek and Hebrew languages, in order that he might inveſtigate the ſcriptures in their original tongues. In 1539 he took his degree of B.A., and in 1541 that of M.A., and about the ſame time he was elected fellow of his college, and admitted into holy orders. Shortly after he was invited to become a member of cardinal Wolſey's new foundation at Chriſt-church, which he accepted. Here he continued his former ſtudies, but it does not appear that his courſe of reading had produced any doubts in his mind reſpecting the popular religion, for he even entered into a vindication of the Catholic doctrines in a diſpute with Hooper, afterwards biſhop of Wincheſter. The diſcuſſion was however favourable to his improvement and candour, as it afforded him the opportunity of diſcovering that his own opinions were not ſo well ſupported by ſcripture as he imagined. Upon the acceſſion of Edward VI., Peter Martyr was ſent, under the patronage of that prince, to Oxford to read divinity lectures, a duty which he performed in a ſtrain to which that univerſity had been but little accuſtomed. He attacked many eſtabliſhed doctrines, which had been long regarded as the truth, and the only truth. Gilpin was looked up to, as capable of defending the eſtabliſhed doctrines in oppoſition to modern innovations, but his faith was ſhaken, and he choſe to remain an unprejudiced ſpectator, ready to embrace whatever ſhould appear the truth, after deliberately weighing the arguments which the diſcuſſion might provoke. At length, however, he conſented to enter the liſts with Peter, and the diſpute ended in the conviction of Gilpin that there were great corruptions in popery, and that there was need of a total reformation. He continued at Oxford till he was thirty-five, and took his bachelor's degree in divinity. In 1552 he was preſented with a living in Durham, but before he went to reſide there, he was appointed to preach before his majeſty at Greenwich. The king was not preſent, but Gilpin's diſcourſe was a ſerious and very hoſtile attack on the prevailing avarice and corruption of the age; he ſpared neither the court, clergy, magiſtrates, nor gentry. The freedom which he made uſe of at this time recommended him to the notice of many perſons of the firſt rank, particularly of ſir William Cecil, afterwards lord Burleigh, who obtained for him a general licence for preaching. While Mr. Gilpin was in London, he frequently viſited his uncle Tonſtal, biſhop of Durham, at that time a priſoner in the Tower, under a ſentence of miſpriſion of treaſon. When Mr. Gilpin was ſettled in the country, he felt many doubts how to proceed in the inſtruction of his people; he had not made up his own mind on many important doctrines, and therefore felt but ill qualified to teach others, or indeed to guard them from the prevailing errors. He accordingly reſigned his living, and determined, at the advice of Tonſtal, to ſpend ſome time abroad. He had now an opportunity of re-examining all his opinions; he began to have juſt notions of the doctrines of the reformed; ſaw things in a clearer light, and felt a ſatisfaction in the change that he had made, to which he had hitherto been a ſtranger. On the death of king Edward, Tonſtal was releaſed and reinſtated in his biſhopric; he immediately offered his nephew a good living, which was reſpectfully refuſed on conſcientious principles. He returned from the continent in the year 1556, and immediately viſited biſhop Tonſtal, who received him with great friendſhip, and preſented him with the archdeaconry of Durham, to which he annexed the living of Eaſington. He now repaired to his pariſh, determined to do what good he was able in reproving vice, and encouraging virtue. His zeal and aſſiduity in the good work of reformation made him many enemies, and the cry of hereſy was continually ſounded againſt him, but by the ſkilful management of his uncle, the charge, though formally and publicly brought, was diſmiſſed. After this, he reſigned his preferment in the church, and became domeſtic chaplain to the biſhop. Mr. Gilpin did not remain long without a benefice, but was inducted to the living of Houghton-le-Spring, and upon his arrival at the place, people crowded to him from all quarters, perceiving that he was a teacher very different from thoſe to whom they had been accuſtomed, and by his truly affectionate treatment of them, he quickly gained their confidence, reſpect, and attachment. The biſhop was ſtill anxious for the advancement of his nephew, and preſented to him a vacant prebend in the cathedral of Durham, which Mr. Gilpin modeſtly, but firmly declined, and told the prelate, "that by his bounty he had already more wealth than, he was afraid, he could give a good account of, and he hoped his lordſhip would rather beſtow this preferment on one by whom it was more wanted." A freſh ſet of articles of impeachment were drawn up and preſented againſt him, and he was again protected by his uncle, but from this period the biſhop's favour to him manifeſtly declined, and he ſtruck him out of his will. He was exceedingly concerned to have in any way offended ſo good a benefactor, but he could not compromiſe the matter; he was bound to ſatisfy his conſcience, and Tonſtal was vexed that he ſhould carry his piety and zeal to what he thought an exceſs. The malice of Mr. Gilpin's enemies was not ſatisfied with the loſs which he had experienced in his uncle's eſteem; they accuſed him before the ſavage Bonner, who, in the moment of his frantic zeal, declared that he would bring him to the ſtake in a fortnight. Gilpin refuſed to liſten to the entreaties and interceſſions of his friends by leaving the country, but was prepared to ſuffer for the truth, as he had been zealous in propagating it. He accordingly waited with great compoſure for the arrival of the biſhop's meſſengers. He was apprehended, but fortunately, before he could reach London, an account of the Queen's death met them on the road, an event not more favourable to our worthy paſtor, than important for the country at large. The merciless ſavage might now gnaſh his teeth, but he could no longer inflict the venom of his malignity upon the unoffending reformers. Gilpin, thus almoſt miraculouſly delivered, returned to Houghton through crowds of people, who regarded him as a father, and who expreſſed their utmoſt joy, and offered up their thanks to Almighty God for his deliverance. Mr. Gilpin was ſoon nominated to the biſhopric of Carliſle, which he declined, giving as a reaſon, that in this dioceſe he had many friends and acquaintance, of whom he did not think very highly, and that he muſt connive at many irregularities, or draw upon himſelf ſo much hatred as to prevent his uſefulneſs. In 1561 he was offered the provoſtſhip of Queen's college, Oxford, which he likewiſe declined; contenting himſelf with the living of Houghton, the duties of which he performed in the moſt exemplary manner. He employed much of his time in endeavouring to improve the minds of the younger part of his pariſh, ſuffering none to grow up in an ignorance of their duty, but urging all to intermix religion with labour, and amidſt the cares of this life to have a conſtant regard to the next. He was aſſiduous in preventing lawſuits among his pariſhioners, and his hall was frequently thronged with people of his own or neighbouring pariſhes, who came to ſettle their differences. He had a tender concern for all under affliction, and was a much readier viſitant at the houſe of mourning than at the houſe of feaſting. To ſtrangers and travellers there was always a generous welcome at the houſe of Mr. Gilpin, and he could ſuit himſelf to perſons of all ranks in life. Once he received an unexpected viſit from lord Burleigh, and the reception of the noble ſtranger was ſo liberal, that his lordſhip was accuſtomed to ſay, that he could not have expected more at Lambeth. When the great ſtateſman left his hoſt, and had travelled about a mile from his reſidence, he turned his horſe to take one more view of the place in which he had experienced ſo much content, and having kept his eye fixed ſome time, he exclaimed, "*There* is the enjoyment of life, indeed! Who can blame that man for not accepting a biſhopric! What does he want, or what can he poſſeſs to make him greater or happier, or more uſeful to mankind." Mr. Gilpin's labours extended beyond his own pariſh; he every year viſited divers neglected pariſhes in Northumberland, Yorkſhire, Cheſhire, Weſtmoreland, and Cumberland; and that his own flock might not ſuffer, he was at the expence of a conſtant aſſiſtant. In all his journies he did not fail to viſit the gaols and places of confinement; and by his labours and affectionate manner of behaviour, he is ſaid to have reformed many abandoned perſons in thoſe abodes of human miſery. He had ſet places and times for preaching in the different parts of the country, which were as regularly attended as the aſſize towns of a circuit. If he came to a place in which there was a church, he made uſe of it; if not, of barns, or any other large building, where great crowds of perſons were ſure to attend him, ſome for his inſtructions, more, perhaps, to partake of his bounty; but in his diſcourſes he had a ſort of enthuſiaſtic warmth, which rouſed many to a ſenſe of religion who had never thought of any thing ſerious before. The dangers and fatigues attending this employment were, in his eſtimation, abundantly compenſated by the advantages which he hoped would accrue from them to his uninſtructed fellow-creatures. He did not ſpare the rich; and in a diſcourſe before the biſhop of Durham, who had already conceived a prejudice againſt him, he ſpoke with ſo much freedom, that his beſt friends dreaded the reſult; they rebuked him for giving the prelate a handle againſt him, to which he replied, "If the diſcourſe ſhould do the good he intended by it, he was regardleſs of the conſequences to himſelf." He then waited on the prelate, who ſaid, "Sir, I propoſe to wait upon you home myſelf." When they arrived at the rectory, and entered the houſe, the biſhop turned ſuddenly round, and graſped him eagerly by the hand, ſaying, "Father Gilpin, I know you are fitter to be biſhop of Durham, than I am to be parſon of this church of yours. I aſk forgiveneſs for paſt injuries. Forgive me, father, I know you have enemies, but while I live biſhop of Durham, none of them ſhall cauſe you any further trouble." Upon queen Elizabeth's recommending the eſtabliſhmentof free-ſchools, Mr. Gilpin undertook to build and endow one, a deſign which he immediately put in execution. This ſchool was no ſooner opened than it began to flouriſh; and there was ſo great a reſort of young people to it, that in a little time the town was ſcarcely able to accommodate them. He procured able maſters from Oxford, and took every method to encourage thoſe of his pupils who were moſt diligent in their ſtudies. In the latter part of his life Mr. Gilpin went through his various duties with much difficulty: his health was impaired, and his conſtitution broken down by the great fatigues which he had undergone for many years. In addition to his infirmities, he met with an accident which had nearly proved fatal to him, and from the effects of which he never perfectly recovered. As he was croſſing the market-place at Durham, he was thrown down, and almoſt trampled to death by an ox. After a long and tedious confinement, he was able to get out, but continued lame as long as he lived. He died in 1583, in the 66th year of his age. Such were the life and labours of Bernard Gilpin, who, for his exemplary piety, laborious virtue, and unbounded benevolence, deſerves to have his name tranſmitted to poſterity with reſpect and reverence, and who obtained, and moſt deſervedly among his contemporaries, the title of the Northern Apoſtle. By his unwearied application he had amaſſed a great ſtock of knowledge, and was indeed ignorant of no part of learning at that time in eſteem. He had given more than common attention to the ſtudy of the dead languages, to hiſtory and divinity; he is ſaid to have excelled in poetry, but he expended little time in the purſuit of any thing that was foreign to his profeſſion. His temper was naturally warm, but, by degrees, he ſucceeded in obtaining an entire command of himſelf. His diſpoſition was ſerious, yet, among his particular friends, he was cheerful and even facetious. His ſeverity had no other object but himſelf: to others he was mild, candid, and indulgent. Biog. Brit.

Gilpin, Sawrey, who lately practiſed horſe painting with ſo much ſucceſs, was born at Carliſle in 1733, from whence, after having acquired ſome reliſh for the art from his father, who was a captain in the army, he came to London, and was articled to a ſhip-painter. His firſt intereſting works were compoſed of ſome market groups which ſtruck his eye from his window. Soon after he went to Newmarket, being encouraged by the late William, duke of Cumberland, where he executed many compoſitions which might have vied with Hogarth in point of character. In the duke's ſtud he acquired that knowledge of the horſe, which he has diſplayed with ſuch ſuperior ſpirit and beauty, and when we ſee with what felicity he applied it to the higher departments of the art, to hiſtoric compoſitions in the triumph of Camillus, the election of Darius, the ſtory of Phaeton, we muſt lament that ſuch talents ſhould have been drawn aſide to the meaner employment of horſe-portrait-painting, which occupied too much of his valuable life.

His drawings of animals, in pencil and water-colours, diſplay a degree of taſte and ſkill ſeldom attained. As a man he was equally eſteemed for probity of character and ſimplicity of manner, and, as a member of the Royal Academy, he added honour to the inſtitution. Fuſeli's Pilkington.

GILSON, in *Geography*, a townſhip of America, in Cheſhire county, New Hampſhire, containing 484 inhabitants; ſituated on the E. ſide of Aſhuelot river, and joining Keene on the ſouth.

GILT, in *Rural Economy*, a term ſignifying a young female pig, whether in an open or ſpayed ſtate.

Gilt-*Head*, in *Ichthyology*. See Aurata and Sparus.

GIMAR, in *Geography*, a town of the iſland of Cuba; 6 miles E. of Havannah.

GIMBLET, in *Carpentry*, a ſmall boring tool, which enters the wood with a ſcrew; the part above is cylindrical, both inſide and out: its uſe is to make a way for nails, in order to drive more eaſily, or to prevent the wood from ſplitting.

GIMBLETING, in *Sea Language*, is applied to the anchor, to denote the action of turning it round by the ſtock, ſo that the motion of the ſtock appears ſimilar to that of the handle of a gimblet, when it is employed to turn the wire.

GIMBOLS, denote the braſs-rings by which the ſea-compaſs is ſuſpended in its box that uſually ſtands in the binacle.

GIMESCH, in *Geography*, a town and caſtle of Hungary; 10 miles W. of Bukans.

GIMIGLIANO, a town of Naples, in Calabria Ultra; 10 miles E. of Nicaſtro.

GIMMER, a town of Africa, in Dar-fûr; 40 miles N.N.W. of Cobbé.

Gimmer *Hog*, in *Rural Economy*, a name applied to a female ſheep of the firſt year.

Gimmer *Lamb*, a term applied to a female lamb.

GIMONT, in *Geography*, a town of France, in the department of the Gers, and chief place of a canton, in the diſtrict of Auch; 12 miles E. of Auch. The place contains 2300, and the canton 8413 inhabitants, on a territory of 230 kiliometres, in 13 communes.

GIMZO, in *Scripture Geography*, a city of Judah, which the Philiſtines took from Ahaz. 2 Chron. xxviii. 18.

GIN, in *Geography*, a town of China, of the third rank, in Pe-tcheli; 10 miles S.E. of Chun-te.

Gin, formed probably by corruption from *engine*, in *Artillery* and *Mechanics*, is a machine for raiſing great weights, compoſed of three long legs, two of which are kept at a proper diſtance by means of two iron or wooden bars fixed to one of the legs by means of a bolt at one end, and by the other end to the other leg with a bolt and key, ſo that it may be put on or off at pleaſure. At three feet from the bottom is a roller moving in cheeks, that are faſtened to theſe poles by two iron bands and two iron bolts. The three legs of this machine are joined together with an iron bolt, about which they move; to this bolt is fixed an iron half ring to hook on the windlaſs, containing two braſs pullies. When the gin ſtands upright, and its legs are at a proper diſtance, one end of the cable is fixed to the dolphins of a gun or mortar with another windlaſs, containing likewiſe two braſs pullies, and the other paſſes through the pullies and round the roller, which is turned round by means of handſpikes paſſing through the holes in the ends of the roller: while a man holds the cable tight, the gin is raiſed to ſuch a height as to admit a carriage being put under it.

The gin is uſed in loading a timber-carriage with timber; it conſiſts of an acute triangular frame, in the lower part of which is a roll or windlaſs: at the apex is a ſet of pullies, and a hole to receive the top of a ſtrong pole, which is ſet up oppoſite the triangular frame, which by this means forms a ſort of tripod (or triangle, as it is commonly called among workmen) ſtanding acroſs a tree to be raiſed and loaded: the gin-rope is then reeved through a moveable block of pullies, faſtened by a chain to the tree, through that in the top of the gin and round the roll; and then, by means of hand-ſpikes or levers uſed to the roll, the tree is drawn up to a ſufficient height for the timber-carriage to be paſſed under it. Long trees are raiſed at one end firſt, and two of the wheels of the timber carriage are paſſed under them; when the other ends are raiſed in like manner, and the other two wheels (which are made to ſeparate for this purpoſe) are paſſed under them, and then are joined to the other wheels by the long adjuſtable pole with which the carriage is furniſhed. See Timber-*Carriage*.

An erect axis or drum, turned by the force of horſes walking in a circle, and uſed for raiſing coals and other weights, is alſo called a gin; the buckets being attached to the oppoſite ends of a rope, which paſſes round the drum, and which is drawn by means of its adheſion to the drum. One of the buckets deſcends empty, while the other is drawn up full; and when the motions of the buckets are to be changed, the horſes are turned, or the wheels are made to impel the axis in a contrary direction, when any other moving power is employed.

For ſhallow mines or ſhafts, theſe are worked by horſes, and are called horſe-gins; and in deep mines thus worked, it is uſual to have two levers projecting from the ſhaft, ſo as to employ two horſes, and even four in ſome caſes, with a boy to each pair, or ſingle horſe, to ſtop and turn them, ſo as to draw from the other ſide of the lever, as often as a corve or baſket arrives at the top of the ſhafth. See the article Coal.

The increaſing depth of the pits, and demand for coals at Newcaſtle, occaſioned Mr. Smeaton, the engineer, to be applied to in the year 1777, by the proprietors of Long Benton colliery, to contrive them a mode of drawing more expeditiouſly, and larger baſkets of coals than the horſe-gins then in uſe, and he accordingly erected for them a water-gin, the ſupply for which was raiſed by the ſteam-engines employed at the pits. Since the above period, ſmall ſteam-engines, called wimſeys in many places, have been applied to the winding of coals, and other minerals, and have already ſuperſeded all other modes of drawing at the large collieries; theſe ſeveral modes of drawing or winding we ſhall deſcribe particularly in the article Winding-*Engine*.

Gin, in *Mining*, horſe-gin, or coal-gin, is a machine uſed for drawing buckets or corves of earth or minerals up a mine-ſhaft or tunnel-pipe of a canal: it conſiſts of a large vertical drum or barrel, on which a rope winds, which is conducted to pullies over the ſhaft; and uſually as one bucket or corve deſcends another aſcends. See the preceding article and *Mine* Winding *Engine*.

Gin-*driver*, is the man or boy who attends the gin-horſe and turns him, when a full bucket or corve has arrived at the top of the mine-ſhaft.

GINAIRI, in *Geography*, a town of Africa, in Kumbo.

GINANNIA, in *Botany*, ſo called by Scopoli and Schreber in memory of Count Joſeph Ginanni, a native of Ravenna, whoſe poſthumous works in Italian, compoſing two folio volumes, with above 90 plates, were publiſhed at Venice in 1755. They chiefly relate to the marine productions of the Adriatic, as corals, fuci, a few ſhells, &c. but are perhaps not too ſeverely characterized by Linnæus, in a letter to Gerard, as "of no manner of uſe." The author was recommended to the ſtudy of natural hiſtory by his friend Valiſneri, as a cure for hypochondriacal diſorders, but this is hardly a ſufficient reaſon for the publication of his book. Haller appears to have ſeen the firſt volume only. Schreb. 271. Mart. Mill. Dict. v. 2. (Paloue; Aubl. Guian. 365. t. 141. Palovea; Juſſ. 351. Brownea pauciflora; Willd. Sp. Pl. v. 3. 716.) See Brownea, to which genus we are perſuaded this plant is rightly referred by Willdenow at the ſuggeſtion of Schreber, Addend, 829. The *ſtem* is ſhrubby, 15 feet high, branched, the branches alternate, ſtraight or declining. *Leaves* ſimple, alternate, nearly ſeſſile, ovate, entire, pointed, ſmooth and ſhining. *Stipulas* minute, acute. *Flowers* terminal, few, red, large, and handſome, their ſhort ſtalks enveloped in large concave imbricated *bracteas*. *Legume* reddiſh, linear, compreſſed, three inches long, ſomewhat like that of *Cercis ſiliquaſtrum*. Native of the foreſts of Guiana, flowering in February, and bearing fruit in May.

GINASSERVIS, in *Geography*, a town of France, in the department of the Var, and chief place of a canton, in the diſtrict of Brignolles; nine miles N.W. of Barjols. The place contains 782, and the canton 8000 inhabitants, on a territory of 302½ kiliometres, in ſix communes.

GINDARUS, in *Ancient Geography*, a town of Aſia, in Syria, ſituated on a mountain, E. of the gulf of Iſſicus.

GINDELI, in *Geography*, a town of Candahar, on the Behat; 48 miles E.S.E. of Cabul.

GINDERE, a town of Ceylon; five miles N. of Point de Galle.

GINERCA, a town of the iſland of Corſica, ſituated in a ſmall bay to which it gives name; 13 miles S. of Calvi.

GINESTAS, a town of France, in the department of the Aude, and chief place of a canton, in the diſtrict of Narbonne; ſeven miles N.W. of Narbonne. The place contains 501, and the canton 6753 inhabitants, on a territory of 167½ kiliometres, in 15 communes.

GINETO, St. a town of Naples, in Calabria Citra; 16 miles N.W. of Biſignano.

GINETTA, Genetta, or *Genet*, in *Zoology*, the Viverra *genetta* of Linnæus, which ſee.

GINGEE, in *Geography*, a town and fortreſs of Hindooſtan, in the Carnatic, once the capital of a kingdom of the ſame name, ſituated on a mountain and defended by three caſtles; 33 geographical miles from Pondicherry and 23 from Trinomaly. N. lat. 12° 16′. E long. 79° 36′.

GINGER, in *Botany*. See AMOMUM.

GINGER, *Zingiber*, in the *Materia Medica*, &c. Ginger is either black or white. In Jamaica this plant attains its full height and flowers about Auguſt or September, and fades about the cloſe of the year. When the ſtalks are entirely withered, the roots are in a proper ſtate for digging, which is generally performed in the months of January and February. After being dug, they are picked, cleanſed, and gradually ſeethed, or ſcalded in boiling water: they are then ſpread out, and expoſed every day to the ſun till ſufficiently dried; and after being divided into parcels of about 100lb. weight each, they are packed in bags for the market: this is called the "black ginger." "White ginger" is the root of the ſame plant, but inſtead of ſcalding the roots, by which they acquire the dark appearance of the former, each root is picked, ſcraped, ſeparately waſhed, and afterwards dried with great care: by this operation more than double expence is incurred, and the market price is proportionably greater. Black ginger is ſaid by Jacquin to loſe part of its eſſential oil by being thus immerſed in boiling water; and on this account it is leſs uſeful for medical and other purpoſes than the white, which is always good when perfectly ſound and free from worm-holes: but that imported from the Eaſt Indies is ſtronger than any we have from Jamaica.

This warm aromatic root appears, ſays Lewis, to be much leſs liable to heat the conſtitution than might be expected from the penetrating heat and pungency of its taſte, and the fixedneſs of its active principles. But Dr. Cullen is of opinion, that there is no real foundation for this remark. It gives part of its virtue to water, and the whole to rectified ſpirit, tinging the latter of a deep, and the former of a pale yellow colour. This latter property it poſſeſſes in ſo conſiderable a degree, that if a watery infuſion of this root be boiled down to a thick conſiſtence, diſſolved afreſh in a large quantity of water, and ſtrongly boiled down again, the heat and pungency of the root remain, but with little or nothing of its ſmell. It is uſed medically as an antiſpaſmodic and carminative. The caſes in which it is more immediately ſerviceable are flatulent colics, debility and laxity of the ſtomach and inteſtines, and in torpid and phlegmatic conſtitutions to excite briſker vaſcular action. It is ſeldom given but in combination with other ingredients. In the Pharmacopœias it is directed to be adminiſtered under the form of a ſyrup and tincture; it is alſo preſcribed as a condiment, and as a ſubſidiary ingredient in many compoſitions. The ſyrup of ginger is prepared by macerating two ounces of the ginger root ſliced in a pint of boiling water for twenty-four hours, and then ſtraining, and adding two pounds of refined ſugar, as in other ſyrups. The tincture of ginger is formed by macerating two ounces of ginger root ſliced in two pints of proof ſpirit for 14 days, and then ſtraining the liquor. The dietetic qualities and uſes of ginger are well known; and it is employed under various forms.

It is not uncommon to candy the root, when green, with ſugar and honey; having firſt ſteeped it ſome time in water, to take away part of its acrimony, and to diſpoſe it to let go the outer ſkin. This candied ginger, brought from abroad, is moderately aromatic. They alſo make a marmalade of it, and dry cakes.

The northern people make great uſe of this confection, as holding it ſovereign againſt the ſcurvy. The Indians eat the root, when green, by way of ſallad, firſt chopping it ſmall, mixing it with other herbs, and ſeaſoning it with oil and vinegar.

Ginger may be preſerved by waſhing it, and laying it to ſteep for ten or twelve days in white wine and water, ſtirring them every day; then boil a pound of roots with two quarts of white wine, and about a pint of lemon juice, for a quarter of an hour; then add two pounds and a half of fine ſugar, and boil it to a ſyrup, ſcumming it as it riſes; ſet it by till the next day in a glazed pan; then boil it for half an hour, and repeat this boiling at the ſame interval till the ginger is clear. Put it into glaſſes, and cover them with paper, and it will afford a fine ſweetmeat for the winter. A wine is made of ginger, which is a pleaſant and ſalubrious beverage.

GINGER, in *Geography*, one of the ſmaller Virgin iſles in the Weſt Indies; 10 miles S.S.W. of Virgin Gorda. N. lat. 18° 5′. W. long. 62° 53′.—Alſo, a town of Egypt, on the E. branch of the Nile, oppoſite to Manſorah.

GINGERBREAD, a richer kind of bread; the flavour and taſte of which are heightened and improved with ſpices, and particularly ginger; whence the name.

There are various forms and preparations of gingerbread: we ſhall content ourſelves with the following receipt, which is well recommended.

Into a pound of almonds, blanched and pounded, grate a penny white loaf; ſift and beat them together; to the mixture add an ounce of ginger, ſcraped fine; and liquorice, and anniſeed in powder, of each a quarter of an ounce; pour in two or three ſpoonfuls of roſe-water, and make the whole into a paſte, with half a pound of ſugar: mould and roll it, print it, and dry it in a ſtove. Others make it of treacle, citron, lemon, and orange-peel, with candied ginger, coriander, and caraway-ſeeds, mixed up with as much flour as will make it into a paſte.

GINGERO, or LENDERO, in *Geography*, a kingdom of Africa, ſituated on the S.W. of Abyſſinia. N. lat. 6°. E. long. about 35°.

GINGHAM, a town on the north coaſt of Sumatra. N. lat. 5° 10′. E. long. 96° 10′.

GINGIDIUM, in *Botany*, a name adopted by Forſter, Nov. Gen. t. 21, for an umbelliferous plant, found on the hills of New Zealand, which he himſelf ſuſpected to be a *Liguſticum*, and which has been ſo conſidered by following botaniſts. It is *Liguſticum Gingidium* of Willd. Sp. Pl. v. 1. 1428. See LIGUSTICUM.

The γιγγίδιον of Dioſcorides appears to be likewiſe of this natural order, but the ſpecies can ſcarcely be determined with certainty. Dr. Sibthorp ſuppoſed it might be *Daucus Gingidium* of Linnæus, merely from the coincidence of the names, for it agrees better with *D. Viſnaga*, *Ammi Viſnaga*, Prod. Fl. Græc. n. 650; not that any thing can be gathered, from the deſcription of Dioſcorides, to quote him, in ſuch a caſe, with any propriety. He ſays it is "by ſome called *Lepidium*, and grows very abundantly in Cilicia (now Caramania) and Syria. It is a little herb, like wild carrot, but more ſlender and more bitter, with a whitiſh and bitteriſh root." This will be found to accord equally well with many plants of thoſe countries. Matthiolus, miſled, as it ſeems, either by a Latin verſion, or by the opinion of thoſe who take the σταφυλινος of Dioſcorides for the *Paſtinaca*, or Parſnip, whereas it is evidently by the deſcription a *Daucus*, or Carrot, took for the γιγγίδιον a Syrian plant, firſt deſcribed by himſelf, and which indeed is ſmaller and ſlenderer than the Parſnip, though larger and broader than the Carrot. Hence he cenſures thoſe who have taken the Chervil, *Scandix Cerefolium*, for the herb in queſtion, though they really appear to be more in the right than himſelf. However this may be, the plant of Matthiolus is the *Daucus Gingidium* of Linnæus, as well as his *D. lucidus*;

Linnæus having in the firſt inſtance defined it from the wooden cut of Matthiolus, and in the latter deſcribed it from a ſpecimen in the Upſal garden. The hiſtory of this miſtake is given at length, by the writer of the preſent article in the Tranſactions of the Linnæan Society, v. 9. 131.

GINGING, in *Mining*, ſteining or ſtaining, ſignifies the lining of a mine-ſhaft with ſtones or bricks for its ſupport. Shallow ſhafts, where the meaſures are adapted to ſtand, are ſunk firſt, and the lining of them with ſtone, or ginging, is begun from the bottom and carried up at once to the top: but in ſinking deep ſhafts, after as great a depth is done at once as the nature of the meaſures will permit, a further depth is ſunk in the bottom, beginning firſt withinſide the ginging, and continuing the ſhaft of that diminiſhed diameter for 12 or 18 inches, according to the ſoundneſs of the meaſures in that place, when it is gradually enlarged to the full ſize as the ſinking proceeds, and ſunk ſome yards lower, until upon reaching a bed of ſtone, or as great a depth as is judged ſafe, according to the nature of the ſinking, the ginging is begun, and carried up to where the diminiſhing of the ſhafts begins; when the ſame is picked out to admit the ſucceſſive courſes of ſtone or bricks, as high as is judged ſafe, then the removal of the remainder of the ſupport for the firſt ginging is commenced, by cutting out a piece, wide enough to admit of one or two courſes of ſtone or bricks, being built up like a pier, which is firmly keyed or underpinned to the ginging above by means of tile-ſheds or thin ſlate if neceſſary: a ſimilar piece is then cut out and underpinned on the oppoſite ſide of the ſhaft, and then another between each of theſe, and ſo on, until the ginging of the lower and upper part is entirely joined all round the ſhafts.

The ſhaft is then deepened withinſide the laſt ginging, and ſunk, firſt narrow and then of its proper width, as far as is judged ſafe, when a new ginging is begun, and carried up, and joined to that previouſly finiſhed, as above deſcribed. Solid ſtone-beds or permanent rocks, which are met with in ſinking, are not ginged, but the ſhaft is ſunk through ſuch rocks, of the ſame diameter as the inſide of the ginging, which ſtands upon their top and is pinned up beneath their bottoms.

GINGIVA, in *Anatomy*, the gum; a hard ſort of fleſh, inveſting the alveoli, or ſockets, of the teeth. See *Gums* under Cranium.

GINGLARUS, in the *Ancient Muſic*, a ſmall Egyptian flute, which, according to Jul. Pollux, was proper for a ſimple melody, perhaps from having but few holes

GINGLYMOID, in *Anatomy*, from γιγγλυμος, *a hinge*, and ειδος, *form*; a term applied to certain joints of the body. See Diarthrosis.

GINGLYMUS. See Diarthrosis.

GINGO, Gingoux, or *Gingoup*, in *Geography*, a town of the Valais; 10 miles W. of Aigle.

GINGRA, in *Antiquity*, a kind of dance uſed at funerals.

GINGRAS, or Gingros, in the *Ancient Muſic*, a dance performed to the ſound of flutes.

GINGRINA, in *Antiquity*, a name given to a ſmall kind of flute fit for beginners.

GINGROS, and Gingrias, *Muſical Inſtruments of the Ancients.* The Phœnicians, according to Athenæus, had flutes of only a palm in length, which produced acute, but plaintive ſounds. The Carians made uſe of them in their funerals: perhaps by Carians the Phœnicians are meant here, as in Corinna and Bathyllides. Thoſe flutes derive their names from the lamentations of the Phœnicians at the death of Adonis, whom they called *Gingras*. Encycl. Suppl.

GINHEIM, in *Geography*, a town of Germany, in the county of Hanau Munzenberg; 11 miles W. of Hanau.

GIN-HOA, a town of China, of the third rank, in Quang-tong; 22 miles N. of Chao-tcheou.

GIN-HOAI, a town of China, of the third rank, in Se-tchuen; 32 miles S. of Tche-li-leou.

GINIPALIAGARUM, a town of Hindooſtan; 25 miles E. of Calicut.

GINKGO, in *Botany*, Linn. Mant. 313. Kæmpf. Amoen. 811. t. 813.—The Japaneſe name of a tree, as large as a Walnut-tree, with leaves reſembling an *Adiantum*. The male flowers are in catkins, the female ſolitary, on ſtalks, producing a drupa, whoſe nut reſembles that of a *Piſtacia*, with a white, ſomewhat aſtringent, kernel, which is eaten in Japan, being ſuppoſed to aſſiſt digeſtion. This tree is hardy in our gardens, ſometimes bearing catkins, but no fruit. The late Mr. Gordon ſent a living plant to Linnæus, who mentions it in an appendix by the above appellation, not being able either to define the genus, or to name it properly, till he knew the fructification. Mr. Saliſbury having with great aſſiduity determined its eſſential characters, it was dedicated to him, by Dr. Smith in the Tranſ. of the Linn. Soc. v. 3. 330, and his botanical merits will ever juſtify the appropriation. See Salisburia.

GIN-KIA-CENTZE, in *Geography*, a town of Chineſe Tartary. N. lat. 41° 45′. E. long. 123° 29′.

GIN-KIEOU, a town of China, of the third rank, in Pe-tcheli; 17 miles N. of Ho-kien.

GINLIA, a town of Naples, in Abruzzo Ultra; 12 miles N. E. of Teramo.

GINNANI, Francis, in *Biography*, was born at Ravenna in 1716. He was educated in his father's houſe, and at the age of fourteen was placed at Parma, as page to the duke of Antony Farneſe. The duties of this ſituation did not prevent him from purſuing his ſtudies, and he was particularly attentive to natural hiſtory, under the direction of his uncle Joſeph Ginnani, who was well known for his reſearches into marine productions. He devoted himſelf to a retired and ſtudious life, and was the inventor of divers agricultural inſtruments and other machines, uſeful as well as curious. His writings, which relate to almoſt all the departments of natural hiſtory, obtained for him an admiſſion into the learned ſocieties of London, Paris, Bern, and Perugia, and he held a literary correſpondence with many of the moſt eminent natural philoſophers of the age. In private life he was courteous, modeſt, and benevolent, and he was particularly obſervant of the duties of religion. He died at the age of forty. His principal work was a treatiſe on the diſeaſes of corn, with obſervations on the cauſes and remedies. He publiſhed an account of the natural productions in the muſeum of Ravenna, and he greatly intereſted himſelf in the inſtitution of the ſociety of that town. He left behind him ſome manuſcripts, among which was a "Natural and Civil Hiſtory of the Pine Foreſts of Ravenna." Gen Biog.

GINNIS, in *Geography*, a town of Turkiſh Armenia; 21 miles W. N. W. of Erzerum.

GINNISH, a town of Hindooſtan, in Guzerat; 36 miles S. of Amedabad.

GINONDAYAN, a town on the E. coaſt of the iſland of Leyta. N. lat. 10° 27′. E. long. 125° 10′.

GINORIA, in *Botany*, was named by Jacquin, to commemorate a patron of ſcience and of himſelf, the marquis Charles Ginori, governor of Leghorn, who was extremely liberal in ſupporting a botanic garden at Florence. Linn. Gen. 240. Schreb. 323. Jacq. Amer. 148. Willd. Sp. Pl. v. 2. 871. Mart. Mill. Dict. v. 2. Lamarck Dict.

v. 2. 712. Juſſ. 331. Claſs and order, *Dodecandria Monogynia.* Nat. Ord. *Calycanthemæ*, Linn. *Salicariæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf: tube bell-ſhaped; limb ſix-cleft: ſegments lanceolate, ſpreading, coloured, permanent. *Cor.* Petals ſix, roundiſh, ſpreading, longer than the calyx, with long claws inſerted into the neck of the calyx. *Stam.* Filaments 12, awl-ſhaped, the length of the calyx and inſerted into it; anthers kidney-ſhaped. *Piſt.* Germen roundiſh, depreſſed; ſtyle awl-ſhaped, as long as the corolla, not deciduous; ſtigma obtuſe. *Peric.* Capſule roundiſh, depreſſed, ſhining, coloured, with about four furrows and four valves, of one cell, gaping at the top. *Seeds* numerous, minute; receptacle roundiſh, large.

Eſſ. Ch. Calyx ſix-cleft. Petals ſix. Capſule of one cell, with four valves, coloured, with many ſeeds.

1. G. *americana.* Linn. Sp. Pl. 642. Jacq. Amer. t. 91.—Native of the rocky and gravelly banks of rivers in the iſland of Cuba. This beautiful ſhrub has much of the aſpect of a myrtle, and bears its flowers and ripe fruit in December. It riſes erect to the height of three or four feet, and its *branches* are round, ſmooth, and woody. *Leaves* lanceolate, entire, ſmooth, ſpreading, on ſhort footſtalks, oppoſite, an inch and half long, numerous. *Stalks* ſingle-flowered, ſlender, axillary and terminal. *Flowers* inodorous, with a reddiſh calyx, blue corolla, and dark-red capſule, containing a moſt beautiful berry. *Seeds* whitiſh. The capſule remains entire for ſome time after the ſeed is ſhed, together with the calyx and part of the ſtyle. The natives call this plant *Roſa del rio*, or river Roſe.—It has never been introduced into the gardens of Europe, nor have we even ſeen a dried ſpecimen.

GIN-PIN, in *Geography*, a town of China, of the third rank, in Chan-tong; 17 miles N. E. of Tong-chang.

GIN-SENG, or NIN-SENG, in *Botany*. See PINAX.

GIN-SENG, in the *Materia Medica*, is one of the principal medicines of the Chineſe and Tartars; and their moſt eminent phyſicians have written many volumes concerning its virtues.

It is known among them by divers other names, expreſſing only *ſpirit*, or *the pure ſpirit of the earth; the plant that gives immortality*, &c. It makes, in effect, the whole materia medica for the people of condition, but is too precious for the populace.

All the writers of the Chineſe affairs make mention of the gin-ſeng: as Martinius, in his Atlas; F. Kircher in his China Illuſtrata; F. Tachard, in his Voyages; and F. Le Comte, in his Memoirs.

And yet we knew but very little of this plant before F. Jartoux, a Jeſuit, and miſſionary in China; who, being employed, by order of the emperor, in making a map of Tartary, in the year 1709, had an opportunity of ſeeing it growing in a village about four leagues from the kingdom of Corea, inhabited by Tartars, called *Calca-Tatze.*

That father took this opportunity to make a draught of the plant, and give an accurate deſcription of it, with its virtues and manner of preparing it. The gin-ſeng, according to his deſcription and drawing, has a white root, ſomewhat knotty, about thrice the thickneſs of the ſtem, and which grows tapering to the end; at a few inches from the head it frequently parts into two branches, which gives it ſome reſemblance of a man, whoſe thighs the branches repreſent; and it is hence it takes the denomination gin-ſeng, which ſignifies a figure of a man.

It is hard to ſay, why the Chineſe ſhould call it gin-ſeng, a word which ſignified *figure* or *repreſentation of a man:* neither that father, nor any he enquired of, could ever find, that it bore more reſemblance to the figure of a man than is ordinarily ſeen among other roots. The Tartars, with more reaſon, call it *orhota*, that is, the firſt of plants. It grows to the height of about eighteen inches.

The plant dies away every year: the number of its years may be known by the number of ſtalks it has ſhot forth, of which there always remains ſome mark.

Thoſe who gather the gin-ſeng preſerve only the root; and all they can get of it in ten or fifteen days time they bury together, in ſome place under ground; then they take care to waſh it well, and ſcour it with a bruſh; then dip it in ſcalding water, and prepare it in the fumes of a ſort of yellow millet, which gives it part of its colour. The millet is put in a veſſel, with a little water, and boiled over a gentle fire; the roots are laid over the veſſel, upon ſmall tranſverſe pieces of wood, being firſt covered with a linen cloth, or ſome other veſſel placed over them.

They may alſo be dried in the ſun, or by the fire; but then, though they retain their virtue well enough, they have not that yellow colour which the Chineſe ſo much admire When the roots are dried, they muſt be kept cloſe in ſome very dry place; otherwiſe they are in danger of corrupting, or of being eaten by worms.

As to the place where this root grows, it is between the thirty-ninth and forty-ſeventh degree of north latitude, and between the tenth and twentieth degree of eaſt longitude, reckoning from the meridian of Pekin. Here is found a long tract of mountains, which thick foreſts, that cover and encompaſs them, render almoſt impaſſable: it is upon the declivities of theſe mountains, and in theſe thick foreſts, upon the banks of torrents, or about the roots of trees, and amidſt a thouſand other different ſorts of plants, that the gin-ſeng is found: it is not to be met with in plains, valleys, marſhes, the bottoms of rivulets, or in places too much expoſed and open

If the foreſt takes fire and be conſumed, this plant does not appear till two or three years after; it alſo lies hid from the ſun as much as poſſible, which ſhews that heat is an enemy to it.

The places where the gin-ſeng grows are, on every ſide, ſeparated from the province of Quang-tong by a barrier of wooden ſtakes, which encompaſſes this whole province, and about which guards continually patrol, to hinder the Chineſe from going out and looking after this root.

Yet, however vigilant they are, greedineſs after gain incites the Chineſe to lurk about privately in theſe deſerts, ſometimes to the number of two or three thouſand, at the hazard of loſing their liberty, and all the fruits of their labour, if they are taken either as they go out of or come into the province.

The emperor, in order that the Tartars ſhould reap all the advantage that is to be made of this plant, rather than the Chineſe, gave orders, in 1709, to ten thouſand Tartars, to go and gather all they could find of the gin-ſeng, upon condition that each perſon ſhould give him two ounces of the beſt, and that the reſt ſhould be paid for, weight for weight, in pure ſilver.

It was computed, that, by this means, the emperor would get this year above twenty thouſand Chineſe pounds of it, which would not coſt him above one-fourth part of its value.

We met, by chance, ſays F. Jartoux, with ſome of theſe Tartars, in the midſt of thoſe frightful deſerts; and their mandarins, who were not far out of the way, came, one after another, and offered us oxen for our ſubſiſtence, according to the commands they had received from the emperor.

This army of herbaliſts obſerved the following order: after they had divided a certain tract of land among their ſeveral companies, each company, to the number of a hundred perſons, ſpread itſelf out in a right line, to a certain fixed place, every ten of them keeping at a diſtance from the reſt.

Then they ſearched carefully for the plant, going on leiſurely in the ſame order; and in this manner, in a certain number of days, they run over the whole ſpace of ground appointed them.

When the time was expired, the mandarins, who were encamped in their tents in ſuch places as were proper for the ſubſiſtence of their horſes, ſent to view each troop, to give them freſh orders, and to inform themſelves if their number was complete.

If any one of them was wanting, as it often happened, either by wandering out of the way, or being attacked by wild beaſts, they always looked for him a day or two, and then returned again to their labour as before.

Gin-ſeng was formerly ſuppoſed to grow only in Chineſe Tartary, affecting mountainous ſituations, ſhaded by cloſe woods, but it has now been long known that this plant is alſo a native of North America, whence M. Sarraſin tranſmitted ſpecimens of it to Paris in the year 1704; and the gin-ſeng ſince diſcovered in Canada, Pennſylvania, and Virginia, by Lafiteau, Kalm, Bartram, and others, has been found to correſpond exactly with the Tartarian ſpecies, and its roots are now regularly purchaſed by the Chineſe, who conſider them to be the ſame with thoſe of eaſtern growth, which are known to undergo a certain preparation above-mentioned, by which they aſſume a ſomewhat different appearance. This plant was firſt introduced into England in 1740 by that induſtrious naturaliſt, Peter Collinſon. The dried root of gin-ſeng, as it is imported here, is ſcarcely as thick as the little finger, about three or four inches long, frequently forked, tranſverſely wrinkled, of a horny texture, and both internally and externally of a yellowiſh white colour. To the taſte, ſays Lewis (Mat. Med.), it diſcovers a mucilaginous ſweetneſs, approaching to that of liquorice, accompanied with ſome degree of bitteriſhneſs, and a ſlight aromatic warmth, with little or no ſmell. It is far ſweeter, and of a more grateful ſmell, than the roots of fennel, to which it has by ſome been ſuppoſed ſimilar; and differs likewiſe remarkably from thoſe roots, in the nature and pharmaceutic properties of its active principles: the ſweet matter of the gin-ſeng being procured entire in the watery as well as the ſpirituous extract, whereas that of fennel-roots is deſtroyed or diſſipated in the inſpiſſation of the watery tincture. The ſlight aromatic impregnation of the gin-ſeng is likewiſe in good meaſure retained in the watery extract, and perfectly in the ſpirituous.

The gin-ſeng, we have obſerved, is an ingredient in moſt of the medicines which the Chineſe phyſicians preſcribe to the better ſort of patients: they affirm, that it is a ſovereign remedy for all weakneſſes occaſioned by exceſſive fatigues, either of body or mind; that it attenuates and carries off pituitous humours; cures weakneſs of the lungs and the pleuriſy; ſtops vomitings; ſtrengthens the ſtomach, and helps the appetite; diſperſes fumes or vapours; fortifies the breaſt; is a remedy for ſhort and weak breathing; ſtrengthens the vital ſpirits, and is good againſt dizzineſs of the head and dimneſs of ſight; and that it prolongs life to extreme old age. Nobody can imagine, that the Chineſe and Tartars would ſet ſo high a value upon this root, if it did not conſtantly produce a good effect: thoſe that are in health often make uſe of it to render themſelves more vigorous and ſtrong. And I am perſuaded, adds father Jartoux, above-mentioned, it would prove an excellent medicine in the hands of any European who underſtands pharmacy, if he had but a ſufficient quantity of it to make ſuch trials as are neceſſary to examine the nature of it chemically, and to apply it in a proper quantity, according to the nature of the diſeaſe for which it may be beneficial.

It is certain, that it ſubtilizes, increaſes the motion of, and warms the blood, that it helps digeſtion, and invigorates in a very ſenſible manner.

After I had deſigned the root, he goes on, I obſerved the ſtate of my pulſe, and then took half of a root, raw as it was, and unprepared; in an hour after I found my pulſe much fuller and quicker; I had an appetite, and perceived myſelf much more vigorous, and could bear labour better and eaſier than before. Four days after, finding myſelf ſo fatigued and weary, that I could ſcarcely ſit on horſeback, a mandarin, who was in company with us, perceiving it, gave me one of theſe roots; I took half of it immediately, and an hour after I was not in the leaſt ſenſible of any wearineſs. I have often made uſe of it ſince, and always with the ſame ſucceſs. I have obſerved alſo, that the green leaves, and eſpecially the fibrous part of them, chewed, would produce nearly the ſame effect. The Tartars often bring people the leaves of gin-ſeng inſtead of tea: and I always find myſelf ſo well afterwards, that I ſhould readily prefer them before the beſt tea; their decoction is of a grateful colour, and, when one has taken it twice or thrice, its taſte and ſmell become very agreeable.

As for the root, it is neceſſary to boil it a little more than tea, to allow time for extracting its virtue, as is practiſed by the Chineſe, when they give it to ſick perſons; on which occaſion they ſeldom uſe more than the fifth part of an ounce of the dried root.

To prepare the root for exhibition they cut it into thin ſlices, and put it into an earthen pot well glazed, with about half a pint of water: the pot is to be well covered, and ſet to boil over a gentle fire; and, when the water is conſumed to the quantity of a cupful, a little ſugar is to be mixed with it, and to be drank; immediately after this, as much more water is to be put to the remainder, and to be boiled as before, to extract all the juice, and what remains of the ſpirituous part of the root.

Theſe two doſes are to be taken, the one in the morning, and the other in the evening. Phil. Tranſ. N° 337, or Abridg. vol. iv. part ii. p. 314, &c.

Gin-ſeng has been conſidered by the Chineſe as a powerful aphrodiſiac; but a fact to the contrary is alleged by Dr. Cullen in his Mat. Med. v. ii. p. 261. Highly as the virtues of this root have been extolled by the Chineſe, and by others, upon their authority, we know of no proofs, ſays Dr. Woodville (Med. Bot.), of its efficacy in Europe, and from its ſenſible qualities, we judge it to poſſeſs very little power as a medicine. It is recommended in decoction, *viz.* a dram of the root to be long boiled in a ſufficient quantity of water for one doſe; but it has been omitted in the laſt edition of the London Pharmacopœia.

GIO, in *Geography*, a cape of Scotland, on the N. coaſt of the iſland Shapinſka.

Gio, *St.*, a town of Italy, in Friuli; 11 miles W. of Palma la Nuova.

Gio *di Fiore*, *St.*, a town of Naples, in Calabria Citra; 16 miles W.S.W. of Umbriatico.

Gio *in Pelago*, *St.*, an iſland in the gulf of Venice, near the coaſt of Iſtria. N. lat. 45° 15′. E. long. 13° 49′.

GIOAR, in the *Materia Medica* of the ancient Arabians, a word a word applied to ſeveral different ſubſtances, and ſometimes uſed as the diſtinct names of them; ſometimes only as an epithet to them. It is generally uſed by Avicenna as a name for arſenic, ſometimes for antimony; and in Serapion, we often find it ſtanding for any of the mineral poiſons. The original meaning of the word is no more than what the Greeks expreſſed by the word ουσια, *ſubſtance;* but it became applied to ſeveral things moſt eminent in their way; as to arſenic, the moſt fatal of poiſons; to antimony, ſuppoſed at that time the moſt valuable of medicines; and to pearls, as the moſt valuable of gems.

GIOBAR, in *Geography,* a town of Aſiatic Turkey, in the province of Diarbekir; 20 miles N.W. of Tecrit.

GIOCONDO, Fran. Giovanni, in *Biography,* who flouriſhed in the ſixteenth century, was a native of Verona, where he taught the learned languages for a ſubſiſtence. Among his pupils was the celebrated Julius Cæſar Scaliger. He afterwards became a monk, and was claimed as a brother both by the Dominicans and Franciſcans. He was extremely learned in mathematics, and contributed much to the revival of claſſical learning, by the collection of ancient monuments and manuſcripts. He preſented to Lorenzo de Medici a collection of ancient inſcriptions which he had compiled in Rome. Giocondo was ſome time at the court of the emperor Maximilian. He viſited France, and was employed to build two bridges over the Seine. After this he obtained the title of Architect-royal in France. The time of his death has not been aſcertained: it is ſuppoſed he did not ſurvive, very long, the year 1521, as he calls himſelf an old man, eight years before this, in the dedication of a work to Juliano de Medici. He materially ſerved the cauſe of literature by ſeveral works, which did him much credit as a writer, as they likewiſe extended his fame as an artiſt. He publiſhed an edition of Pliny's epiſtles, and gave a correct edition of Vitruvius, illuſtrated with figures, which he dedicated to pope Julius II. He took a part in editing many other works of the ancients, and was the firſt perſon who gave a deſign of Cæſar's bridge over the Rhine. In 1506 he wrote four diſſertations, addreſſed to the magiſtracy of Venice, concerning the waters of that city. He was employed with Raphael and San Gallo in ſuperintending the erection of St. Peter's. His laſt work was, probably, the rebuilding of the ſtone bridge of Verona. Gen. Biog.

GIOFAR, Al, in *Geography,* a town of Arabia; 8 miles S.S.E. of Rabogh.

GIOGI, a town of Tranſilvania, ſituated near the Maros; 14 miles S.W. of Millenbach.

GIOJA, or Giova, Flavio, in *Biography,* was born at Paſitano, near Amalfi, in the kingdom of Naples, about the year 1300. Little is known of the hiſtory of his life, except that he is thought to have been the diſcoverer of the directive power of the magnet, by which it diſpoſes its poles along the meridian of every place, or nearly ſo, and to have applied this important fact to the purpoſes of navigation, under the form of a compaſs. As a proof that this inſtrument was the invention of a ſubject of the king of Naples, who was a junior branch of the royal family of France, it is ſaid he marked the north point with a fleur-de-lis, by which it is diſtinguiſhed by the people of every country. As a memorial of this diſcovery, the territory of Principato, in which Gioja was born, bears, for its arms, a compaſs. It muſt not, however, be concealed, that the French and the Engliſh have claimed for themſelves the honour: and many authors of reputation have given it to the Chineſe, who are reported to have known its uſe long before their intercourſe with Europeans, and that the ſecret was brought to Italy by Marco Polo. Moreri. See the article Compass.

Gioia, in *Geography,* a town of Naples, in the province of Bari; 14 miles S.S.W. of Converſano.—Alſo, a town of Naples, in Abruzzo Ultra; 7 miles S.E. of Celano.—Alſo, a town of Naples, in Calabria Ultra; 7 miles S. of Nicotera.

GIOMELU, a body of the ſpahis, or horſe, in the ſervice of the grand ſignior.

GIONI Piano, *St.* in *Geography,* a town of Naples, in Capitanata; 8 miles S.S.W. of Leſina.

GIORASH, a town of Arabia, in Yemen; 60 miles N.W. of Saade.

GIORDANI, Vital, in *Biography,* was born at Bitonto, a town belonging to the kingdom of Naples, in 1633. He was intended for the church, but deſerted the ſtudies neceſſary for that profeſſion, and married when he had no means of providing for the ſupport of a family. After this he led an idle life, quarrelled with his relations, murdered his brother, and fought for ſafety by leaving his country. He entered as a common ſoldier on board the galleys, which pope Innocent X. ſent againſt the Turks in the Levant. He was preſent in ſeveral actions, and gave abundant proofs of his courage and heroiſm. His talents led him to promotion and he was made purſer, a ſituation which obliged him to improve himſelf in arithmetic, of which he ſcarcely knew the elements. What his duty required him to learn, his inclination led him to purſue with pleaſure and delight; he became an able mathematician, and was at length choſen profeſſor of mathematics to Chriſtina, queen of Sweden. Lewis XIV. appointed him profeſſor of the ſame branch of ſcience in the Academy of Sculpture and Painting. This was in 1666, and in 1672 pope Clement X. made him his engineer, and profeſſor at the College of Wiſdom. By his great prudence, regularity, and temperance, he redeemed his character, and died in his 78th year. His principal works are "Euclide Reſtituto," 1686, folio. "Fundamentum Doctrinæ Motus Gravium," and "Ad Hyacinthum Chriſtophorum Epiſtola." Moreri.

GIORDANO, Luca, an hiſtorical painter, born at Naples in 1629. His father was an artiſt of no great repute, who, fancying his ſon Luca had an inclination to painting, employed him very early in the practice of the art; by which means he acquired an uncommon facility of handling the pencil, and ſucceeded in imitating the works of great maſters. By this, when very young, he gained for his parents conſiderable wealth; and ſo eager was his father to make advantage of his ingenuity, that he ſcarcely allowed the youth time to eat his meals, but was continually urging him to purſue his labours by repeating ſo inceſſantly Luca fa preſto, *(Luca make haſte,)* that fa preſto became his nick-name among his companions.

His firſt maſter of any note was Joſeph de Ribera, called Spagnoletto; to whoſe ſtyle he, for a time, ſo much adhered, as to puzzle the moſt diſcerning critics. From Naples he removed to Rome, where he induſtriouſly ſtudied the noble remains of antiquity, and the works of eminent maſters in the art. He fixed himſelf unhappily with Pietro Cortona, by which it is probable his brilliant imagination was taught to expand itſelf in a more imperfect and trifling manner than it was originally capable of entertaining. His ready hand, and the freedom, boldneſs, and preciſion of his touch, was exactly what Cortona required, and with him he wrought on many noble works in freſco; and was ſo incredibly expeditious in that way, that he could diſpatch as much work in a day, as any other painter could in a week.

His imagination was exceedingly fertile; and this, with the readineſs of his hand, and the conſequent abundance of his productions, ſoon ſpread his fame over Europe. The king of Spain (Charles II.) deſiring to ſee him paint, and to have the Eſcurial adorned by his hand, invited him there, ordering him to be paid 1500 ducats de Plata for the voyage, and allowing him to freight the ſhip that brought him over duty free. He alſo made him groom of the bed-chamber, honouring him with a golden key, but diſpenſing with his attendance, that he might be more his own maſter.

Velaſco ſays, "that it is impoſſible to expreſs the number and beauty of his compoſitions in Madrid, Toledo, and at the Eſcurial: and that he employed only two years to paint ten arched cielings of the church and ſtaircaſe of that palace. He was exceedingly induſtrious, generally painting ſix or ſeven hours every day; and being highly favoured by the king, became exceedingly rich. It was in 1692 he firſt arrived at Madrid, and did not return to Italy till 1702, when he accompanied Philip V. to Naples, and in 1704 died there.

Previouſly to his going into Spain he had executed numerous works in Rome, Genoa, Milan, and other places; and had produced a vaſt number of pictures in imitation of Titian, Tintoret, Giorgione, &c. &c. which are extremely correct, and exhibit the amazing power of his memory, and the verſatility of his genius. The extraordinary facility of painting which he poſſeſſed, enabled him to work with great ſucceſs in freſco, as well as in oil. This very facility is, however, the cauſe that Giordano's works will never be regarded as ſtandards in the art of painting. Too great a degree of freedom is an enemy to grandeur of ſtyle, and the perſon who poſſeſſes it is apt to be too eaſily ſatisfied with his productions; and indulging himſelf in the pleaſure afforded by the freſhneſs and clearneſs of colour and effect produced by it, is unwilling to diſturb it in order to render the parts more poſitively correct; and thus, though ever agreeable, yet works wrought in this manner are too often flimſy and weak in their effect on the mind. This is the character of Luca Giordano, who, though a great maſter in the art, ranks only in a ſecond or third rate. One of his moſt conſiderable productions is the altar-piece of the church of the Aſcenſion at Naples, repreſenting the fall of Lucifer. And in the Durazzo Polau at Genoa, is a fine picture of Seneca dying in the Bath; of which, alſo, there is a duplicate in the gallery at Dreſden.

GIORGIEV, in *Geography*, a town of Walachia, on the N. ſide of the Danube; 40 miles S.W. of Buchareſt. In June 1771, the Ruſſians defeated the Turks near this town, killing 5000 of them, and taking 180 pieces of cannon, with artillery and baggage for 30,000 men. N. lat. 43° 38'. E. long. 25° 18'.

GIORGIO ANTONIOTTO, in *Biography*, an Italian writer on muſic, who, having been a conſiderable time in England, had a work entitled "L'Arte Armonica," tranſlated into Engliſh, which he publiſhed in two vols. folio, by ſubſcription, under the title of "A Treatiſe on the Compoſition of Muſic," in three books, with an Introduction on the Hiſtory and Progreſs of Muſic from its beginning to this time, written in Italian by Giorgio Antoniotto, and tranſlated into Engliſh, 1760, printed by Johnſon, Cheapſide.

We had at this time no well digeſted, clear, and ample treatiſe of compoſition in our language. Morley's treatiſe was become ſcarce, obſolete, and totally defective in every thing that concerns modern muſic. We had indeed Malcolm's treatiſe publiſhed in 1721, and that of Dr. Pepuſch in 1731. The firſt is dark and awkwardly written; the ſecond, though excellent as far as it goes, has ſome prejudices of the old ſchool, which were totally abandoned in 1760, and it is too conciſe in many particulars to enlighten or ſatisfy the doubts of young ſtudents in many eſſential points, which were now neceſſary to be explained, and which in the year 1731 had no exiſtence. Geminiani's "Guida Armonica," ſo long expected, and publiſhed about the year 1746, puzzled the cauſe, and diſappointed every reader. Much therefore was expected, even by profeſſors, from a work in two vols. folio, written by a learned Italian, and nearly half the liſt of ſubſcribers conſiſted of the names of the principal compoſers and organiſts of the time.

We had a miſerable tranſlation of Rameau's treatiſe, written originally in a muſical technica, totally different from that to which we were accuſtomed, which, with the ungrammatical and bad Engliſh into which the reſt was tranſlated, threw every one who attempted to read it into deſpair.

The ſonatas and concertos of Corelli, publiſhed in ſcore by Dr. Pepuſch, and the works of Handel and Geminiani, for thoſe who took the trouble to ſcore them, were excellent leſſons of counterpoint, if they had been properly ſtudied. But it is aſtoniſhing how long even great performers on inſtruments remain in utter ignorance of compoſition. Jack James, Magnus, and Kilway, though admirable organiſts, never attempted compoſition, and if they had, after a certain time, they would never have been ſure of their ground, but even in making a baſe to a minuet or country dance would have diſcovered to real judges, that they were not regular bred contrapuntiſts.

Signor Antoniotto, we believe, was a perfect judge of the mechanical rules of harmony; but his method is not clear and intelligible to a ſtudent out of the reach of a maſter. His introduction, and hiſtorical account of the progreſs of muſic from the ſyſtem of the Greeks to the preſent time, will amuſe, though not accurately inſtruct, curious readers.

He aſcribes to Guido the invention of harmony, and to John de Muris the invention of muſical characters, as had been long done by others, who, truſting to tradition, had never ſeen the Micrologus of Guido, nor the Compendium of John de Muris, by which it has been lately proved, that the laws of harmony were unknown to Guido, and that de Muris himſelf aſſigns the invention of muſical characters to Magiſter Franco, who flouriſhed 1047, near 300 years before John de Muris was born. (See FRANCO and DE MURIS.) So much for ſig. Antoniotto's hiſtorical part.

When he comes to practical muſic, his definitions are ſo far from clear to readers in the firſt ſtages of counterpoint, that they multiply the ſtudent's doubts. His plates have *primâ facie* ſo ſcientific an appearance as to frighten a *principiante* as much as teaching geometry or algebra would do. His examples of notation are methodically ſtated; but the joining the old and modern characters in the ſame table will confuſe the ſtudent's ideas. He begins with three characters no longer in uſe, and the ſemibreve, now the firſt and longeſt note, ranks only as the fourth.

His general ſcale and ſyſtem of intervals will terrify a young ſtudent by the manner in which it is repreſented; his ſyſtem of harmonic combinations the ſame. Plates 14 and 15 of tranſpoſed ſcales are clear and uſeful, as are the ſcales in the ſeveral clefs.

The règle de l'octave ſeems unknown to the author, and his plain counterpoint is written entirely on a ſeries of ſevenths to baſes riſing or falling by fourths and fifths totally without modulation. No inſtructions are given for the uſe of diſcords, but in examples *a due cori* he gives diſcords indiſcriminately to every note, without informing the ſtudent when and where to uſe them, or ſpeaking of *accented* or *unaccented* parts of a bar.

At plates 48 and 49 the anſwers to ſhort examples of fugue and imitation are clear and ingenious; but no inſtructions are given for melody throughout the work. And muſical compoſition conſiſting of the union of melody and harmony, it ſeems, at leaſt, to have merited a definition. He might have told the ſtudent that it conſiſts of a pleaſing ſeries of ſingle notes of various lengths, arranged with grace, divided into equal meaſure by bars, phraſed and governed by rhythm.

At pl. 49, ex. vii. there are *ſuſpicions* of fifths in abundance between the ſecond and third lines, unnoticed by the author.

Page 106, vol. i. the author very juſtly cenſures vocal fugues and canons, in which the ſeveral voices are ſinging different words and ſyllables at the ſame time; but Rouſſeau had done this before, in his "Lettre ſur la Muſique Françoiſe," 1751. His examples of fugue and canon, which he allows to have an admirable effect in inſtrumental muſic, are few and artleſs. No other examples are given of melody than chords broken into very common paſſages as variations. Nor of harmony or melody do we find more than two or three examples in triple time, and thoſe of a very common and unmeaning ſort.

We remember that the public was much diſappointed by this work, which was ſilently put on the ſhelf, and has ſcarcely ever been mentioned ſince its publication.

GIORGIO GANDINI, a painter, ſurnamed *del Grano*. He was of Parma, and, if we believe Orlandi, not merely one of Correggio's ſchool, but a pupil, whoſe works the maſter himſelf retouched. The principal picture in St. Michele, erroneouſly aſcribed to Lelio Orſi, is claimed for him by P. Zapata; a performance, though in parts capriciouſly conceived, of an impaſto, a relief, a ſweetneſs of colour and pencil, to confer honour on the beſt of that ſchool. The eſteem in which he was held by his fellow-citizens may be conceived, from the commiſſion which they unanimouſly conferred on him after the deceaſe of Correggio; *viz.* to paint the Tribune of the Duomo. Death prevented him from the execution of it, and the commiſſion fell to a third, to Giralomo Mazzuolo, though not yet ripe for an enterprize of ſuch magnitude. Fuſeli's Pilkington.

GIORGIO, *St.*, in *Geography*, a town of Naples, in Calabria Ultra; 17 miles S.E. of Nicotera.—Alſo, a town of the iſland of Leſina; 44 miles E. of Leſina.—Alſo, a town of France, in the department of the Po; ſix miles N.W. of Chivaſſo.—Alſo, a town of Naples, in the province of Otranto; four miles E. of Tarento.—Alſo, a town of Naples, in the ſame province; three miles N.N.W. of Nardo.—Alſo, a town of Naples, in the province of Principato Ultra; three miles S.E. of Benevento.—Alſo, a town of Italy; 10 miles N.W. of Verona.—Alſo, a town of Italy, in the department of the Reno; 11 miles N. of Bologna.

GIORGIONE DA CASTEL FRANCESCO, or GIORGIO BARBARELLI, in *Biography*, was a painter of moſt uncommon talents, who diſputes the rank of head of the Venetian ſchool with Titian. He was born at Caſtel-Franco in 1477, and acquired the name of Giorgione as well from his ſuperior mode of feeling in art, as from the beauty and elegance of his perſon and manner. He at firſt became a ſcholar of Giovanni Bellini, but ſoon ſhook off the minuteneſs and trifling labour of that ſchool, and ſubſtituted breadth and fulneſs of handling and effect. Vaſari obſerves, that Giorgione, having ſeen ſome works of Lionardo da Vinci, wherein the grand ſtyle of chiaroſcuro was effected, was ſtruck by them, and endeavoured in future to imitate that character in his own pictures. If this be true, which is doubted by ſome, he, in adopting that ſtyle, did not ſcruple to vary it, to ſuit his own more pleaſing taſte; and certainly differs exceedingly from it in line, as much as in colour and effect. The former confines the eye almoſt to a ſingle point, the latter diffuſes the lights and ſhades; and though art be apparent, ſtill nature more truly predominates.

He painted in freſco with great vigour and beauty, but little of his labour in that way now remains. He was engaged to paint the bridge of the Rialto in Venice, where he almoſt altogether reſided; Vaſari, while he praiſes the beauty of the colours and execution, condemns the work, as wanting ſubjects. Many of his oil pictures are in this country, and they cannot be too much extolled for their excellence in character of colour, or fulneſs and freedom of handling: with a rich impaſto, and a ſoftneſs in the roundings, that render them delightfully pleaſing to contemplate. One large picture of a Holy Family is in poſſeſſion of the marquis of Stafford, which is highly laboured as to effect. But, perhaps the moſt perfect work of his in this country, is a ſmall picture in the collection of the earl of Carliſle, a portrait of Gaſton de Foix, with a ſervant putting on his armour. We are not acquainted with any picture that has more truth or beauty of colour, and ſtyle of character to recommend it. His portraits, in general, have every excellence required in that intereſting branch of the art, and he may be juſtly ſtyled the father of portrait painting, as ſince handed down to us by Titian, Vandyke, and ſir Joſhua Reynolds; the three great luminaries that have at different periods ſucceeded him. It is told of him, that having a diſpute concerning the ſuperiority of ſculpture or painting; and it being argued, that ſculpture had the advantage, becauſe the figures it produces may be ſeen all around; he took the adverſe ſide, maintaining, that the neceſſity of moving, in order to ſee the different ſides, deprived it of its ſuperiority; whereas the whole figure might be viewed at one glance, in a minute. To prove his poſition, he painted a figure, and ſurrounded it with mirrors, in which all the various parts were exhibited, and obtained great applauſe for his ingenuity. He died of the plague, at the early age of 34, in the year 1511.

GIORGY, ST. in *Geography*, a town of Sclavonia; 16 miles N.N.W. of Verovitza.

GIORNICO, called by the Germans *Irnis*, a town of Switzerland, in the Levantine valley, famous for the victory which 600 Swiſs gained, in 1478, over the troops of the duke of Milan, amounting to 15,000 men; a victory which inſured to the Swiſs an honourable and advantageous peace. In the vicinity of this town, there are many vineyards, and the walnut and cheſnut trees are of a very large ſize, ſome of them being not leſs than 30 feet in girth; 13 miles N. of Bellinzona.

GIOSTAH, a town of Africa, in the country of Moſambique, at the bottom of a bay not far from Soſala.

GIOTTO, in *Biography*, a painter, conſpicuous among thoſe who revived the knowledge of the art in the 13th century. His father was a labourer, who lived at Veſpignano, near Florence, and whoſe name was Bondoni; but he gave the name of Giotto to his ſon, who was born in 1276, and whom, at an early age, he placed with ſome ſhepherds to aſſiſt in tending their flocks. Whilſt engaged in this employment, he was found by Cimabue drawing a ſheep in the ſand with ſo much ingenuity, that that painter was induced to aſk him of his father, that he might teach him the art of painting. In a ſhort time he not only learned to imitate his maſter, but alſo to paint from nature; and, throwing off the dry Gothic manner which reigned till then, endeavoured to give the actual imitation of nature. He ſoon became far ſuperior to his maſter, and arrived at a degree of art which, in grace at leaſt, was not excelled before Maſſaccio. M. Fuſeli, in his laſt edition of Pilkington's Dictionary, obſerves, that "it is not eaſy to account for the rapidity of his progreſs, unleſs we aſcribe it to the ſtudy of the antique, with which he might have become acquainted at Florence, and afterwards at Rome; and as we know that he was likewiſe a ſculptor, and that models of his exiſted at the time of Lorenzo Ghiberti; this conjecture becomes highly probable, when we conſider the character of his heads, the ſquareneſs of his forms, the broad and majeſtic folds of his draperies, with the grave and decorous attitudes of his figures."

Being contemporary with Dante, it is to him we owe the portrait of that illuſtrious poet, and alſo thoſe of many other perſons of that period famed for their birth and talents. The great work now remaining, though in a ruined ſtate, which teſtifies moſt fully the juſt ground on which he earned the fame he receives, is at Aſſiſi, in the church of St. Franciſco, where, in 32 pictures, he has repreſented the various actions of that ſaint in the courſe of his life.

They, together with many other pictures in the ſame place, are in freſco, and have ever been eſteemed of ſupreme excellence for expreſſion and beauty of compoſition, and for the grace and truth of actions, and proportions of the figures.

His fame reached the ears of pope Benedict IX. who ſent for him to Rome, and employed him in the Vatican, and in St. Peter's. Clement V. took him to Avignon, where, and in other places in France, he painted many pictures in freſco, and thence drew great riches; returning to Florence in 1316. He afterwards painted in moſt of the principal cities of Italy, but more particularly at Florence, where his works were ſtudied by ſucceeding artiſts, and highly applauded even by Michael Angelo Buonarotti. He died in 1336, aged 60, having enjoyed a life of fame and eſteem; and honoured by admiſſion to the citizenſhip of Florence, as a reward for the honour his great talents conferred upon his country.

GIOVAIN, in *Geography*, a town of Perſia, in the province of Kerman; 57 miles E. of Sirgian.—Alſo, a town of Perſia, in the province of Farſiſtan; 10 miles N. of Schiras.—Alſo, a town of Perſia, in the province of Segeſtan; 55 miles W.N.W. of Zareng.

GIOVANA, a town of the republic of Lucca; ſeven miles N. of Lucca. N. lat. 44°. E. long. 10° 40′.

GIOVANI Ansani, in *Biography*, a celebrated Italian opera ſinger, with a tenor voice. His firſt appearance on the ſtage was at the theatre royal at Copenhagen, where he remained three years. In 1772, we ſaw and heard him at Hamburgh, and in 1773 he went to Amſterdam, where, as well as at Hamburgh, he only ſung at concerts, there being no opera eſtabliſhed in thoſe cities at that time. In 1775 and 1776, he ſung at Turin with the Agujari. In 1777 at Naples with Rubinelli.

In 1779 he arrived in England, where he found Roncaglia, whoſe bounded abilities excited an ambition in the tenor ſinger to take the *pas* of the ſoprano. Anſani had one of the beſt tenor voices we had ever heard on our opera ſtage. It was ſweet, powerful, even, and of great compaſs and volubility. Nor could any defect be juſtly aſcribed to it, except perhaps a little want of variety, ſpirit, and animation, in ſinging allegros, to diſtinguiſh joy from ſorrow. For there was a natural melancholy and pathos in his tones on all occaſions, which rendered his performance ſomewhat monotonous. He was of ſuch a diſcontented and irritable diſpoſition, that "trifles light as air" occaſioned perturbation. He and Roncaglia had been at variance in Italy, and here their enmity broke out anew, with double violence. Sacchini, with whom Anſani contrived to quarrel, took ſides in the diſpute between him and Roncaglia, and from the tenor ſinger's pride, impatience, and irreconcileable diſpoſition, he was in a perpetual warfare during the two ſeaſons he remained in this country.

His figure and countenance on the ſtage were good; he was tall, thin, and had the look of a perſon of high rank. He told us, we believe with great truth, that he was *ſempre in guai*, always in vexation. He was huſband to the Maccherini, who came hither as firſt woman of the ſerious opera, without a voice. If ever ſhe *had* a voice, ſhe had loſt it before her arrival in this country. We never could receive any pleaſure from her performance; every note, feeble as it was, ſhe ſqueezed out with ſuch difficulty, and with a look ſo croſs and miſerable, that after her firſt exhibition we never wiſhed more either to hear or ſee the Signora Maccherini, who was ſo proper a match for her huſband in ſweetneſs of diſpoſition, that in Italy, when employed in the ſame theatre, if one happened to be applauded more than the other, they have been known *mutually* to employ perſons to hiſs the ſucceſsful rival. The Maccherini is ſaid to have been once a very agreeable ſinger, and a conſiderable favourite on the continent during her bloom; but ſoon after her firſt appearance ſhe ran away with an Engliſh nobleman, from the theatre in Florence, in her ſtage dreſs during the middle of the performance.

GIOVANNI da San Giovanni, a painter whoſe real name was Gio. Mannozzi. He was one of the beſt Italian artiſts in freſco. Poſſeſſing a vivid imagination and a ready hand, his works are numerous, and adorn many of the churches and palaces of Rome and Florence. He did not begin to paint till he was 18 years old, his ſucceſs is therefore the more extraordinary. The genius he was endowed with being of an irregular nature, he frequently took great liberties in his deſigns; but his freſco-paintings at Florence ſhew how well, when he pleaſed, he could reſtrain the improper exuberancies of his imagination. He died in 1636, aged 46.

Giovanni, *St.* in *Geography*, a town of Naples, in Capitanata; ſix miles N.E. of Aſcoli.—Alſo, a town of the duchy of Carniola; two miles N.W. of Duino.—Alſo, a town of Italy; 19 miles N. of Bergamo.—Alſo, a town of Iſtria; nine miles N.E. of Pola.—Alſo, a town of Naples, in Abruzzo Ultra; 13 miles S. of Celano.—Alſo, a town of Naples, in Baſilicata; 17 miles S.W. of Matera.—Alſo, a town of Italy, in the duchy of Piacenza; ſix miles W. of Piacenza.—Alſo, a town of Etruria; 18 miles S.E. of Florence.

Giovanni, *St.* or *St. John*, an iſland in the Mediterranean. N. lat. 36° 27′. E. long. 26° 24′.

Giovanni *Rotondo*, *St.* a town of Naples, in Capitanata; 10 miles N.W. of Manfredonia.

GIOVAR, a town of Perſia, in the province of Farſiſtan; 55 miles S.S.W. of Schiras.

GIOVELLINO, a town of Corſica; 25 miles E. of Corte.

GIOVENAZZO, a town of Naples, in the province of Bari, ſituated near the ſea, the ſee of a biſhop; containing four churches, four convents, and defended by a caſtle; eight miles W. of Bari. N. lat. 41° 17′. E. long. 16° 42′.

GIOVI, a town of Etruria, on the Chieno; five miles N. of Arezzo.

GIPPING, a river of England, in Suffolk, which joins the Orwell, and falls with it into the Stour.

GIPSIES. See Egyptians; under which article the reader will find an account of their ſuppoſed origin, migrations, and character, and of the treatment they have undergone in ſeveral countries in which they have appeared. We ſhall here add, that Muratori, in his "Antichita Italiane," ſuggeſts, that it was not before the year 1480 that this ſingular race of people iſſued from their concealments, pretending that Egypt was their native country, and that they were deprived of their ſettlements by a king of Hungary. Nothwithſtanding the geographical abſurdity of this aſſertion, it was readily credited by the ignorant vulgar. It appears probable, according to this writer, that they drew their origin from Walachia, or the neighbouring countries, as they are ſtill found in great numbers in Hungary, Servia, Bulgaria, and Macedonia. Whether they were expelled from their native dens, or left them ſpontaneouſly, and we may add, whatever was the country from which they migrated, it is certain that about this period they began to appear in the weſtern provinces, and by their fraudulent arts were able to gain a footing there, though by nature ever addicted to a vagabond life. They were neither cultivators of the ſoil, nor artiſans, but found an inexhauſtible ſupply of their neceſſities in theft, rapine, and deceit. Although their mode of life was not unknown to the Italians, their infamous practices were tolerated, becauſe they made the ſimple people believe, that a penance was impoſed upon them of wandering about for ſeven years; and ſtill more, becauſe they pretended to the gift of divination and foretelling future events. An opinion long prevailed, that they were forbidden to remain longer than three days in one place, and that they had a privilege from the pope of providing themſelves with neceſſary food wherever they ſhould be. The time in which theſe "Zingani," or "Zingari," as they were called, firſt made their appearance in Italy, may be collected from the "Miſcella Bologneſe," publiſhed in the 18th volume of the "Rerum Italicarum." Hence we learn, "that on July the 18th, 1422, there came to Bologna a duke of Egypt, named duke Andrew, together with men, women, and children of his country, in number about 100. They had a decree from the king of Hungary, who was emperor, authorizing them to rob wherever they ſhould go for the ſpace of ſeven years, without being amenable to juſtice. When they arrived at Bologna, they lodged within and without the Porta di Galliera, and ſlept under porticoes, except the duke, who was lodged at the king's hotel. They remained here 15 days, during which time many perſons viſited them, on account of the duke's wife, who underſtood divination, and could tell what was to be a perſon's fortune, what was his preſent condition, how many children he was to have, if a woman was good or bad, and the like. In many things ſhe ſpoke the truth; and when people went to have their fortunes told, few eſcaped without having their pockets picked, or, if women, their cloaths ſtripped of their ornaments. Their women went, by ſix or eight together, through the city, entering the houſes of the citizens and prating with them, at the ſame time filching what they could lay their hands on. They alſo went into the ſhops, pretending to buy ſomething, whilſt ſome of the party were employed in pilfering." Italy did not ſuffice for this crew, which was gradually augmented by acceſſions from the men and women of the countries through which they paſſed. Krantz, in his hiſtory of Saxony, writes, that they began to be ſeen in that country in the year 1417, and he gives a lively deſcription of their cuſtoms and cheats, under the name of "Zigeni," or "Zigeuni." Aventine alſo mentions their arrival in Bavaria, and their mal-practices in 1411. They ſpread in like manner through Flanders and France, in which country they were called "Egyptians" and "Bohemians," and in Spain they were named "Gittanos." They are alſo found in the Turkiſh dominions. Although they have been frequently baniſhed from various diſtricts, and ſevere edicts have been iſſued againſt them, they ſtill contrive to keep up the race, and carry on their trade of petty pillage and deception.

GIR, or Ghir, in *Geography*, a river of Africa, which Ptolemy delineates as equal in length to the Nigir, the courſe of each being probably about 1000 Britiſh miles; but running from eaſt to weſt, till it be loſt in the ſame lake, marſh, or deſert, as the *Nigir*, which ſee. The Arabian geographer Edriſi ſeems to indicate the Gir, when he ſpeaks of the Nile of the Negroes, as running to the weſt, and loſt in an inland ſea, in which was the iſle Ulil. Some have ſuppoſed the Gir of Ptolemy to be the river of Bornou, or Wed-al-Gazel, which joining another conſiderable river, flowing from Kuku, diſcharges itſelf into the Nubia Palus, or Kauga, and it is ſo delineated in Rennell's map; but others apprehend, ſeemingly with better reaſon, that the Gir of Ptolemy is the Bahr Kulla of Browne, in his hiſtory of Africa. This river, the Nilus Nigrorum, as well as the Nile of Egypt, have their ſource in the mountains of Kumri, which Browne lays down in N. lat. 7°. The banks of the river Kulla, according to this ingenious traveller's information, abound with pimento trees, and the ferry-boats are partly managed by poles, partly by a double oar. The trees are ſo vigorous, from the quantity of water and deep clay, that canoes are hollowed ſo large as to contain ten perſons. Ptolemy ſeems to have confounded the Nigir with the Gir, which laſt river he clearly deduces from mountains in the S.E., ſo as to correſpond with the Bahr Kulla, though he be a ſtranger to its remote ſource. This river is repreſented by Ptolemy as receiving two tributary ſtreams from two lakes; and among other cities on its bank is a metropolis called Gira. The termination of the Gir is not a little obſcure, but it ſeems to be delineated, as paſſing under a chain of hills, on the N. of the Lybia Palus, or central lake of Africa, and afterwards joining the Nigir in its courſe to the weſt. The Panagra of Ptolemy, between the Gir and the Nigir, may be the Wangara of the Arabs; and his Lybia Palus, which forms the termination of the Nigir eaſtward, ſeems to be meant, as Rennell obſerves, either for the largeſt of the lakes, or for the lakes of that country (of which there are ſeveral) collectively. From an accurate examination of Edriſi, who wrote in Sicily in the 12th century, and who, from his minute attention to eaſtern Africa, has been called the Nubian geographer, it will appear, that while the Nile of the Negroes, which he ſays runs to the weſt, has been miſtaken for the Nigir, he really knew nothing of that river; and his Nile of the Negroes is the Gir of Ptolemy, terminating in an inland lake, in which was the iſland of Ulil, one day's ſail from the mouth of the river; and in which iſland another Arabian geographer places the capital city of all Soudan. Beyond this lake and iſland, Edriſi appears to have had no knowledge of central Africa; all the regions and towns he mentions ſeeming to belong to the Gir, his Nile of the Negroes, running to the N.W.; and from his account it would appear that Wangara is the Delta of the Gir.

Gir, in *Botany*, a ſpecies of graſs growing plentifully near Ras el Feel, on the borders of Abyſſinia. It begins, ſays Mr. Bruce, to ſhoot in the end of April, and ſpeedily advances to its full height of about three feet four inches. It is ripe in the beginning of May, and decays naturally ſoon afterwards. This ſpecies of graſs was one of the acquiſitions of our author's travels. It was not before known in Europe, nor when he publiſhed his work had the ſeed produced a plant any where but in the garden of the late French king.

GIRA, in *Geography*, a town of Perſia, in the province of Mazanderan; 18 miles S. of Sari.

GIRA, in *Ancient Geography*, a metropolis of Libya interior, ſeated on the river Gir. Ptol. See GIR.

GIRAFFE, in *Zoology*. See CAMELOPARDALIS.

GIRAGLIA, in *Geography*, a ſmall iſland near the N. coaſt of Corſica; 23 miles N. of Baſtia. N. lat. 43° 1′. E. long. 9° 35′.

GIRALDI, GIGLIO GREGORIO, in *Biography*, one of the moſt learned men of his time, was born at Ferrara in the year 1489. He purſued his ſtudies at his native place, and having attained to conſiderable eminence in the languages, he was choſen by the counteſs Rangone as preceptor to her ſon Hercules, afterwards a cardinal. He accompanied the counteſs to Rome during the pontificate of Leo X, and had apartments aſſigned him at the Vatican. He appears to have been employed in the inſtruction of other young perſons in polite literature, and continued at [illegible] He enjoyed but a tender portion of health, and at the ſack of Rome he loſt [illegible] his property, and even his books. This was in the year 15[illegible]7, when, having loſt his friend and patron the cardinal Rangone, he was obliged to leave the capital. In his diſtreſs, which was very ſevere, he went to Bologna, and thence to Mirandola, where he met with a very kind friend in Gianfranceſco Pico. This patron was murdered in 1533, and Giraldi with great difficulty eſcaped to Ferrara with his life. His poverty was now extreme, but he was not without friends, by whoſe liberality, eſpecially that of the ducheſs Renata, he was enabled to lay up a ſtore for the future. He died, after a life of much torture, in the year 1552. So varied was his life, and ſevere his afflictions, that towards the cloſe of life he complained that he had always to combat againſt three enemies, Nature, Fortune, and Injuſtice. His great work was entitled "Syntagma de Diis Gentium." This is the firſt treatiſe in which mythology is diſcuſſed in a truly learned manner, and it is a treatiſe which exhibits the vaſt extent of the author's reading, and for which the learned world is under very great obligations. He was author of ſeveral other treatiſes, "On the Muſes;" "The life of Hercules;" "Explications of the Pythagorical Symbols," and other ancient enigmas: "A Treatiſe of Years and Months, with Greek and Latin Calendars, and thirty Dialogues on ſubjects of Erudition." He gave "A Hiſtory of the Greek and Latin Poets," and of "The Poets of his own Time." He was a conſiderable Latin poet, and it is thought a ſenſe of his own misfortunes induced him to write two ſmall pieces againſt ingratitude, entitled "Progymnaſmata adverſus litteras et litteratos." Moreri.

GIRALDUS, SILVESTER, CAMBRENSIS, one of the moſt learned and eloquent divines of his time, was born near Pembroke, in South Wales, 1145. Among his numerous works that have been preſerved, printed and manuſcript, we ſhall here only advert to an extraordinary paſſage relative to muſic, in his "Cambriæ Deſcriptio, cap. XIII." which has been lately quoted by muſical writers, and on which great ſtreſs has been laid by Eximeno (Dubbio ſopra il ſaggio fond. prat. di contrap. di P. Martini) and by Mr. Ed. Jones, Muſ. Relics of the Welſh Bards.

After all the enquiries that we have made concerning the origin and antiquity of counterpoint, or muſic in parts, the paſſage to which we allude ſurpriſed us extremely. Many eccleſiaſtical hiſtorians tell us that the organ was firſt admitted into the church at Rome by pope Vitalian, 666, the ſame pontiff who two years after ſent ſingers into Kent, to finiſh the work which Auſtin, the firſt Roman miſſionary, had begun. In 680, according to Bede, John, the præcentor of St. Peter's in Rome, was ſent over by pope Agatho to inſtruct the monks of Weremouth in the manner of performing the ritual, who opened ſchools there and in other places of the kingdom of Northumberland for teaching muſic.

This may, perhaps, reconcile to probability ſome part of the following account, which Giraldus Cambrenſis gives of the peculiar manner of ſinging that was practiſed by the Welſh, and the inhabitants of the north of England, about the end of the twelfth century.

"The Britons," ſays he, "do not ſing in uniſon, like the inhabitants of other countries; but in many different parts. So that when a company of ſingers among the common people meets to ſing, as is uſual in this country, as many different parts are heard as there are performers, who all at length unite in conſonance, with organic ſweetneſs. In the northern parts of Great Britain, beyond the Humber, on the borders of Yorkſhire, the inhabitants uſe the ſame kind of ſymphonious harmony; except that they only ſing in two parts, the one murmuring in the baſe, and the other warbling in the acute or treble. Nor do theſe two nations practiſe this kind of ſinging ſo much by art as habit, which has rendered it ſo natural to them, that neither in Wales, where they ſing in many parts, nor in the north of England, where they ſing in two parts, is a ſimple melody ever well ſung. And, what is ſtill more wonderful, their children, as ſoon as they attempt uſing their voices, ſing in the ſame manner. But as not *all* the Engliſh ſing in this manner, but thoſe only of the north, I believe they had this art at firſt, like their language, from the Danes and Norwegians, who uſed frequently to invade and to occupy, for a long time together, thoſe parts of the iſland."

This extraordinary paſſage requires a comment. And firſt, it may be neceſſary, before we reaſon upon the circumſtances it contains, to be certain of their authenticity. Giraldus Cambrenſis is indeed an author who has been often ſuppoſed inaccurate and fabulous; and the glaring improbabilities in the above account, with the manifeſt ignorance of the ſubject in queſtion, by no means contribute to augment his credibility. For whoever is acquainted with the laws of counterpoint, or with the firſt difficulties attending the practice of ſinging in parts, can have no exalted idea of the harmony of an untaught crowd, *turba canentium*, or ſuppoſe it to be much better than the diſſonant pæans of a good-humoured mob; in which the parts would be as various as the pitch of voices of which their chorus was compoſed. But how all theſe united at laſt in the conſonance of organic melody, and the ſoft ſweetneſs of B mollis, will long remain an impenetrable ſecret:

"As true no meaning puzzles more than wit."

With reſpect to what he aſſerts of the people in Northumberland ſinging in two parts, it is more reconcileable to probability, from the circumſtances juſt mentioned, of the cultivation of muſic in that part of the world under Roman maſters, who may probably have firſt brought over the art of diſcant, or double ſinging, which the newly invented organ had ſuggeſted, by the facility it afforded of ſounding two or more notes at a time; which art, when practiſed by voices, was thence called *organum, organizare*. But as to what Giraldus ſays of children naturally ſinging in this manner as ſoon as they were out of the cradle, the reader will afford it what degree of weight he pleaſes; but for our own part, we muſt own that it is not yet admitted into our muſical creed.

GIRAN, in *Geography*, a town of Algiers, anciently called *Arina*; 45 miles S.E. of Oran.

GIRANA, a town of Abyſſinia; 60 miles N.W. of Gondar. N. lat. 13°. E. long. 36° 37′.

GIRANDOLE, a large kind of branched candleſtick. See Branch and Jesse.

GIRAPIATRA, in *Geography*, a town of the iſland of Candy; 16 miles S.W. of Settia.

GIRAR, a fortreſs of Hindooſtan, in Malwa; 40 miles S.W. of Chanderee. N. lat. 24° 23′. E. long. 79° 18′.

GIRARD, Gabriel, in *Biography*, a diſtinguiſhed member of the French academy, known as the author of a work entitled "Synonymes François," the object of which is to prove that the French words, uſually accounted ſynonymous, have, almoſt all, certain ſhades of difference, which, in correct ſpeech, ſhould prevent them from being uſed indifferently. No grammatical work was ever better received by the public, and it was the opinion of Voltaire that it will ſubſiſt as long as the language. This work has been imitated in Engliſh, in one entitled "The difference between words eſteemed ſynonymous in the Engliſh language, and the proper choice of them determined," in two vols. 12mo. 1766. The abbè Girard alſo wrote a French grammar, entitled "Principes de la Langue Françoiſe," which has much merit in its plan and theory, but is thought very defective in point of ſtyle.

GIRARDON, Francis, an eminent ſculptor, intended by his father, who was a founder, for the profeſſion of the law. His inclination for the fine arts could not be controlled, and he was educated as an artiſt. He was brought up at Troyes, but having acquired much reputation and practice there, he went to Paris to improve his taſte and judgment under the ſculptor Anguier. His performances obtained for him a high degree of reputation; he was noticed by the king, and by him ſent with a liberal penſion to Rome. In 1657 he was admitted into the academy, and was patronized by Le Brun. Girardon is reckoned to have had more correctneſs than invention; and he is ſaid to have modelled with more facility than he worked in marble. His principal works are, four figures compoſing the group of the baths of Apollo, and the rape of Proſerpine in the gardens of Verſailles; the equeſtrian ſtatue of Lewis XIV. and the mauſoleum of cardinal Richelieu, in the church of the Sorbonne. He cultivated the friendſhip of the fine writers of the age, ſeveral of whom have done honour to his merits and memory. He was nominated to the chancellorſhip of the academy in 1695. After having adorned the capital and many other parts of the kingdom with a number of works, and riſen to the very head of his profeſſion, he died in 1715 at the age of eighty-five. Moreri.

GIRBÉ, in *Geography*, a town of Egypt, on the right bank of the Nile; 26 miles N. of Syené.

GIRBEH, a river of Switzerland, which runs into the Aar, two miles S. of Berne.

GIRCH, a river of North Wales, which runs into the ſea, near Pwllhely, Caernarvonſhire.

GIRCHSBECK, a town of the duchy of Holſtein; ſix miles W.S.W. of Oldeſlohe.

GIRCZENI, a town of Moldavia; 30 miles N.N.E. of Galatz.

GIRDERS, or Girding *beams*, in *Carpentry*, are thoſe large beams thrown acroſs a room, in order to ſhorten the bearing of the joiſts.

When the bearing is not very great, the girder conſiſts of a ſingle beam; when it is more than common, the baulk, or piece of wood out of which the girder is made, is ſawn down the middle, and the two pieces are reverſed and bolted. In great bearings the girder is framed like the principals of a roof, for the conſtruction of which we refer our reader to the article Carpentry, and *Naked* Flooring.

No girder ought to be leſs than ten inches in the wall, nor ought they, or any principal beam, to be placed over an aperture. They ought to be of the moſt hearty wood, and as free of knots as poſſible, for knots deſtroy the continuity of the fibres, and conſequently impair the ſtrength.

GIRDING-GIRT, in *Sea Language*. The ſeamen ſay a ſhip is *girt*, or hath a *girding-girt*, when her cable is ſo tight or ſtrained, that upon the running of the tide ſhe cannot go over it with her ſtern part, but will lie acroſs the tides.

GIRDLE, Cingulus, or *Zona*, a belt or band of leather, or other matter tied about the loins, to keep the part more firm and tight.

It was anciently the cuſtom for bankrupts, and other inſolvent debtors, to put off and ſurrender their girdle in open court. The reaſon was, that our anceſtors uſed to carry all the neceſſary utenſils, as purſe, keys, &c. tied to the girdle; whence the girdle became a ſymbol of the eſtate. Hiſtory relates, that the widow of Philip I. duke of Burgundy, renounced her right of ſucceſſion by putting off her girdle upon the duke's tomb. Accordingly the girdle amongſt the ancients was uſed for a purſe. Our Saviour forbids his apoſtles to carry money in their girdles, Matt. x. 9. Haggai, i. 6. Horace ſays, that he who has loſt his girdle (his money) is ready for any thing. "Ibit eó quo vis, qui zonam perdidit." Hor. Ep. l. ii. c. 1. The Romans always wore a girdle to tuck up the tunica, when they had occaſion to do any thing; this cuſtom was ſo general, that ſuch as went without girdles, and let their gowns hang looſe, were reputed idle, diſſolute perſons.

Girdle, *Maidens'* or *Virgins'*. It was the cuſtom among the Greeks and Romans for the huſband to untie his wife's girdle. Homer, lib. xi. of his Odyſſey, calls the girdle *παρθενιην ζωνην*, *maid's girdle*. Feſtus relates, that it was made of ſheep's wool, and that the huſband untied it in bed: he adds, that it was tied in the Herculanean knot; and that the huſband untied it, as a happy preſage of his having as many children as Hercules, who, at his death, left ſeventy behind him.

The poets attribute to Venus a particular kind of girdle, called *ceſtus*, to which they annexed a faculty of inſpiring the paſſion of love.

Girdle, *Quickſilver*, in *Medicine*, is a ſort of girdle ſmeared over with mercury, or having mercury incloſed within it.

It is made of leather, linen, cloth, cotton, ſtuff, or the like; and the mercury is prepared or killed various ways; as with faſting ſpittle, fat, or the like.

It is applied as a topical medicine about the waiſt, ſometimes with good effect; but frequently it proves dangerous, principally in weak conſtitutions, and thoſe ſubject to convulſions. Its intention is, the cure of the itch, driving away vermin, killing lice, &c.

Girdle, *Queen's*, is an ancient duty or tax, raiſed at Paris every three years, at the rate of three deniers upon each muid of wine, and ſix for each queue: it was intended for the maintenance of the queen's houſhold: afterwards they augmented and extended it to other commodities, as coals, &c.

Vigenere ſuppoſes it to have been originally thus called, becauſe the girdle anciently ſerved for a purſe; but he adds, that a like tax had been raiſed in Perſia, and under the ſame name, above two thouſand years ago; as appears from Plato, in his Alcibiades, Cicero, Athenæus, &c.

Girdle, *Chriſtians of the.* Motavackel, tenth caliph of the family of the Abaſſides, enjoined the Chriſtians and Jews, in the year of the Hegira 235, of Jeſus Chriſt 856, to wear a large leathern girdle, as a badge of their profeſſion; which they wear to this day throughout the Eaſt: from which time the Chriſtians of Aſia, and particularly thoſe of Syria and Meſopotamia, who are almoſt all Neſtorians or Jacobites, have been called "Chriſtians of the girdle."

Girdle, *Order of the,* the order of Cordeliers. See Cord and Cordelier.

Girdle, in *Architecture.* See Cincture.

Girdle, among *Jewellers,* the line which encompaſſes the ſtone parallel to the horizon; or, which determines the greateſt horizontal expanſion of the ſtones.

Girdle *Wheel,* a ſmall ſpinning-wheel, made for hanging to a woman's girdle or apron-ſtring, ſo that ſhe may ſpin with it though walking about.

Girdle, in *Mining,* is the name uſed in Cumberland, and ſome other counties, to denote the uncertain ſtrata, or chance beds, of ſtone and different ſubſtances that are met with in ſome diſtricts; which, inſtead of occupying the whole ſpace, of the ſame or nearly an equal thickneſs throughout, are only local, preſerving, however, conſtantly the ſame relative ſituation to the other ſtrata, wherever they appear; that is, they are peculiar to particular places in the ſeries of ſtrata, and ſeem, according to the numerous enquiries and obſervations which Mr. Farey, ſen. has made on theſe anomalous maſſes in the ſtratification, to be lenticular in their ſhape, always ending inſenſibly or with ſharp-edges on all ſides, like extremely flattened nodules; and, except in ſhape and ſize, and their rarity, he conjectures that they differ nothing from the nodules which are ſo very common in particular ſtrata, as of iron-ſtone in the binds and ſhales of moſt coal-fields, and in the grit-ſtones of ſome; thoſe of pyrites in many coal-ſeams, ſome of the nodules of flint in the upper chalk ſtrata, &c. &c. Particular ſtrata in the Britiſh ſeries are found to be ſubject to theſe chance beds, or ſtrata, within their maſs; ſome of which large nodular maſſes aſſume a confuſedly cryſtallized ſtructure, and ſeem to occaſion large hills and even mountainous tracts, as Charnwood Foreſt, in Leiceſterſhire, whoſe ſienite and ſlate, &c. have been referred, by the gentleman named above, to the anomalous maſſes of the red-ground or marle ſtrata. See Philoſophical Magazine, vol. xxxi. page 40.

GIRDLENESS, in *Geography,* a cape on the E. coaſt of Scotland. N. lat. 57° 4'. W. long. 2° 2'.

GIRELLI, Aguilar, in *Biography,* a female opera ſinger, who arrived here the ſame ſeaſon as Millier, in 1772. Her ſtyle of ſinging was good, but her voice was in decay, and her intonation frequently falſe, when ſhe arrived here; however, it was eaſy to imagine from what remained, that ſhe had been better. She remained here only one ſeaſon, and was ſucceeded by Miſs Cecilia Davies.

GIREST, in *Geography,* a town of Perſia, in Kerman; 100 miles E.N.E. of Gomron.

GIRET, a town of Perſia, in Mazanderan; 30 miles S. of Fehrabad.

GIRGASHITES, in *Scripture Geography.* See Gergasenes.

GIRGE, the capital of Upper Egypt, and the reſidence of the Bey, ſituated about 400 yards from the left bank of the Nile. This town is about a league in circumference, and has ſeveral moſques, bazars, and public ſquares; but it has no remarkable buildings nor ancient edifices, whence ſome have inferred that it is a modern building more eſpecially as Abulfeda does not mention it. The Bey lives in great ſtate, and continues in office three or four years, according to the pleaſure of the divan at Cairo. His ſoldiers commit innumerable outrages. The Copts are not allowed to have churches in that town; and therefore when they would join in divine ſervice, they are obliged to go to a convent ſituated on the other ſide of the Nile. The Franciſcans, who have a convent here, paſs for phyſicians, but they are frequently expoſed to danger from the inſolence of the Janizaries, the moſt refractory of whom are ſent hither from Cairo; 160 miles N. of Syené. N. lat. 26° 30'. E. long. 31° 52'.

GIRGENTI, or Agrigenti, a town of Sicily, near the S. coaſt of the valley of Mazara, erected near the ruins of the ancient *Agrigentum* (which ſee), and occupying only the ground on which the citadel of the ancient city ſtood; the ſee of a biſhop, ſituated on the river St. Blaiſe, about three miles from the ſea; 47 miles S. of Palermo. N. lat. 37° 22'. E. long. 13° 33'. Its ſituation on a mountain renders almoſt all the ſtreets impaſſable, not only for carriages but even for mules. The population of Girgenti falls far ſhort of that of the ancient Agrigentum, which Empedocles reckons at 800,000; whereas at preſent, reckoning the city, properly ſo called, which was the ancient caſtle, the ſuburb of Camico, and that built by Henry and Conſtance in the 12th century, it is reduced to 15,000 perſons, generally poor and of a melancholy appearance. The nobility here are poor, and live in great privacy; the merchants, wholly taken up with their own affairs, ſee nobody but at the exchange; without ſociety and without amuſements, every body is, or appears to be, gloomy and devout. The port of Girgenti, very different from the mole of the ancient Agrigentum, which was at the mouth of the Acragas, and of which not a ſingle trace is left, is ſubject to the ſame inconvenience with that of the harbours of Apulia and Calabria, which is that of being liable to be filled up equally by two oppoſite winds, *viz.* the ſouth-eaſterly and north-weſterly. The two piers erected to remedy this inconvenience having been found inſufficient, the government has been obliged, as at Cortona, to employ galley-ſlaves for emptying and cleanſing the entrance of this port; nor can their laborious work be abandoned on account of the importance of this harbour in the exportation of commodities from all the ſouthern part of Sicily; and the ſhelter it affords to the Neapolitan veſſels in the ſeas moſt expoſed to the Barbary corſairs, being almoſt within ſight of Africa. Near the mole are the admirable magazines of the "Caricatoria," the richeſt in Sicily, conſiſting of caverns or ciſterns cut out of the rock, in which the corn is preſerved without the leaſt injury. Theſe magazines belong to the king, and ſecure the ſubſiſtence of the iſland. Foreign merchants reſort hither to purchaſe the ſurplus, after reſerving enough for the home conſumption. The king is accountable for the corn lodged there, and the proprietors have only a ſmall ſum to pay for ſtore-houſe rent.

GIRGITES, a name uſed by ſome chemical writers for a ſort of white ſtones found in rivers, of which they make a peculiarly ſtrong lime. The ſtones are of the ſparry kind, worn into roundneſs by the motion of the water; and they have their name girgites, from the word *gir,* uſed by the chemiſts for lime.

GIRGITZA, in *Geography,* a town of Walachia; 40 miles N.N.E. of Buchareſt. N. lat. 45° 1'. E. long. 26° 19'.

GIRIA, a town of the iſland of Cephalonia; 16 miles W. of Cephalonia.

GIRKIN, among *Gardeners.* See Guerkin.

GIRLE, or Gyrle, among *Sportſmen,* denotes the roe-buck in its ſecond year.

GIRMANO, in *Geography*, a town of Pruſſia, in Samland; 25 miles N.W. of Konigſberg.

GIROMAGNY, a town of France, in the department of the Upper Rhine, and chief place of a canton, in the diſtrict of Befort. The place contains 1700, and the canton 9572 inhabitants, on a territory of 150 kiliometres, in 19 communes.

GIRON DE LOYASA, GARCIAS, in *Biography*, a learned Spaniſh prelate, who flouriſhed towards the cloſe of the 16th century, was born at Talavera. In the courſe of his ſtudies he had paid a marked attention to philoſophy and theology; to hiſtory and the councils, with which he became intimately converſant. He lived in a retired way as a canon, till his uncle reſigned to him the archdeaconry of Guadalajar, which is one of the dignitaries belonging to the church of that city. In 1585, Philip II., king of Spain, ſent for him to court, made him maſter of the royal chapel and almoner; and likewiſe entruſted to his care the education of his ſon Philip, infant of Spain. In 1596, Cardinal Albert aſſumed the government of the Low Countries, and appointed Giron his vicar-general over the archbiſhopric of Toledo; to which valuable ſee he was himſelf afterwards preferred. He died in 1599, and his death has been imputed to the chagrin which he felt for the neglect ſhewn him by his pupil, who had lately ſucceeded to the throne. He was author of a valuable collection of Spaniſh councils, under the title of "Collectio Conciliorum Hiſpaniæ, cum Notis et Emendationibus." Moreri.

GIRON, in *Geography*, town of Africa, on the Ivory coaſt.—Alſo, a town of S. America, in the province of Quito; 25 miles S. of Cuença.

GIRON, or *Guiron*, in *Heraldry*, denotes a triangular figure having a long ſharp point, not unlike a wedge, terminating in the centre of the eſcutcheon.

The word is French, and literally ſignifies the *geremium* or *lap*; becauſe, in ſitting, the knees being ſuppoſed ſomewhat aſunder, the two thighs, together with a line imagined to paſs from one knee to the other, form a figure ſomewhat ſimilar to this.

When a coat has ſix, eight, or ten of theſe girons, meeting or centering in the middle of the coat, it is ſaid to be *girroné* or *gironny*.

GIRONDE, in *Geography*, a river of France, formed by the union of the Garonne and Dordogne; 12 miles N. of Bourdeaux, which runs into the Atlantic, after a courſe of about 27 miles N. N. W.

GIRONDE, one of the nine departments of the ſouth-weſt, or Garonne region of France, deriving its name from the river Gironde. It is a maritime department, compoſed of a portion of Guienne, in N. lat. 44° 40′, and bounded on the N. E. by the department of the Lower Charente, on the E. by the departments of the Dordogne and Lot and Garonne, on the S. by the department of the Landes, and on the W. by the ſea. Its capital is Bourdeaux. This department contains 11,270 kiliometres, or about 537 ſquare leagues, and 519,685 inhabitants, and is divided into ſix diſtricts; *viz.* Blaye, comprehending 4 cantons, 61 communes, and 52,026 inhabitants; Libourne, including 9 cantons, 143 communes, and 102,576 inhabitants; La Reole, comprehending 6 cantons, 118 communes, and 53,705 inhabitants; Bazas, containing 7 cantons, 68 communes, and 47,549 inhabitants; Bourdeaux, comprehending 18 cantons, 153 communes, and 233,021 inhabitants; and Leſparre, containing 4 cantons, 37 communes, and 30,808 inhabitants. Its contributions amount to 5,853,053 francs, and the expences for adminiſtration, juſtice, and public inſtruction to 533,643 francs. The ſoil of this department is various: the eaſt and north-eaſt diſtricts are the moſt fertile. In the valley between Agen and Bourdeaux, the ſoil, though light, is of an excellent quality. The weſt and ſouth-weſt tracts are ſandy, marſhy, and barren, or indifferently fruitful. The products of the ſoil are grain, hemp, delicious wine and fruits, paſtures, conſiderable foreſts of pines, ſtone quarries, mineral ſprings, &c.

GIRONELLA, a town of Spain, in Catalonia; 7 miles E. N. E. of Solſona.

GIRONNE. See GERONA.

GIRONS, ST. a town of France, and principal place of a diſtrict, in the department of the Arriége; 21 miles W. of Taraſcon. N. lat. 42° 59′. E. long. 1° 13′. The place contains 2504, and the canton 14,983 inhabitants, on a territory of 287½ kiliometres, in 16 communes.

GIROST, a town of Perſia, in the province of Kerman; 125 miles S. of Sirjian.

GIRROCK, in *Ichthyology*, the common Engliſh name of the fiſh called the *Lacertus*, a large ſpecies of gar-fiſh, caught in the Mediterranean and Engliſh ſeas.

GIRRONNÉ, GIRONY, in *Heraldry*, is when a ſhield or coat is divided into ſeveral girons, which are alternately colour and metal.

When there are eight pieces, or girons, it is abſolutely ſaid to be *girronné*: when there are more, or fewer, the number is to be expreſſed: *girronné* of four, of fourteen, &c.

Some, inſtead of *girronné*, ſay, *parti*, *coupé*, *tranché*, and *taillé*, becauſe the girons are formed by ſuch diviſions of the field. Four girons form a ſaltier, and eight a croſs.

GIRT, in meaſuring timber, is uſed for the circumference of a tree. See *Coggleſhall's* SLIDING *rule* and DENDROMETER.

Some call the fourth part of the circumference the girt, and ſuppoſe the ſquare of this equal to the area of the ſection of the tree.

GIRT, in *Architecture*, the ſame with fillet. See FILLET.

GIRT, *girdle*, in *Sea Language*. See GIRDING-*girt*.

GIRT-*line* is a rope paſſing through a ſingle block, on the head of the lower maſts, to hoiſt up the rigging thereof: this is the firſt rope employed to rig a ſhip, and by means of this all the reſt are drawn up and fixed; after which it is removed till the ſhip is to be unrigged.

GIRTHS *of a Saddle*, the long ſtraps, made of a canvas ſtuff called girth-web, which being buckled under the horſe's belly, ſerve to fix the ſaddle.

GIRTIN, THOMAS, in *Biography*, a draftſman of uncommon capacity, who lately adorned our days, and if he had not been cut off by an early death, would probably have exhibited unrivalled talents in the peculiar branch of the art he adopted. He was born in 1775, and was one of thoſe who have contributed to raiſe almoſt a new ſpecies of art by the uſe of water-colours in landſcape painting. He drew with a ready hand, in a ſtyle entirely his own, and with great taſte and effect; though not always with a ſtrict adherence to truth. He died of conſumption, brought on by irregularity, at the early age of 27.

GIRU, in *Geography*, a town of Perſia, in the province of Mazanderan; 5 miles E. of Fehrabad.

GIRVAN, a ſea-port of Scotland, in the county of Ayr, ſituated at the mouth of the river Girvan, which riſes in the N. E. part of the county, and runs into the ſea a little below the town. It has a commodious harbour, capable of great improvement. The chief employment of this town, which is a burgh of barony, governed by bailies and counſellors, annually elected, is weaving of cotton and woollen cloths. In 1801 the number of inhabitants was 2260, of whom 1360 were employed in trade and manufactures. The neighbourhood abounds with limeſtone and coal; 21 miles S. S. W. of Ayr. N. lat. 55° 18′. W. long. 4° 44′.

GISARMS, or GUISARMES, in our *Old Writers*, an halbert or hand-ax: it comes from the Latin *lis arma*, becauſe it wounds on both ſides. Shene. "Eſt armorum genus longo manubrio et porrecta cuſpide." It is mentioned in the ſtatute 13 Edw. I. cap. 6.

GISBOROUGH, in *Geography*, a market town and pariſh in the North Riding of the county of York, is ſeated near the mouth of the river Tees, 8 miles from Stokeſley, and 248 from London. By the population returns, printed by order of parliament in 1801, this pariſh contained 383 houſes and 1719 inhabitants. In the time of king James I. ſome alum mines were diſcovered here, and were worked for ſeveral years with great ſucceſs. The bay at the mouth of the Tees forms a commodious harbour. In this town was formerly a ſpacious monaſtery, of which ſome conſiderable ruins remain. Here are a weekly market on Friday, and five annual fairs.

GISCALA, in *Scripture Geography*, a town of the tribe of Aſher, in Lower Galilee; S. E. of Jotapa.

GISEKIA, in *Botany*, named by Linnæus in honour of his pupil Dr. Paul Dietrick Giſeke, profeſſor of Natural Hiſtory at Hamburgh, and editor of the *Prælectiones in Ordines Naturales Plantarum*, compiled from his own notes and thoſe of Fabricius, taken from the mouth of Linnæus, and publiſhed by his leave. Linn. Mant. 554. Schreb. 207. Willd. Sp. Pl. v. 1. 1547. Mart. Mill. Dict. v. 2. Juſſ. 315. Lamarck Illuſtr. t. 221. (Kolreutera; Murr. Comm. Nov. Goett. v. 3. 67. t. 2. f. 1.)—Claſs and order, *Pentandria Pentagynia*. Nat. Ord. *Succulentæ*, Linn. *Portulaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of five ovate, concave, obtuſe, permanent leaves, with membranous edges. *Cor.* none. *Stam.* Filaments five, ſhort, awl-ſhaped, ovate at the baſe; anthers roundiſh. *Piſt.* Germen ſuperior, roundiſh, retuſe, deeply five-lobed; ſtyles five, ſhort, recurved; ſtigmas obtuſe. *Peric.* Capſules five, roundiſh, ſlightly compreſſed, rough, obtuſe, cloſe together, each of one cell. *Seeds* ſolitary, ovate, ſmooth.

Spec. Ch. Calyx of five leaves. Corolla none. Capſules five, approximated, roundiſh, ſingle-ſeeded.

1. G. *pharnacioides.* Linn. Mant. 562. Native of the Eaſt-Indies. A ſmooth annual herb, with the aſpect of an *Illecebrum* or *Pharnaceum*. The *ſtems* are proſtrate, a foot or two in length, furrowed along their upper ſide, alternately branched. *Leaves* oppoſite, ſtalked, obovate, entire, light green, rather fleſhy. *Flowers* ſmall, green, in little axillary umbels. *Fruit* blackiſh. On the ſhort axillary branches, the leaves, as Juſſieu well obſerves, are oppoſite. No other ſpecies has been diſcovered.

GISELO, in *Geography*, an iſland on the E. ſide of the gulf of Bothnia. N. lat. 61° 40′. E. long. 21° 22′.

GISGI, a town of Tranſilvania, near the Maros; 14 miles S. W. of Millenbach.

GISHI, a town of Georgia, in the province of Kaket; 115 miles S. E. of Teflis.

GISHUBEL, a town of Bohemia, in the circle of Konigingratz; 20 miles E. N. E. of Konigingratz.

GISING, a town and caſtle of Hungary; 14 miles S. W. of Steinam-Anger.

GISIO, a town of Sweden, in Angermannland, on the Gidea; 16 miles W. of Nordmalling.

GISLAVY, a town of Sweden, in the province of Smaland; 40 miles S. W. of Jonkioping.

GISON, or GHISON, in the *Jewiſh Antiquities*, a little wall about breaſt high, made round the temple properly ſo called, and the altar of burnt ſacrifices, to keep the people at a diſtance. Joſephus, in his Book of Antiquities, makes it to be three cubits high; and but one, in his Hiſtory of the Jewiſh war. Joſ. Antiq. lib. viii. cap. 2. p. 262. et de Bello Jud. lib. vi. p. 918. Calm. Dict. Bibl.

GISORS, in *Geography*, a town of France, in the department of the Eure, and chief place of a canton, in the diſtrict of Les Andelys; 27 miles N. E. of Evreux. The place contains 3500, and the canton 9496 inhabitants, on a territory of 147½ kiliometres, in 23 communes. N. lat. 49° 17′. E. long. 1° 50′.

GISSINGHEIM, a town of Germany, in the county of Wertheim; 15 miles S. of Wertheim.

GISTAIN, a town of Spain, in Arragon, ſituated on a brook in the Pyrenées, on the confines of France, having in its vicinity mines of cobalt; 15 miles N. of Ainſa.

GISTO, a ſmall iſland in the Adriatic. N. lat. 44° 36′. E. long. 14° 51′.

GISUND, a town of Norway, in the dioceſe of Drontheim; 44 miles N. W. of Drontheim.

GITHAGO, in *Botany*, a name uſed by ſome authors, particularly by Pliny, for the lolium or darnel-graſs.

GITI, in *Geography*, a town of Thibet; 234 miles N. E. of Delhi. N. lat. 32° 10′. E. long. 79° 36′.

GITPOUR, a town of Mocaumpour; 47 miles S. W. of Mocaumpour.

GITSCHIN, a town of Bohemia, in the circle of Konigingratz; 22 miles N. W. of Konigingratz. N. lat. 50° 23′. E. long. 15° 20′.

GITTITH. This word occurs frequently in the Pſalms, and is generally tranſlated *wine-preſſes*. The conjectures of interpreters are various concerning this word gittith. Some think it ſignifies a ſort of muſical inſtrument; others, that the Pſalms, with this title, were ſung after the vintage; laſtly, others, that the hymns of this kind were invented in the city of Gath. Calmet is rather of opinion, that it was given to the claſs of young women, or ſongſtreſſes of Gath, to be ſung by them. (Pſ. viii. 1. lxxxi. 1. lxxxiv. 1.) Dr. Hammond thinks that the Pſalms, with this title, were all ſet to the ſame tune, and made on Goliah the Gittite.

GIVA, in *Geography*, a town of Aſiatic Turkey, in Natolia; 32 miles S. E. of Milets.

GIVANIROTONDO, a town of Naples, in Capitanata; 9 miles W. of Monte St. Angelo.

GIUDEL, a ſmall iſland, near the ſouth coaſt of Sardinia. N. lat. 39° 1′. E. long. 9° 3′.

GIUDUCCA, LA, or ZUECCA, one of the iſlands adjoining to the city of Venice, which is ſaid to owe its name to the Jews, who formerly reſided there. It contains 10 churches, 4 monaſteries, and as many nunneries.

GIVEN, DATUM, a term very frequently uſed in *Mathematics*, ſignifying a thing which is ſuppoſed to be known.

Thus, if a magnitude be known, or we can find another equal to it, we ſay, it is a given magnitude, or that ſuch a thing is given in magnitude.

If the poſition of any thing be ſuppoſed as known, we ſay, given in poſition.

Thus, if a circle be actually deſcribed on a plane, its centre is given in poſition, its circumference given in magnitude, and the circle is given both in poſition and magnitude.

A circle may be given in magnitude only; as when only its diameter is given, and the circle not actually deſcribed.

If the kind or ſpecies of any figure be given, they ſay, given in ſpecie. If a ratio between any two quantities is known, they are ſaid to be given in proportion. See DATA.

GIVET, in *Geography*, a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Rocroy; 15 miles N. E. of Rocroy. N. lat. 50° 7′.

E. long. 4° 51′. The place contains 3533, and the canton 8445 inhabitants, on a territory of 130 kiliometres, in 20 communes.

GIUF, La, a diſtrict of Arabia, in the province of Nedsjed; E. of mount Ramleah.

GIULA, a town of Hungary, ſituated on the river Keres; 52 miles N. N. W. of Temeſwar. N. lat. 46° 35′. E. long. 20° 55′.

GIULAB, a town of Aſiatic Turkey, in the government of Diarbekir; 18 miles N. N. E. of Ourfa.

GIULENEI, a ſmall iſland in the Caſpian ſea; 130 miles S. of Aſtrachan. N. lat. 44° 15′. E. long. 47° 49′.

GIULIA Nuova, a town of Naples, in Abruzzo Ultra, on the coaſt of the Adriatic; 12 miles E. N. E. of Teramo.

Giulia, *St.* a town of France, in the department of the Stura; 12 miles S.S.W. of Acqui.

GIULIANO, St. a mountain of Etruria, near Piſa, at the foot of which are warm baths, known in the time of Pliny.—Alſo, a town of Naples, in Capitanata; 9 miles W.S.W. of Dragonera.—Alſo, a town of Naples, in the county of Moliſe; 13 miles S.S.E. of Moliſe.—Alſo, a town of Naples, in the province of Otranto; 17 miles S.S.W. of Brindiſi.—Alſo, a town of Italy, in the department of the Olona; 7 miles S.E. of Milan.

GIVORS, a town of France, in the department of the Rhone, and chief place of a canton, in the diſtrict of Lyons; 12 miles S. of Lyons. The place contains 3200, and the canton 10,590 inhabitants, on a territory of 90 kiliometres, in 10 communes.

GIVRY, a town of France, in the department of the Saone and Loire, and chief place of a canton, in the diſtrict of Chalons-ſur-Saone; 4 miles W. of it. N. lat. 46° 47′. E. long. 4° 50′. The place contains 2582, and the canton 11,405 inhabitants, on a territory of 132½ kiliometres, in 13 communes.

GIUSEPPE Aprile. See Tenducci.

Giuseppe Arena, in *Biography*, an able compoſer of Naples, whoſe ſtyle had much of the brilliancy of that ſchool. In 1741 he ſet the ſerious drama of Tigrane, written by Goldoni, to muſic, for the great theatre of St. John Chryſoſtom, at Venice, which eſtabliſhed his character.

GIUSMARK, in *Geography*, a town of Curdiſtan; 80 miles S.S.E. of Betlis.

GIUSTENDIL, a town of European Turkey, in Bulgaria; 24 miles S. of Sophia.

GIUSTINELLI, in *Biography*, a ſecond-rate Italian ſinger in ſoprano, arrived here, in 1762, with De Amicis and her family, as firſt ſerious man in the burletta operas. He had a good voice, and ſufficient merit to ſupply the place of ſecond man on our ſtage, in the ſerious operas, for ſeveral years after.

GIUSTINIANI, Augustin, was born at Genoa in 1470, was educated for the church, and in 1514 was made biſhop of Nebbio in Corſica. He publiſhed, in 1516, a Pſalter in four languages, *viz.* the Hebrew, Greek, Arabic, and Chaldee, with interpretations: this was the firſt of the Polyglott editions of the books of ſcripture. After this, he was invited by Francis I. to Paris, and appointed to the profeſſorſhip of the Oriental languages in that univerſity, an office which he held about five years. During this period he received a penſion from the crown, and was enabled to collect a very choice library, which he afterwards preſented to the republic of Genoa. In the year 1536, in paſſing by ſea to his biſhopric, he was loſt with his ſhip. This prelate reviſed and edited the treatiſe written by Porchetti, entitled "Victoria adverſus impios Judæos." Some time after his death, were publiſhed his "Annals of the Republic of Genoa," from the foundation of the city, to the year 1528: this work is highly eſteemed for its information, and for the veracity of the facts. Moreri.

Giustiniani, Bernard, a Venetian nobleman, born in 1408, was educated under the moſt learned perſons of his time, and obtained a high celebrity for his own knowledge and eloquence. He was employed on ſeveral honourable occaſions by the republic. In 1451 he was appointed to receive the emperor Frederic III. when he paſſed through the Venetian territories. He was afterwards ſelected as a fit perſon to be ſent on embaſſies to Ferdinand, king of Naples, to ſeveral of the popes, and to Lewis XI. king of France, who honoured him with knighthood. In 1467 he was made captain commandant of Padua, and admitted to almoſt all the honours of the ſtate, and finally procurator of St. Mark. He died in 1489. He was author of many works: as public orations: the life of his uncle "The bleſſed Lorenzo Giuſtiniani;" three pieces on the life, the tranſlation, and the appearance of St. Mark: a verſion of the book of Socrates to Nicocles: ſome Latin letters of his father Leonardo; and the ancient hiſtory of Venice, written in Latin. This laſt was tranſlated into Italian by Lodov. Domenichi. It was the work of his old age, but is highly eſteemed, becauſe the authorities are drawn from the beſt ſources, and the author rejects the fables handed down by ſome other writers. Moreri.

GIZE', Gizah, or *Jiza*, in *Geography*, a conſiderable town of Egypt, extending along the weſt bank of the Nile, on the other ſide of the iſland of Roudda, or Raonda, with reſpect to Cairo; 3 miles S. W. of Cairo. This town was fortified by Iſmail Bey, who alſo built a palace there, completed and ſince inhabited by Murad Bey, who has eſtabliſhed a cannon foundery. Here is alſo a manufacture of ſal ammoniac. The walls of Gizé are of great extent, and have only one gate to the country; they are ten feet high, three feet thick, and have ſix half-moons; but are only fit to reſiſt cavalry, the original intention in raiſing them. Murad Bey has ſuffered the iron-work about the loop-holes to be plundered or ruined. The palace is in the ſouthern quarter of the city, cloſe to the water; it has numerous apartments for the Mamlûks, and every convenience for eaſe or luxury. Murad Bey has, of late years, thought it neceſſary to inſtitute a marine; having purchaſed ſome veſſels of the Europeans, and built three or four others. The largeſt of theſe veſſels carries 24 guns: thoſe that are occaſionally moored before Gizé cannot be navigated hence, except during the time of the Nile's increaſe. The mariners are chiefly Greeks of the Archipelago. Not far ſouth of Gizé is "Geziret-el-dahab," a ſmall iſland, which Diodorus Siculus denominated "Venus Aurea." N. E. of the city are gardens, and ſome ſpacious houſes, occupied by the affluent and great, who occaſionally leave the city to amuſe themſelves in this retreat; and they have there an open ſpace where the Mamlûks perform their military evolutions, and exerciſe their horſes. The ground under the mountains to the eaſt is filled with tombs. The mountain is of white ſand and calcareous ſtone, and deſtitute of verdure. The numerous date-trees by which Gizé is ſurrounded, interſperſed with the lofty turrets of the moſques, and the river, whoſe waves waſh the very foundation of the houſes, give it, at a diſtance, a very pleaſing aſpect. Dr. Shaw is of opinion, that the ancient Memphis ſtood on the ſcite of Gizé; but this is diſputed by Savary and others. (See Memphis.) This is the neareſt ſpot, ſays Sonnini, to the moſt valuable monuments which ancient Egypt has left behind of her glory and her power. The neareſt pyramids are at the diſtance of three leagues, and they are indiſcriminately called the "Pillars of Memphis," or the "Pillars of Gizé." This town was taken from the French by the Britiſh in June, 1801. Browne's Travels in Africa; Savary's Letters on Egypt, vol. i. Sonnini's Travels in Upper and Lower Egypt.

GIZIGINSKAIA, a gulf at the N. W. extremity of the Peninſkoi ſea, extending about 50 miles in length, and 16 in breadth. N. lat. 67° to 68°. E. long. 160° 14'.

GIZZARD *of* BIRDS. See *Anatomy of* BIRDS.

GIZZIELLO, GIOACHINO, CONTI, in *Biography*, one of the greateſt Italian ſingers of the laſt century, arrived in England in 1736, as Handel's firſt ſinger, at the time that he had quitted the Royal Academy in the Haymarket, upon a quarrel with Seneſino, and ſet up for himſelf at the new theatre in Covent Garden. The nobility and gentry who ſeem to have abetted Seneſino, engaged for the opera in the Haymarket Porpora as a compoſer, and Farinelli, Cuzzoni, and a complete company of vocal and inſtrumental performers to oppoſe him. Handel, May 5th, opened his ſummer campaign with the revival of "Ariodante," an opera of the preceding year.

The next day the following eulogium on his new ſinger was inſerted in the Daily Poſt: "laſt night Signor Gioachino Conti Gizziello, who made his firſt appearance in the opera of "Ariodante," met with an uncommon reception; and in juſtice both to his voice and judgment, he may be truly eſteemed one of the beſt performers in this kingdom." Neither his friends nor the friends of Handel could venture to ſay more, while Farinelli was in the kingdom. Conti was at this time a young ſinger, more of promiſing, than mature abilities; and ſo modeſt and diffident, that when he firſt heard Farinelli, at a private rehearſal, he burſt into tears, and fainted away with deſpondency. He had his cognomen of Gizziello from his maſter Gizzi, once an eminent ſtage ſinger, who, in his old age, became an excellent maſter.

The next opera in which Conti appeared, was "Atalanta," compoſed as an epithalamium on the marriage of his royal highneſs Frederic prince of Wales, with her ſerene highneſs the princeſs of Saxe-Gotha.

The ſongs in "Atalanta," which Handel compoſed expreſsly for his new ſinger, Conti, ſeem, upon examination, to have been written in his new, graceful, and pathetic ſtyle of ſinging. The baſs and accompaniments, too, are of a modern caſt, and, except the cloſes and two or three of the diviſions, the whole ſeems of the preſent age.

Handel, never till now, had a firſt man to write for with ſo high a ſoprano voice. Nicolini, Seneſino, and Cereſtini, were all contraltos. There was often dignity and ſpirit in their ſtyle; but Conti had delicacy and tenderneſs, with the accumulated refinements of near thirty years, from the time of Handel's firſt tour to Italy. We think it is not difficult to diſcover, particularly in the firſt act, that in compoſing Conti's part in this opera, he modelled his melody to the ſchool of his new ſinger. Indeed, Handel was always remarkably judicious in writing to the taſte and talents of his performers in diſplaying excellence, and covering imperfections.

While Conti was his firſt male ſinger, and the Strada his firſt woman, he revived his opera of "Alcina and Faramond," and compoſed his part in the opera of "Arminio," expreſsly to diſplay his peculiar talents; in the airs of which it ſeems as if Handel had more baſſes and accompaniments in iterated notes, than in any preceding work.

He was advancing rapidly in the modern ſtyle of opera ſongs when he quitted the ſtage, and retreated back to a more ſolemn and ſolid ſtyle for the church.

It is chiefly in writing for Conti and Anibali that the conformity to a different ſtyle from his own appears.

DOMENICO ANNIBALI, who ſhould have had an article in the letter A, had he been remembered, ſhall be characterized here, in apology for the omiſſion. His firſt air in the opera of "Arminio," in which he performed with Conti and the Strada, diſcovers his voice to have been a contralto, which Handel gave him an opportunity to diſplay by a ſwell, *ad libitum*, at the beginning; but no peculiar taſte, expreſſion, or powers of execution, appear in his part; his bravura air in the ſecond act, *Sì cadrò*, contains only common and eaſy paſſages. His abilities during his ſtay in England ſeem to have made no deep impreſſion, as we never remember him to have been mentioned by thoſe who conſtantly attended the operas of thoſe times, and were rapturiſts in ſpeaking of the pleaſure which they had received from ſingers of the firſt claſs. But to return to Conti, who, after he quitted England, ſtudied with ſuch diligence, that being engaged at Madrid to ſing in the operas under the direction of Farinelli, he turned the tables on that wonderful ſinger, in whom it has been ſaid, that he excited envy by his new and refined taſte and pathos.

He was one of the conſtellation of great ſingers which the king of Portugal had aſſembled together in 1755.

There were, according to Paccheirotte's account, Eliſi, Manzoli, Caffarelli, Gizziello, Veroli, Babbi, Luciani, Raaf, Raina, and Guadagni. No females were then allowed to appear on the opera ſtage in Portugal. Gizziello, narrowly eſcaping with his life during the dreadful earthquake which happened at Liſbon that year, was impreſſed with ſuch a religious turn by that tremendous calamity, that he retreated to a monaſtery, where he ended his days. It was ſoon after this event, that Guadagni ſhut himſelf up in the ſame convent not ſo much for ſpiritual conſolation as muſical counſel; which he ſo effectually obtained from the friendſhip of Gizziello, that from a young and wild ſinger of the ſecond and third claſs, he became, in many reſpects, the firſt ſinger of his time.

GLABALK, in *Geography*, a town of France, in the department of the Dyle, and chief place of a canton, in the diſtrict of Louvain. The place contains 239, and the canton 6771 inhabitants, on a territory of 120 kiliometres, in 19 communes.

GLABELLA, in *Anatomy*, from *glaber*, *ſmooth*; the ſpace between the two eye-brows, which is ordinarily not covered with hairs.

GLABER, in *Biography*, a Benedictine monk, who flouriſhed in the 11th century, and who has rendered his name memorable by a "Chronicle or Hiſtory of France," written in the Latin language. It conſiſts of five books, of which the firſt relates to the events of the monarchy previouſly to Hugh Capet, and the four ſubſequent ones to thoſe following it, as far down as the year 1046. This work is defective as a compoſition, and, at the ſame time, full of fabulous ſtories, yet it contains much valuable information relative to thoſe remote ages. He was author of a life of William, abbot of St. Benignus at Dijon. Moreri.

GLABRARIA, in *Botany*, ſo denominated by Linnæus, on account of the ſmooth, ſhining, ſilky appearance of its wood. Linn. Mant. 156. Schreb. 515. Willd. Sp. Pl. v. 3. 1433. Mart. Mill. Dict. v. 2. Juſſ. 433. Lamark, Illuſtr. t. 640. Claſs and order, *Monadelphia Polyandria*. Nat. Ord. "uncertain; perhaps akin to *Styrax*." Juſſ. Rather *Malvaceæ*, near *Durio*.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular half as long as the corolla, cut half way down into five equal, obtuſe, broadiſh teeth. *Cor.* Petals five, lanceolate, obtuſe, equal. Nectary ſurrounding the germen, and conſiſting of five awl-ſhaped, erect, coloured bodies, the length of the calyx. *Stam.* Filaments thirty, capillary, the length of the calyx, united by their baſe into five parcels of ſix filaments each, ranged alternately with the nectaries; anthers kidney-ſhaped. *Piſt.* Germen ſuperior, nearly globular, four-lobed; ſtyle thread-ſhaped, as long as the ſtamens; ſtigma ſimple. *Peric.* according to Rumphius, a mucilaginous *drupa,* of one cell, containing a hard oval *nut.*

Eſſ. Ch. Calyx tubular, five-cleft. Petals five. Nectary of five briſtles, alternate with the parcels of ſtamens. Style one. Stamens thirty, in five parcels. Drupa.

1. G. *terſa.* Linn. Mant. 276. (Lignum læve minus; Rumph. Amb. v. 3. 71. t. 44.) Native of the lofty and cloſe woods of Amboyna. Rumphius deſcribes and figures two kinds of his *Lignum læve,* very ſimilar to each other, nor does it appear on what authority Linnæus adopted one as a ſynonym in preference to the other. The ſpecimens in his herbarium have ſlender leafy *branches,* with a ſmooth greyiſh bark. *Leaves* alternate, on ſhort thick ſtalks, ovato-lanceolate, pointed, entire, three or four inches long, veiny; ſmooth and ſhining above; pale grey beneath, as if hoary, but they are rather clothed with a ſilvery ſcaly ſkin, minutely dotted all over, which ſoon leaves the rib and veins. *Stipulas* none. *Flower-ſtalks* axillary and terminal, branched irregularly, the partial ones ſomewhat umbellate, all clothed, as well as the calyx, with minute umbilicated ruſty ſcales, exactly like thoſe on the leaves and ſtalks of the *Durio;* ſee that article. The *flowers* are ſmall. *Fruit,* according to Rumphius, an aromatic black *drupa,* the ſize of a pea, ſtanding on the permanent calyx.

If the *Durio* belongs to *Malvaceæ,* we are perſuaded this genus muſt likewiſe be placed in that order, but otherwiſe we ſhould have had no ſuch idea, nor does the fruit confirm it. The light fibrous ſilky nature of the wood, which while wet is cloſe, but has large fiſſures when expoſed to the ſun, favours our ſuppoſition.

GLACIALIS, Icy, of *glacies, ice,* ſomething relating to ice; and particularly a place that abounds in ice.

Thus we ſay, the *Mare Glaciale,* or *Congelatum,* that is, the Icy or Frozen ſea; called alſo the Chronian or Sarmatian ſea.

GLACIERS, a denomination applied to large ſheets or fields of ice among the Alps, and which are numerous in Switzerland and Savoy. Of theſe there are five, that ſtretch towards the plain of Chamouny, and unite at the foot of Mont Blanc; they are called Tacona, Boſſons, Montanvert, Argentiere, and Tour. The origin of theſe glaciers, extending into fields of corn and paſture, and lying, without being melted, in a ſituation where the heat of the ſun is powerful enough to bring vegetation to maturity, is a very curious ſubject of inveſtigation. Mr. Coxe has given us an abſtract of the theory of Gruner, with regard to their formation, and other particulars reſpecting them, confirmed and amended by that able naturaliſt Sauſſure; which appears, upon the whole, to be the moſt ſimple and natural. If a perſon, ſays this intereſting traveller, could be conveyed to ſuch an elevation as to embrace, at one view, the Alps of Switzerland, Savoy, and Dauphiné, he would behold a vaſt chaos of mountains, interſected by numerous vallies, and compoſed of many parallel chains, the higheſt occupying the centre, and the others gradually diminiſhing in proportion to their diſtance. The moſt elevated, or central chain, would appear briſtled with pointed rocks, and covered, even in ſummer, with ice and ſnow, in all parts that are not perpendicular. On each ſide of this chain he would diſcover deep vallies clothed with verdure, peopled with innumerable villages, and watered by many rivers. In conſidering theſe objects with greater attention, he would remark, that the central chain is compoſed of elevated peaks and diverging ridges, whoſe ſummits are overſpread with ſnow; that the declivities of the peaks and ridges, excepting thoſe parts that are extremely ſteep, are covered with ſnow and ice, and that the intermediate depths and ſpaces between are filled with immenſe fields of ice, terminating in thoſe cultivated vallies which border the great chain. In purſuing this general ſurvey, and moreover obſerving that the branches moſt contiguous to the central chain would preſent the ſame phenomena, only in a leſſer degree; the glaciers would be obviouſly divided into two ſorts; the firſt occupying the deep vallies ſituated in the boſom of the Alps, and termed by the natives "Vallées de Glace," diſtinguiſhed by Mr. Coxe by the name of "Lower Glaciers;" the ſecond, which clothe ſummits and ſides of the mountains, are denominated "Upper Glaciers." The former are much the moſt conſiderable in extent and depth. Some ſtretch ſeveral leagues; that of Des Bois in particular is more than 15 miles long, and above three in its greateſt breadth. Theſe lower glaciers do not communicate with one another, and few of them are parallel to the central chain. They moſtly ſtretch in a tranſverſe direction, being bordered at the higher extremity by inacceſſible rocks, and on the other extending into the cultivated vallies. Sauſſure found the general depth of the ice in the glacier des Bois from 80 to 100 feet; but there is reaſon to believe that its thickneſs in ſome places exceeds even 600 feet. Theſe immenſe fields of ice uſually reſt on an inclined plane; being puſhed forwards by the preſſure of their own weight, and weakly ſupported by the rugged rocks beneath, they are interſected by large tranſverſe chaſms, and preſent the appearance of walls, pyramids, and other fantaſtic ſhapes, obſerved at all heights and in all ſituations, wherever the declivity exceeds 30 or 40 degrees. But in thoſe parts, where the plane on which they reſt is nearly horizontal, or gently inclined, the ſurface of the ice is nearly uniform; the chaſms are few and narrow, and they are croſſed without much difficulty. The ſurface of the ice is leſs ſlippery than that of ponds or rivers; it is rough and granulated, and only dangerous to thoſe who paſs it in ſteep deſcents. It is not tranſparent, is very porous, and full of ſmall bubbles, and is of courſe leſs compact than common ice. Its perfect reſemblance to the congelation of ſnow impregnated with water, in opacity, roughneſs, and the number as well as ſmallneſs of the air-bubbles, led Sauſſure to conceive the following ſimple and natural theory concerning the formation of the glaciers. An immenſe quantity of ſnow continually accumulates in the elevated vallies encloſed within the Alps, as well from that which falls from the clouds during nine months in the year, as from the maſſes inceſſantly rolling from the ſteep ſides of the circumjacent mountains. Part of this ſnow, not diſſolved during ſummer, impregnated with rain and ſnow-water, is frozen during winter, and forms that opaque and porous ice of which the "Lower Glaciers" are compoſed. The "Upper Glaciers" may be ſubdivided into thoſe which cover the ſummits, and thoſe which extend along the ſides of the Alps. The former owe their origin to the ſnow that falls at all ſeaſons of the year, and which remains nearly in its primitive ſtate, being congealed into a hard ſubſtance, and not converted into ice. The ſubſtance which clothes the ſides of the Alps is neither pure ſnow, like that of the ſummits, nor ice which forms the Lower Glaciers, but an aſſemblage of both. It contains leſs ſnow than the ſummits, becauſe the ſummer heat has more power to diſſolve it, and becauſe the liquefied ſnow deſcending from above, the maſs abſorbs a larger quantity of water. It contains more ſnow than the Lower Glaciers, becauſe the diſſolution of the ſnow is comparatively leſs. Hence the ice is even more porous, opaque, leſs compact than that of the Lower Glaciers, and of ſo doubtful a texture, as renders it, in many parts, difficult to decide, whether it may be called ice or frozen ſnow. In a word, there is a regular gradation from the ſnow on the ſummits to the ice of the Lower Glaciers, formed by the intermediate mixture, which becomes more compact and leſs porous in proportion as it approaches the Lower Glaciers, until it unites and aſſimilates with them. And it is evident, that the greater or leſſer degree of denſity is derived from the greater or leſſer quantity of water, with which the maſs is impregnated.

It has been a conteſted point among naturaliſts, whether the glaciers are in a ſtate of increaſe or diminution. The following obſervations may be alleged in proof of the latter alternative. In 1785, the inferior glacier of Grindelwald was diminiſhed at leaſt 400 yards ſince the year 1776; in the valley of Chamouny, the glaciers called "les murailles de glace," from their reſemblance to walls, and which riſe in very thick, ſolid, parallel ranges to a height of 150, or, as ſome ſay, 400 feet above their real baſe, and forming the border of the glacier of Boſſon, no longer exiſted, and young trees had ſhot up in the parts which were then covered by the glaciers of Montanvert. The advocates for the increaſe of the glaciers, notwithſtanding theſe facts, applicable, as they ſay, to the lower regions, aſſert, both from theory and obſervation, that more ſnow falls, and more ice is annually formed in the Alps than can be annually diſſolved. From theory they argue, that the cold occaſioned by the maſs of ice already formed ought to augment it ſtill further: and from experience they deduce, that within the remembrance of the preſent generation, many mountains have been covered, many paſtures and habitations invaded, and many paſſages irrecoverably obſtructed by the ice. In reply to the argument from theory it is maintained, that the cauſes which lead to the diminution of the ice are no leſs powerful than the augmentation of the cold, which is ſuppoſed to occaſion its indefinite increaſe. Theſe cauſes are principally rain and ſleet in the leſs elevated regions, evaporation, deſcent of the ſnow and ice, both precipitous and gradual, heat of the atmoſphere, and mean temperature of the earth, which is always above the freezing point, as is evident from the heat of the ſprings which iſſue from the bowels of the earth. With regard to the argument derived from experience, it is thought ſufficient to obſerve, that while the facts that prove the progreſs of the ice are admitted, it by no means ſeems to follow, that its maſs is perpetually increaſing. For the advocates of this opinion, while they ſcrupulouſly enumerate the places which have been invaded by the ice, do not take notice of thoſe parts, no leſs numerous, from which the ice has receded. Upon the whole we have reaſon to conclude, that if the collection of ice and ſnow gains in ſome places, it is diminiſhed in others, and that, upon an average, the aggregate quantity is nearly the ſame. Coxe's Travels in Switzerland, vol. ii.

GLACIES MARIÆ. See SPECULARIS *Lapis*.

GLACIS, in *Building*, an eaſy inſenſible ſlope or declivity. The deſcent or inclination of the glacis is leſs ſteep than that of the talut. In gardening a deſcent ſometimes begins in talut, and ends in glacis.

The glacis of the corniche is an eaſy imperceptible ſlope in the cymatium of the corniche, to promote the deſcent and draining off of the rain-water.

GLACIS, in *Fortification*, is particularly uſed for that of the counterſcarp, being a ſloping bank, which reaches from the parapet of the counterſcarp, or covert-way, to the level ſide of the field, at the diſtance of about twenty fathom.

The conſtruction of the covert-way and glacis is more diſtinctly illuſtrated in *Plate* V. *Fortification*, *fig.* 6. When the body of the place, and all the neceſſary out-works are conſtructed, lines are drawn parallel to the outermoſt counterſcarps of the ditches, at ſix toiſes diſtant from it; and the ſpace *m n m n*, included between that line and the counterſcarp, will be the covert-way required. If lines are drawn parallel to the lines which terminate the covert-way, and the places of arms *m*, *m*, &c. at twenty toiſes diſtant from them, the ſpace *x x x* between theſe lines will be the glacis. A, in this figure, repreſents the arrow; B, the detached redoubt; *v*, *v*, the traverſes; *z*, *z*, the ſally-ports. When the ground is low, and water to be found, there is often a ditch of about ten or twelve toiſes made round the glacis; beyond which there is a ſecond covert-way of four toiſes, with traverſes and places of arms, and a ſecond glacis from fifteen to eighteen toiſes broad. Muller's Fort p. 42. See *Military* CONSTRUCTION.

GLADBACK, or GLADBACH, in *Geography*, a town of Germany, in the circle of Weſtphalia, and duchy of Juliers; 16 miles N. of Juliers. N. lat. 51° 14′. E. long. 6° 15′.

GLADDON, or GLADWIN, the name of a plant, otherwiſe called ſpurge-wort.

GLADE, in *Agriculture*, *Gardening*, &c. a viſta, or open and light paſſage made through a thick wood, grove, or the like, by lopping off the branches of trees along the way.

GLADE, in *Zoology*. See GLEAD.

GLADENBACH, in *Geography*, a town of Germany, in the principality of Upper Heſſe; 12 miles N. of Gieſſen.

GLADIATORS, in *Antiquity*, perſons who were retained to fight ordinarily in the arena, for the entertainment of the people.

The gladiators were uſually ſlaves, and condemned criminals, who fought from neceſſity; though, ſometimes, freemen made profeſſion of this practice, like our prize-fighters, for a livelihood. After a ſlave had ſerved on the arena three years, he was diſmiſſed.

The Romans borrowed this cruel diverſion from the Aſiatics: ſome ſuppoſe that there was policy in this practice, the frequent combats of gladiators tending to accuſtom the people to deſpiſe danger and death.

The origin of ſuch combats ſeems to be as follows: From the earlieſt times with which we have any acquaintance with profane hiſtory, it had been the cuſtom to ſacrifice captives, or priſoners of war, to the manes of the great men who had died in the engagement; thus Achilles, in the Iliad, lib. xxiii. ſacrifices twelve young Trojans to the manes of Patroclus; and in Virgil, lib. xi. ver. 81. Æneas ſends captives to Evander, to be ſacrificed at the funeral of his ſon Pallas.

In courſe of time they came alſo to ſacrifice ſlaves at the funerals of all perſons of condition; this was even eſteemed a neceſſary part of the ceremony; but, as it would have appeared barbarous to have maſſacred them like beaſts, they were appointed to fight with each other, and endeavour to ſave their own lives by killing their adverſaries. This ſeemed ſomewhat leſs inhuman, becauſe there was a poſſibility of avoiding death by an exertion of ſkill and courage.

This occaſioned the profeſſion of gladiator to become an art; hence aroſe maſters of arms, and men learned to fight and exerciſe this art.

Theſe maſters, whom the Latins called *laniſtæ*, bought ſlaves to be trained up to this cruel trade, whom they afterwards ſold to ſuch as had occaſion to preſent the people with ſo horrible a ſhow.

They were at firſt performed near the ſepulchre of the deceaſed, or about the funeral pile, but were afterwards removed to the circus and amphitheatres, and became ordinary amuſements. See Bustuarii.

The firſt ſhow of gladiators, called *munus gladiatorum*, was exhibited at Rome, according to Valerius Maximus, by M. and D. Brutus, upon the death of their father, in the year of the city 488; though Livy (ix. 40.) ſpeaks of it in the 444th year of Rome, as practiſed among the Campanians. On the exhibition by M. and D. Brutus, there were probably only three pairs of gladiators: in the year of Rome 537, the three ſons of M Emilius Lepidus the augur, who had been three times conſul, entertained the people with the cruel pleaſure of ſeeing twenty-two gladiators fight in the forum; and the ſhow continued three days. In the year of Rome 547, the firſt Africanus diverted his army at New Carthage with a ſhow of gladiators, which he exhibited in honour of his father and uncle, who had begun the reduction of Spain. In the 552d year the ſons of M. Valerius Lævinus exhibited 25 pairs of gladiators; and in 569, 70, and in 578, 74 fought on the like occaſion. In proceſs of time, the Romans became ſo fond of theſe bloody entertainments, that not only the heir of any great and rich citizen lately deceaſed, but all the principal magiſtrates, preſented the people with ſhows of this nature, to procure their affection. The ædiles, pretors, conſuls, and, above all, the candidates for offices, made their court to the people, by entertaining them frequently with theſe fights: and the prieſts were ſometimes the exhibitors of the barbarous ſhows; for we meet with the *ludi pontificales* in Suetonius, Auguſt cap. 44. and with the *ludi ſacerdotales*, in Pliny, Epiſt. lib. vii. As for the emperors, it was ſo much their intereſt to ingratiate themſelves with the populace, that they obliged them with combats of gladiators almoſt upon all occaſions, and as theſe increaſed, the number of combatants increaſed likewiſe. Accordingly, Julius Cæſar, in his ædileſhip, diverted the people with three hundred and twenty couple. Gordian, before he was emperor, gave theſe ſhows twelve times in a year. In ſome of theſe there were 500 pairs of gladiators, and never leſs than 50.

Germanicus and Claudius, both ſons of Druſus, gave combats of gladiators in honour of their father. Nero's and Domitian's combats of gladiators are noticed in the ſequel of this article. Otho employed 2000 gladiators in the war againſt Vitellius (A.D. 69), and Vitellius hired gladiators to fight in all the ſtreets of Rome for the amuſement of the people. The inhuman fights of gladiators, though long authorized by cuſtom, afforded no pleaſure to Veſpaſian. Titus, however, exhibited a ſhow of gladiators, wild beaſts, and repreſentations of ſea-fights, which laſted a hundred days; and Trajan continued a ſolemnity of this nature for a hundred and twenty-three days, during which time he brought out ten thouſand gladiators. And Adrian, on his firſt viſit to Rome, after his promotion to the empire, gave combats of gladiators for ſix days ſucceſſively. Before this time, under the republic, the number of gladiators was ſo great, that when the conſpiracy of Catiline broke out, the ſenate ordered them to be diſperſed into the garriſon and ſecured, leſt they ſhould have joined the diſaffected party. See Gladiators' *War*.

Theſe ſports were become ſo common, and their conſequences, in a variety of reſpects, ſo dangerous, that Cicero preferred a law, that no perſon ſhould exhibit a ſhow of gladiators within two years before he appeared candidate for any office. Julius Cæſar ordered, that only a certain number of men of this profeſſion ſhould be in Rome at a time. Auguſtus decreed, that only two ſhows of gladiators ſhould be preſented in a year, and never above ſixty couple of combatants in a ſhow. And Tiberius provided by an order of ſenate that no perſon ſhould have the privilege of gratifying the people with ſuch a ſolemnity, unleſs he was worth four-hundred thouſand ſeſterces. They were alſo conſiderably regulated by Nerva.

The emperor Claudius reſtrained them to certain occaſions; but he ſoon afterwards annulled what he decreed, and private perſons began to exhibit them at pleaſure, as uſual: and ſome carried the brutal ſatisfaction ſo far, as to have them at their ordinary feaſts.

And not ſlaves only, but other perſons, would hire themſelves to this infamous office.

The maſter of the gladiators made them all firſt ſwear, that they would fight to death; and if they failed, they were put to death, either by fire, or ſwords, clubs, whips, or the like.

It was a crime for the wretches to complain when they were wounded, or aſk for death, or ſeek to avoid it, when overcome; but it was uſual for the emperor, or the people, to grant them life, when they gave no ſigns of fear, but waited the fatal ſtroke with courage and intrepidity: Auguſtus even decreed, that it ſhould always be granted them. But fear and want of ſpirit were very rare on occaſions of this kind; inſomuch, that Cicero more than once propoſes the principle of honour which actuated the gladiators as an admirable model of courage and conſtancy; by which he intended to animate himſelf and others, to ſuffer every thing for the preſervation of liberty and the defence of the commonwealth. (Tuſc. ii. 41. Philip. ii. 35.)

From ſlaves and freedmen, the inhuman ſport at length ſpread to people of rank and condition; ſo that Auguſtus was obliged to iſſue a public edict, that none of the ſenatorian order ſhould become gladiators; and ſoon after he laid the ſame reſtraint on the knights; nevertheleſs, Nero is related to have brought upwards of four hundred ſenators, and ſix hundred Roman knights upon the arena; though Lipſius takes both thoſe numbers to be falſified, and, not without reaſon, reduces them to forty ſenators, and ſixty knights. Not only ſenators, but even women of quality, fought in public in ſome of Nero's combats of gladiators. On occaſion of the triumph of Probus, A. D. 281, about fourſcore gladiators, together with near 600 others, exhibited the moſt deſperate courage, for the inhuman ſports of the amphitheatre. Diſdaining to ſhed their blood for the amuſement of the populace, they killed their keepers, broke from the place of their confinement, and filled the ſtreets of Rome with blood and confuſion. After an obſtinate reſiſtance, they were overpowered and cut in pieces by the regular forces; but they obtained at leaſt an honourable death, and the ſatisfaction of a juſt revenge (Zoſimus, l. i. p. 66.); yet Domitian, that other monſter of cruelty, refined upon Nero, exhibiting combats of women in the night-time.

Before Rome was become the capital of the known world, Antiochus Epiphanes, king of Syria, in imitation of the Romans, had introduced the combats of gladiators in his dominions. It is remarkable, however, that the Athenians, who were naturally beneficent and humane, never admitted bloody ſhows into their city: and when it was propoſed to eſtabliſh combats of gladiators there, in order not to give place in that reſpect to the Corinthians, "Firſt throw down," exclaimed an Athenian in the midſt of the aſſembly, whoſe name was Demonax, a famous philoſopher, who flouriſhed in the reign of Marcus Aurelius, "the altar which our forefathers above a thouſand years ago erected to Mercy."

Some Pagan emperors, lamenting the ſad effects of this ſavage cuſtom, endeavoured, as we have already ſeen, to moderate it. With this view Marcus Aurelius retrenched the enormous expences employed in theſe combats, and would not ſuffer the gladiators to fight with each other, except with very blunt ſwords, like foils; ſo that they might ſhew their addreſs, without any danger of being killed. But the honour of ſuppreſſing theſe combats was reſerved for Chriſtianity; and it coſt many efforts and much time to effect this purpoſe: ſo rooted was the evil, and ſo much had it eſtabliſhed itſelf by the long preſcription of many ages, and the opinion of the world, that theſe combats were acceptable to the gods, to whom, for that reaſon, they offered the blood of gladiators lately ſhed, by way of ſacrifice, as ſeveral of the Chriſtian fathers obſerve.

Conſtantine the Great is ſaid to have firſt prohibited the combats of gladiators in the Eaſt; at leaſt, he forbad thoſe who were condemned to death for their crimes to be employed; there being an order ſtill extant to the præfectus prætorii, rather to ſend them to work in the mines in lieu thereof; it is dated at Berytus, in Phœnicia, the 1ſt of October, 325.

But, notwithſtanding this edict, which condemned the art and amuſement of ſhedding human blood, the benevolent law expreſſed the wiſhes of the prince, without reforming an inveterate abuſe, which degraded a civilized nation below the condition of ſavage cannibals. Several hundred, perhaps ſeveral thouſand, victims were annually ſlaughtered in the great cities of the empire; and the month of December, more peculiarly devoted to the combats of gladiators, ſtill exhibited to the eyes of the human people a grateful ſpectacle of blood and cruelty. Amidſt the general joy of the victory at Pollentia, gained by the emperor Honorius, Prudentius, a Chriſtian poet, exhorted the emperor to extirpate, by his authority, the horrid cuſtom which had ſo long reſiſted the voice of humanity and religion. The pathetic repreſentations of Prudentius were leſs effectual than the generous boldneſs of Telemachus, an Aſiatic monk, whoſe death was more uſeful to mankind than his life. The Romans were provoked by the interruption of their pleaſures; and the raſh monk, who had deſcended into the arena, to ſeparate the gladiators, was overwhelmed under a ſhower of ſtones. But the madneſs of the people ſoon ſubſided; they reſpected the memory of Telemachus, who had deſerved the honours of martyrdom; and they ſubmitted, without a murmur, to the laws of Honorius, which aboliſhed for ever the inhuman ſacrifices of the amphitheatre. The citizens, who adhered to the manners of their anceſtors, might perhaps inſinuate, that the laſt remains of a martial ſpirit were preſerved in this ſchool of fortitude, which accuſtomed the Romans to the ſight of blood, and to the contempt of death:—a vain and cruel prejudice, ſo nobly confuted by the valour of ancient Greece, and of modern Europe.

It muſt be obſerved, however, that the practice was not entirely aboliſhed in the Weſt before Theodoric, king of the Oſtrogoths. . Honorius, on the occaſion firſt mentioned, had prohibited them; but the prohibition does not ſeem to have been executed. Theodoric, in the year 500, aboliſhed them finally.

Some time before the day of battle, the perſon who preſented the people with the ſhows gave them notice thereof, by programmas, or bills, containing the names of the gladiators, and the marks whereby they were to be diſtinguiſhed; for each had his ſeveral badge, which was, moſt commonly, a peacock's feather, as appears, from the Scholiaſt of Juvenal, on the 158th verſe of the third Satire, and Turnebus Adverſ. lib. ii. cap. 8.

They alſo gave notice what time the ſhows would laſt, and how many couples of gladiators there were; and it even appears, from the 52d verſe of the ſeventh Satire of the ſecond book of Horace, that they ſometimes made repreſentations of theſe things in painting, as is practiſed among us by thoſe who have any thing to ſhow at fairs.

The day being come, they began the entertainments by bringing two kinds of weapons; the firſt were ſtaves, or wooden files, called *rudes;* and the ſecond were effective weapons, as ſwords, poniards, &c.

The firſt were called *arma luſoria*, or *exercitoria;* the ſecond *decretoria*, as being given by decree or ſentence of the prætor, or of him at whoſe expence the ſpectacle was exhibited. They began to fence or ſkirmiſh with the firſt, which was to be the prelude to the battle; and from theſe, when well warmed, they advanced to the ſecond, at the ſound of the trumpets, with which they fought naked.

Then they were ſaid *vertere arma;* the terms of ſtriking were *petere* and *repetere;* of avoiding a blow, *exire;* and when one of the combatants received a remarkable wound, his adverſary or the people cried out, *habet*, or *hoc habet.* The firſt part of the engagement was called *ventilare, præludere;* and the ſecond, *dimicare ad certum*, or *verſis armis pugnare:* and ſome authors think, with much probability, that it is to theſe two kinds of combat that St. Paul alludes, in the paſſage 1 Cor. ix. 26, 27. "I fight, not as one that beateth the air; but I keep my body, and bring it into ſubjection."

If the vanquiſhed ſurrendered his arms, it was not in the victor's power to grant him life; it was the people during the time of the republic, and the prince or people during the time of the empire, that were alone impowered to grant the boon.

The reward of the conqueror was a branch of palm-tree, and a ſum of money, probably collected among the ſpectators; ſometimes they gave him his congé, or diſmiſſed him, by putting one of the wooden foils or rudis in his hand; and ſometimes they even gave him his freedom, putting the pileus on his head.

The ſign or indication whereby the ſpectators ſhewed that they granted the favour, was *premere pollicem*, which M. Dacier takes to be a clenching of the fingers of both hands between one another, and ſo holding the two thumbs upright, cloſe together: and, when they would have the combat finiſhed, and the vanquiſhed ſlain, they *verterunt pollicem*, bent back the thumb; which we learn from Juvenal, Sat. iii. ver. 36.

> "Munera nunc edunt, et verſo pollice vulgi
> Quemlibet occidunt populariter." Juv.

The gladiators challenged or defied each other, by ſhewing the little finger; and, by extending this, or ſome other, during the combat, they owned themſelves vanquiſhed, and begged mercy from the people: "Victi oſtenſam digiti veniam a populo poſtulabant," ſays the old Scholiaſt on Perſius. Vide Plin. lib. xxviii. cap. 2. Prudentius, lib. ii. contra Symm. ver. 1098. Horace, lib. iv. 18. ver. 66.

Politian. Miſcel. cap. 42. Turneb. Adverſ. lib. xi. cap. 6. Lip. Saturn. lib. ii. cap. 22.

There were divers kinds of gladiators, diſtinguiſhed by their weapons, manner, and time of fighting, &c. as,

The *andabatæ*, of whom we have already given an account under ANDABATÆ.

The *catervarii*, who always fought in troops or companies, number againſt number: or according to others, who fought promiſcuouſly, without any certain order. Lipſ. lib. ii. cap. 16.

The *conſummati*, whom authors mention as a ſpecies of gladiators, the ſame with the rudiarii and veterani; founding the opinion on a paſſage in Pliny, lib. viii. cap. 7. But Lipſius ſhews, that they have miſtaken Pliny. Saturn. lib. ii. cap. 16. and Turneb. Adverſ. lib. xxx. cap. 36.

The *cubicularii*, which are a little precarious, being chiefly founded on a paſſage in Lampridius, in the life of the emperor Commodus: "Inter hæc, habitu victimarii, victimas immolavit, in arena rudibus, inter cubicularios; gladiatores pugnavit lucentibus aliquando mucronibus."

Turnebus reads *rudiarios* inſtead of *cubicularios*: and underſtands it of thoſe who had been diſmiſſed, and could no longer be obliged to fight, except with foils.

Salmaſius reads *gladiator*; and refers it to the emperor, who fought not only on the arena, and with foils, or blunted inſtruments, but at home, with his ſervants and valets de chambre, and with ſharps.

Lipſius will have nothing altered in the text: the *gladiatores cubicularii*, he obſerves, were thoſe who fought at private houſes, during feaſts, &c Accordingly, Dion ſays expreſsly, that Commodus ſometimes fought at home, and even killed ſome perſons in ſuch rencounters; but that, in public, he only fought with blunted weapons.

The *dimachæ*, who fought armed with two poniards, or ſwords; or with ſword or dagger. Lipſ. Saturn. lib. ii. cap. 13.

The *eſſedarii*, who fought in cars; called alſo, in an inſcription lately diſcovered at Lyons, *aſſedarii*. Saturn. ſerm. lib. ii. cap. 13.

The *fiſcales*, or *Cæſariani*, who belonged to the emperor's company; and who, being more robuſt and dexterous than the reſt, were frequently called for, and therefore named alſo *poſtulatitii*. Saturn. lib. ii. cap. 16.

The other kinds were, the *hoplomachi*, *meridiani*, *myrmillones*, *ordinarii*, *pinnirapi*, *provocatores*, *retiarii*, *rudiarii*, *Samnites*, *ſecutores*, *ſpectatores*, and *Thraces*: which ſee deſcribed under MERIDIANI, RETIARII, SECUTORES, &c.

Some authors, and particularly Vigenere on Livy, rank the *obſequentes*, mentioned by Spartian, in his life of Marcus Aurelius, among the number of gladiators; Lipſius ridicules him, Saturn. lib. ii. cap. 10. and with ſome reaſon: the *obſequentes* properly were the troops which that emperor raiſed among the gladiators; or whom of gladiators he made ſoldiers.

GLADIATORS' *war*, *bellum Gladiatorum*, or *Spartacium*, called alſo the *ſervile war*, was a war which the Romans ſuſtained about the year of their city 680. Spartacus, Crinus, Oenomaus, having eſcaped, with other gladiators, to the number of ſeventy-four, out of the place where they had been kept at Capua, gathered together a body of ſlaves, put themſelves at their head, rendered themſelves maſters of all Campania, and gained ſeveral victories over the Roman prætors. At length they were defeated, in the year 682, at the extremity of Italy; having, in vain, attempted to paſs over into Sicily.

This war proved very formidable to the Romans. Craſſus was not able to finiſh it: the great Pompey was forced to be ſent as general.

GLADIATOR, *dying*, is a moſt valuable monument of ancient ſculpture, which is now preſerved in the palace of Chighi. This man, when he had received the mortal ſtroke, is particularly careful, *ut procumbat honeſte*, that he might fall gracefully; he is ſeated in a reclining poſture on the ground, and has juſt ſtrength ſufficient to ſupport himſelf on his right arm; and in his expiring moments, it is plainly ſeen that he does not abandon himſelf to grief and dejection, but is ſolicitous to maintain that firmneſs of aſpect, which the gladiators valued themſelves on preſerving in this ſeaſon of diſtreſs, and that attitude which they had learnt of the maſters of defence. He fears not death, nor ſeems to betray any tokens of fear by his countenance, nor to ſhed one tear: "quis mediocris gladiator ingemuit, quis vultum mutavit unquam, quis non modò ſtetit, verum etiam decubuit turpiter," ſays Cicero, in that part of his Tuſculan, where he is deſcribing the aſtoniſhing firmneſs of theſe perſons. We ſee, in this inſtance, notwithſtanding his remaining ſtrength, that he has but a moment to live, and we view him with attention, that we may ſee him expire and fall: thus the ancients knew how to animate marble, and to give it almoſt every expreſſion of life.

GLADIOLE, in *Botany*. See BUTOMUS and LOBELIA.

GLADIOLUS, a name in Pliny, from *gladius*, a ſword, alluding to the form of the leaves. Linn. Gen. 26. Schreb. 35. Willd. Sp. Pl. v. 1. 208. Vahl. Enum. v. 2. 77. Thunb. Diſſ. n. 7. Ait. H. Kew. ed. 2. v. 1. 96. Ker in Ann. of Bot. v. 1. 230. Mart. Mill. Dict. v. 2. Juſſ. 58. Tourn. t. 190. Lamarck Illuſtr. t. 32. Gærtn. t. 11.—Claſs and order, *Triandria Monogynia*. Nat. Ord. *Enſatæ*, Linn. *Irides*, Juſſ.

Gen. Ch. *Cal.* Spatha inferior, ſhorter than the corolla, of two oblong permanent valves; the outermoſt larger, enfolding the inner one. *Cor.* of one petal, ſuperior; tube cylindrical, ſwelling upwards, curved; limb ſomewhat bell-ſhaped, irregular, in ſix deep, oblong, ſlightly ſpreading, unequal ſegments, the upper and lowermoſt either without or within the lateral ones. *Stam.* Filaments three, inſerted into the mouth of the tube, thread-ſhaped, aſcending, ſhorter than the corolla; anthers ovate, incumbent. *Piſt.* Germen inferior, triangular; ſtyle thread-ſhaped; ſtigmas three, ſpreading, folded, recurved, obtuſe, downy. *Peric.* Capſule ovate, triangular, obtuſe, thin, of three cells and three valves. *Seeds* numerous, ſmooth, ſurrounded with a membranous wing.

Eſſ. Ch. Spatha of two valves. Corolla tubular; its limb in ſix deep ſegments, irregular. Stamens aſcending. Stigmas three, dilated. Seeds winged.

Twenty-four ſpecies of this genus are defined in the 14th edition of Linnæus's *Syſtema Vegetabilium*, of which the *ramoſus*, Sp. Pl. 53, belongs, we believe, to *Ixia*, or ſome of its near allies. Willdenow makes 50 ſpecies, but Mr. Ker (late Gawler) has, we think, with great propriety, eſtabliſhed the old genus *Watſonia*, to which ſome of them are removed, while others go to his *Tritonia* or elſewhere, ſo that he names but 28 ſpecies in Sims and Konig's Annals above quoted. He is followed by Mr. Dryander in the new edition of the *Hortus Kewenſis*, except with regard to his *hirſutus*, there called *brevifolius*, after Willdenow and Jacquin; while a moſt diſtinct ſpecies figured in Curt. Mag. t. 574, by Mr. Ker as a variety of *hirſutus*, is properly retained as being the true *hirſutus* itſelf. Five of Mr. Ker's ſpecies are not found in Hort. Kew.

We judge it neceſſary to give a view of the whole genus in its reformed ſtate, adding the Linnæan G. *imbricatus* to what the above-mentioned writers have defined.

1. G. *Cunonia*. Gærtn. v. 1. 31. (Antholyza Cunonia; Linn. Sp. Pl. 54. Vahl. Enum. v. 2. 121. Curt. Mag. t. 343. Redout. Lil. t. 12.)—"Leaves linear-ſword-ſhaped. Upper ſegment of the corolla very long; lower very ſmall."—Native of the Cape of Good Hope, nor does it appear to grow, as Linnæus aſſerts, in Perſia. Remarkable for the vivid ſcarlet of its ſingular and beautiful *flowers*, the three upper ſegments of whoſe corolla are broadly elliptical and vaulted, the middlemoſt projecting far beyond the other two; while the three lower are very ſmall, and greeniſh. This is a hardy green-houſe plant. See ANTHOLYZA, n. 3.

2. G. *Watſonius*. Thunb. Diſſ. 14. Prod 8. Jacq. Coll. v. 3. 257. Ic. Rar. t. 233. Curt. Mag. t. 450 and 569. (G. præcox; Andr. Repoſ. t. 38.)—"Leaves linear-ſword-ſhaped, with three ribs on each ſide. Tube of the corolla cylindrical, longer than the limb."—Native of the Cape of Good Hope; almoſt hardy with us, flowering in April. The *corolla* is ſcarlet, ſometimes ſpeckled with yellow, as in Curtis's t. 569; its ſegments are ſharp-pointed, and nearly equal, each an inch long. Tube an inch and half in length, its baſe very narrow and thread-ſhaped.

3. G. *quadrangularis*. Ker in Curt. Mag. t. 567. (G. abbreviatus; Andr. Repoſ. t. 166. Antholyza quadrangularis; Burm. Fl. Cap. according to Mr. Ker.)—"Leaves with four angles and four furrows. Upper ſegment of the corolla very long; lower very ſmall and ſharp."—Imported from the Cape of Good Hope, by thoſe excellent cultivators Meſſrs. Lee and Kennedy in 1799. It firſt flowered with them in March 1801. The quadrangular *leaves* diſtinguiſhed this from moſt others, except the *triſtis*, n. 10, and *permeabilis*, n. 7; the *flowers* more agree with G. *Cunonia*, at leaſt in their large vaulted upper ſegment, but all the lateral ſegments are extremely ſhort, ovate and acute, the lowermoſt being the leaſt of all. The tube is yellow ſtreaked with orange; large ſegment of the limb purpliſh; all the reſt variegated with dull green and brown. According to the Linnæan idea of hybrid ſpecies, this might be gueſſed to have originated from G. *Cunonia* impregnated by G. *triſtis*.

4. G. *galeatus*. Andr. Repoſ. t. 122. (G. namaquenſis; Ker in Curt. Mag. t. 592.)—Upper ſegment of the corolla vaulted; two lateral rhomboid; three lower pendulous, ſpatulate, blunt with a little point. Leaves coriaceous, obovate.—Native of the Namaqua country, a conſiderable diſtance from the Cape of Good Hope; eaſily propagated by ſeeds or offſets, and blowing freely. The *leaves* are very thick, many-ribbed, obovate, obtuſe, curved or oblique. *Stem* low, bent or zig-zag, covered with *bracteas* and *flowers*. The latter are large and ſhowy, their three narrow drooping lower ſegments, each half green half ſcarlet, ſtrikingly contraſted with the large broad upper ones, which are of a rich ſcarlet, green white and purple at the baſe. No authority can induce us to prefer ſuch a ſpecific name as *namaquenſis*, it being contrary to rule as the name of a country, and ſo peculiarly barbarous in itſelf. The G. *galeatus* of Jacquin is *Sparaxis galeata* of Ker.

5. G. *alatus*. Linn. Sp. Pl. 53. Herb. Linn. Andr. Repoſ. t. 8. Ker in Curt. Mag. t. 586.—Upper ſegment of the corolla obovate, recurved; two lateral rhomboid; three lower pendulous, ſpatulate, pointed. Leaves rigid, lanceolate.—Common about the Cape of Good Hope; eaſily encreaſed by ſeeds or bulbs, but rarely flowering with us. Bears a conſiderable reſemblance to the laſt in form and colours, but the *leaves* are narrower and very differently ſhaped, the lower ſegments of the *corolla* more lanceolate, the upper one reflexed. Linnæus once called this ſpecies *labialis*, but his ſon changed it to *alatus*, in alluſion to the wing-like lateral ſegments.

6. G. *viperatus*. Ker in Curt. Mag. t. 688. (G. alatus; Jacq. Ic. Rar. t. 259. G. orchidiflorus; Andr. Repoſ. t. 241.)—Upper ſegment of the corolla ſpatulate, arched, incurved; two lateral rhomboid; three lower ſpatulate, pendulous, acute. Leaves ſtraight, linear-ſword-ſhaped.—Native of the Cape; rare in our collections. Plukenet's rude figure, t. 224. f. 8, is ſuppoſed to belong to this ſpecies rather than to the laſt, for which it is quoted by Linnæus. This differs from the two preceding in having long erect narrow *leaves*, and *flowers* variegated with dull green and purple, which are luſciouſly fragrant. The *ſtem* is tall, and ſometimes branched.

7. G. *permeabilis*. De la Roche Diſſ. 27. t. 2. Ker in Ann. of Bot. v. 1. 231.—Leaves awl-ſhaped, quadrangular, erect. Upper ſegment of the corolla broadeſt, vaulted, undulated; two lateral narrow-rhomboid; three lower ſpatulate, acute, recurved at the points.—Native of the Cape of Good Hope. We know it only by De la Roche's figure and deſcription. He ſays the *flowers* are of a very pale violet, diluted with purple and yellow. The name alludes to their being pervious between the ſegments, but this is not peculiar. That ſuppoſed variety of *triſtis*, figured by Jacquin, Ic. Rar. t. 244, ſeems to be very near the preſent ſpecies.

8. G. *verſicolor*. Ker in Curt. Mag. t. 1042 and 556. Andr. Repoſ. t. 19.—Leaves linear-ſword-ſhaped, with three ribs on each ſide. Segments of the corolla longer than the tube, pointed, recurved.—Native of the Cape, from whence it was received by Meſſrs. Lee and Kennedy in 1794. Its *flowers* are among the largeſt of its genus, with peculiarly long undulated recurved ſegments, and are remarkable for changing colour ſeveral days ſucceſſively. In the morning it is of a purpliſh brown, but becomes grey in the courſe of the day, and finally of a light blue in the evening. The moſt wonderful, and, as far as we know, unique circumſtance, is, that the original brown hue returns in the courſe of the night, and this happens for nine or ten following days. There are moreover ſome varieties of colour obſervable in different plants, ſome aſſuming more of a yellow hue. It differs eſſentially from the following in having a ſword-ſhaped, not a quadrangular, leaf.

9. G. *triſtis*. Linn. Sp. Pl. 53. Ker in Curt. Mag. t. 272 and 1098. Jacq. Ic. Rar. t. 245 and 243. (Lilio-gladiolus bifolius et biflorus, foliis quadrangulis; Trew. Ehret. t. 39.)—Leaves with four angles and four furrows. Segments of the corolla nearly equal, pointed.—Frequent at the Cape, and not uncommon in our green-houſes, where it is juſtly admired for its rich evening ſcent, like a pink, or a bergamot pear, eſpecially in the moſt common or particoloured variety, to which the firſt-quoted figures of Curtis and Jacquin refer. The deeply furrowed quadrangular *leaves*, like thoſe of the Snake's-head Iris, *tuberoſa*, diſtinguiſh it clearly from the laſt, for which Mr. Ker, we preſume by miſtake, quotes Jacquin's t. 245. He likewiſe cites and blames Trew's Ehret as the yellowiſh variety, which is a fine plate, though rather too pink, of the particoloured one.

10. G. *hyalinus*. Jacq. Ic. Rar. t. 242. Ker in Ann. of Bot. v. 1. 231. Willd. Sp. Pl. v. 1. 211.—Leaves linear, erect, the length of their ſheaths. Segments of the corolla ovate, acute; the uppermoſt largeſt, erect.—Native of the Cape. Jacquin ſays it flowered with him in December. We do not find it in the Hortus Kewenſis, nor Hortus

Cantabrigienſis, nor have we ſeen any ſpecimen. The ſhort, upright, ſtraight *leaves* are remarkable. The *flowers* are ſmaller than in the two laſt, ſcentleſs; the baſe of their ſegments ſemi-tranſparent, the extremities yellowiſh, ſtriped and dotted with purple. The upper ſegment is by far the largeſt; the others gradually ſmaller, to the lower one, which is leaſt of all. Tube funnel-ſhaped, ſemi-pellucid, very pale purple, as long as the largeſt ſegment.—Jacquin firſt called this ſpecies *ſtrictus*: ſee Collect. v. 4. 170.

11. G. *tenellus.* Jacq. Ic. Rar. t. 248. Coll. v. 3. 255, and v. 4. 169. t. 3. f. 1. Ker in Ann. of Bot. v. 1. 231.—Leaves linear, convoluted, ſmooth. Stem zig-zag. Segments of the corolla elliptical, bluntiſh, nearly equal, ſhorter than the tube.—Native of the Cape. Jacquin, from whoſe figures alone we are acquainted with this plant, ſays it bloomed with him in November. The *ſtem* is a ſpan high, curved and zig-zag. *Flowers* one or two, yellowiſh, more or leſs variegated with pale purple, ſcentleſs, about an inch and half long.

12. G. *ſetifolius.* Thunb. Diſſ. 18. Linn. Suppl. 96. Ker in Ann. of Bot. v. 1. 231.—"Leaves linear-briſtle-ſhaped. Corolla ringent. Stem branched."—Native of the Cape of Good Hope. "*Stem* bearing many ſpikes of flowers; very rarely ſimple; upright, ſomewhat zig-zag, four inches high; branches round and erect. *Leaves* about three, linear-ſetaceous, the upper ones gradually ſhorter; the lowermoſt as tall as the ſtem. *Flowers* alternate, white, ringent; their tube ſcarcely longer than the ſpatha." *Thunb.*

13. G. *gracilis.* Jacq. Ic. Rar. t. 246. Ker in Curt. Mag. t. 562.—Leaves linear, ribbed, deeply furrowed on each ſide, with a very ſlight midrib. Corolla ſomewhat bell-ſhaped; ſegments ovate, nearly equal.—Native of the Cape, eaſily cultivated with us, blooming in March or April. *Flowers* wavy, pale blue, more or leſs ſpeckled with black and white on the two lower lateral ſegments; without ſcent. *Bulb* very ſmall. *Stem* variouſly bent, ſlender, two or three feet high.

14. G. *recurvus.* Linn. Mant. 28. Ker in Curt. Mag. t. 578. (G. carinatus; Willd. Sp. Pl. v. 1. 211. Ker in Ann. of Bot. v. 1. 231. G. punctatus; Jacq. Ic. Rar. t. 247. G. ringens; Andr. Repoſ. t. 27 and 227. Redout. Liliac. t. 123. G. alatus; Schneev. Ic. t. 12.)—Leaves linear, flat; rib prominent on each ſide. Radical ſheath ſpeckled. Segments of the corolla nearly equal, ovate, recurved.—Native of the Cape, cultivated and badly figured by Miller, and now frequent in gardens, where it is valued for the fine violet fragrance of its blue and yellow bloſſoms, more than even for their beauty or ſize, which equals that of moſt ſpecies. The *leaves* have a ſtrong rib, prominent on each ſide, and the firſt ſheath from the root is curiouſly ſpeckled with brown, like the ſtalks of *Arum Dracunculus.* Thunberg confounded this and *gracilis* with *triſtis.*

15. G. *brevifolius.* Jacq. Ic. Rar. t. 249. Dryand. in Ait. Hort. Kew. ed. 2. v. 1. 98. (G. hirſutus α; Ker in Curt. Mag. t. 992; and β; t. 727. G. carneus; Andr. Repoſ. t. 240.)—"Leaf of the barren bulb ſolitary, linear, ſlightly downy; of the flowering one ſcarcely any. Corolla ſomewhat ringent."—Native of the Cape, readily cultivated and encreaſed with us. The *flowers* are among the ſmaller ſized, all leaning one way, variouſly tinged with pale purple or roſe-colour, with ſome yellow; their three lower ſegments moſt ſpeckled, and nearly of equal ſize, the uppermoſt one rather largeſt, vaulted, recurved at the ſummit. The *leaves* are minutely downy, upright, linear or ſlightly lanceolate; very ſhort, or rather mere ſcales, on the flowering ſtem; ſolitary and larger on the bulb, which produces no flowers.

16. G. *hirſutus.* Jacq. Ic. Rar. t. 250. Dryand. in Ait. Hort. Kew. ed. 2. v. 1. 98. Ker in Curt. Mag. t. 574. (G. roſeus; Andr. Repoſ. t. 11.)—"Leaves linear ſword-ſhaped, downy. Corolla nearly regular."—Native of the Cape; introduced into our green-houſes in 1795, when it firſt flowered in the collection of Mr. Orde at Fulham. The broadiſh, downy, red-edged *leaves* are remarkable. The *flowers* are large and fragrant, roſe-coloured; their ſegments elliptical, pointed, nearly equal. Jacquin's figure is indeed a poor one, but we can ſcarcely ſuppoſe, with Mr. Andrews, that it is drawn from a dried ſpecimen, as the author ſays it flowered in his green-houſe, nor does he, like Pallas, often practiſe this without acknowledgment.

17. G. *flexuoſus.* Thunb. Diſſ. 9. t. 1. f. 1. Linn. Suppl. 96.—Leaves linear, involute. Corolla ringent; ſegments elliptic-lanceolate, nearly equal, ſhorter than the tube. Stem zig-zag.—Gathered at the Cape by Thunberg, from whom we have a wild ſpecimen. The *ſtem* is a ſpan high, irregularly curved, and zig-zag. *Leaves* ſheathing, ſhort, linear, acute, ſmooth, involute. *Spathas* large, ſwelling, ſharply pointed. *Flowers* very pale fleſh-coloured, with red ribs; tube capillary, an inch and half long; ſegments of the limb narrow, nearly equal in ſize, but ringent.

18. G. *carneus.* Jacq. Ic. Rar. t. 255 Ker in Curt. Mag. t. 591. (G. cuſpidatus; Andr. Repoſ. t. 147. Redout. Liliac. t. 36.)—Leaves ſword-ſhaped, many-ribbed. Segments of the corolla ſhorter than the tube; the uppermoſt broadeſt, with an involute recurved point; the three lower narroweſt, dependent.—Native of the Cape. A tall and handſome plant, with ſeveral many-ribbed *leaves.* *Flowers* inodorous, two-ranked, large, fleſh-coloured with a roſy hue; their three lower ſegments oblong, bluntiſh, each marked with a red rhomboid central ſpot; the three upper broadeſt, eſpecially the top one, with long recurved points, whoſe edges are involute. The tube is ſlender, longer than the limb, twice as long as the ſpatha. This freely blowing ſpecies is a deſirable ornament for the green-houſe in the ſpring.

19. G. *cuſpidatus.* Jacq. Ic. Rar. t. 257. Ker in Curt. Mag. t. 582. Redout. Liliac. t. 136. Andr. Repoſ. t. 219. (G. undulatus; Linn. Mant. 27.)—Leaves ſword-ſhaped, many-ribbed. Segments of the corolla half the length of the tube, nearly equal, pointed, undulated, reflexed.—Native of the Cape; now become pretty frequent in gardens, for the ſake of its elegance of form and colour, and its fragrance in an evening. The very long narrow ſegments of the *corolla*, each of which has a recurved, channelled, undulated point, and the much greater length of the tube, are ſtriking characters. The colour is pale greeniſh yellow, or buff, with a remarkable lanceolate ſpot, ſtained with purple and red, on each of the three lower ſegments. Anthers deep blue. The Linnæan name ought to have been retained for this ſpecies, but to change the preſent appellation would now cauſe more trouble than advantage.

20. G. *blandus.* Ait. Hort. Kew. ed. 1. v. 1. 64. Ker in Curt. Mag. t. 625. 645. 648. Andr. Repoſ. t. 99. (G. carneus; De la Roche Diſſ. 30. t. 4. Redout. Liliac. t. 65. G. albidus; Jacq. Ic. Rar. t. 256. G. campanulatus; Andr. Repoſ. t. 188.)—Leaves many-ribbed. Tube of the corolla ſhorter than the ſpatha, equal to the limb, which is ringent, bell-ſhaped; its upper ſegment concave; three lower narroweſt, ſpotted.—Native of the Cape. Succeeds beſt with us in the open ground, but the bulbs muſt be taken up every year.—This is an elegant ſpecies, with

leaves of the ſword-ſhaped many-ribbed kind like the two laſt. The *flowers* vary in colour, from white to a pale pink, their three lower ſegments bearing each generally a pair of crimſon ſpots. They vary alſo in ſize, ſometimes vyeing in this reſpect with the largeſt. They have no ſcent.

We cannot but complain of thoſe authors who burthen the public with figures of trifling varieties of this and other plants, for which a ſingle plate ought to have been ſufficient; nor does the contrivance of a new name, though it may conceal the impoſition, by any means atone for it.

21. G. *anguſtus*. Linn, Sp. Pl. 53. Hort. Cliff. t. 6. Jacq. Ic. Rar. t. 252. Ker in Curt. Mag. t. 602. Andr. Repoſ. t. 589. Mill. Ic. t. 142. f. 2.—Leaves linear; midrib prominent on each ſide. Tube of the corolla longer than either ſpatha or limb; three upper ſegments ovate; three lower each marked with a triangular ſtalked ſpot.—Native of the Cape, from whence it was very early introduced into the Dutch gardens. It is readily increaſed, but does not flower freely, otherwiſe its elegance could not fail to render it a general favourite. The narrow *leaves*, compared with thoſe ſpecies neareſt akin to this, and eſpecially the three ſpade-like marks of the bloſſom, which are conſtant, mark it ſufficiently.

22. G. *undulatus*. Jacq. Ic. Rar. t. 251. Ker in Curt. Mag. t. 538. 647. Schneev. Ic. t. 19. Redout. Liliac. t. 121. (G. ſtriatus; Andr. Repoſ. t. 111.)—Leaves ſword-ſhaped, many-ribbed. Flowers erect, funnel-ſhaped; ſegments wavy, bluntiſh; three lower ones much the ſmalleſt.—Native of the Cape; often cultivated in our gardens. The *leaves* are numerous, broad and upright. *Flowers* yellowiſh-white, or pale bluſh-coloured, each ſegment always marked with a deep crimſon central ſtripe which runs down into the tube. The latter is ſeldom longer than the ſpatha, often ſhorter.—The name of *undulatus*, which Linnæus had applied to our *cuſpidatus*, has been miſapplied to this, with which however it agrees tolerably well, and we have already given our reaſon for retaining it. This ſpecies is the *auguſtus* of Thunberg, an appellation which ſeems corrupted from *anguſtus*, a totally different plant in every poſſible reſpect, nor are his quotations of Breynius, and of Linn. Mant. leſs erroneous. There is no end of correcting indifferent names, but *undulatus* ought, as Mr. Ker now allows, to have remained with the Linnæan plant; if ſo, *vittatus*, in alluſion to the ſomewhat ſimilar *Amaryllis vittata*, might have ſerved for the ſpecies before us, though indeed it alſo ſuits the following.

23. G. *floribundus*. Jacq. Ic. Rar. t. 254. Ker in Curt. Mag. t. 610. (G. grandiflorus; Andr. Repoſ. t. 118.)—Leaves ſword-ſhaped, many-ribbed. Flowers erect, funnel-ſhaped; ſegments nearly equal, flattiſh, emarginate, the uppermoſt broadeſt.—Native of the Cape; introduced into England by Lee and Kennedy in 1788. *Bulb* large. *Leaves* broad, with a thick edge, and often falcate. *Flowers* numerous, generally larger than in moſt other ſpecies, very pale pink, blue, or white, with a dark central ſtripe to each ſegment. The ſummits of the ſegments are emarginate, with a little point, and they are ſcarcely at all undulated.

24. G. *Milleri*. Ker in Curt. Mag. t. 632. Ait. Hort. Kew. ed. 2. v. 1. 101. (Antholyza, &c; Mill. Ic. t. 40.)—Leaves with many prominent ribs. Flowers inclining one way, bell-ſhaped, nearly regular; upper ſegment rather narrower than the next; tube fleſhy, ſlender.—Native of the Cape, but rare in gardens. Miller raiſed it from ſeed in 1757, and figured it as an *Antholyza*. It is of the ſame tribe as the two laſt, but differs in having a more inclined and more equal *corolla*, at firſt white then yellowiſh, with a darker purpliſh central ſtripe on the three lower than on the three upper ſegments. The tube, according to Mr. Ker's remark, though externally ſlender and exactly cylindrical, is peculiarly fleſhy, reſembling a flower-ſtalk. The outer *ſpatha* is inflated and convolute, oftener longer than the tube.

25. G. *cardinalis*. Curt. Mag. t. 135. Schneev. Ic. t. 27. Redout. Liliac. t. 112.—Leaves many-ribbed. Stem branched. Flowers erect, in one row, funnel-ſhaped; ſegments elliptical; three lowermoſt ſmalleſt, each with a lanceolate white ſpot.—Native of the Cape, from whence it was brought to Holland, and from the latter country to England by Mr. Græffer; before 1789, unleſs we are greatly miſtaken. It will bear an open border in a warm ſituation, but the bulbs muſt be taken up yearly to make it flower in its natural magnificence. The rich ſcarlet of its *bloſſoms*, and their three white ſpots, diſtinguiſh this fine ſpecies. Its green has a glaucous caſt, and the *ſtem* is properly branched, two or three feet high.

The name alludes to the ſcarlet colour, like that worn by the cardinals at Rome, as uſed by Linnæus in *Lobelia* and *Loxia*. The pious Scopoli thought the application profane, and changed it in the latter inſtance to *rubra*. See his Annus primus, 139.

26. G. *byzantinus*. Mill. Dict. ed. 8. n. 3. Ic. t. 142. f. 1. Ker in Curt. Mag. t. 874. Dryandr. in Ait. Hort. Kew. ed. 2. v. 1. 102. Park. Parad. 191. f. 3.—Leaves many-ribbed. Spike two-ranked. Flowers horizontal; upper ſegment covered laterally by the next; three lowermoſt equal, each with a linear-lanceolate ſtripe.—Suppoſed to be a native of Turkey, it having been for near two centuries a hardy inhabitant of our gardens, under the name of the Byzantine corn-flag, though generally confounded, as G. *communis* of Linnæus, with the two following. We readily ſubmit to Mr. Ker's corrections of this error, in which we have, in common with moſt botaniſts, been involved, but which is now alſo corrected in the new edition of *Hort. Kew.*—All the three have broad, upright, acute, many-ribbed *leaves*, and handſome crimſon *flowers*, projecting horizontally, in a long upright, unbranched ſpike, with lanceolate concave bracteas. The three ſegments of the lower lip are each marked with a central white or yellowiſh ſtripe, bordered with deep red, and more or leſs dilated in the middle. The *flowers* of the preſent ſpecies are larger than in either of the other two, their three lower ſegments very nearly equal in ſize and ſhape; the uppermoſt is embraced and covered at its ſides by the lapping over of the two lateral ſegments, ſo that the flower is cloſed, not pervious, at that part. It bloſſoms in June, rather before the *communis*, but, according to Mr. Ker, never bears ſeeds in England, nor does it increaſe by root ſo rapidly as the other two.

27. G. *communis*. Linn. Sp. Pl. 52. Curt. Mag. t. 86. Riv. Monop. Irr. t. 110. (G. narbonenſis; Ger. em. 104. Park. Parad. 191. f. 1.)—Leaves many-ribbed. Spike one-ranked. Flowers horizontal; upper ſegment covered laterally by the next; three lowermoſt each with a linear-lanceolate ſtripe; the central ſegment very large.—Native of fields in the ſouth of Europe, eſpecially in moiſt ſituations, where it is a troubleſome weed. It is now leſs commonly kept in our gardens than the laſt, from which it differs in the ſmaller ſize of its *bloſſoms*, which are approximated nearly into one row, only a little ſpreading alternately, and whoſe lowermoſt or central lobe is as broad as both the other two, and conſiderably longer. This is viſible even in dried

ſpecimens. We have this ſpecies from M. Favrod's herbarium, gathered wild in Switzerland, ſo that it appears to be Haller's n. 1261, the ſmaller variety; his larger being probably the following ſpecies. There is much difficulty in determining the ſynonyms of old authors, their cuts not being correct in thoſe parts on which our characters are founded; Parkinſon's G. *italicus*, for inſtance, Parad. 191. f. 2, has preciſely the lower lip of this preſent ſpecies, but not the infloreſcence, whilſt his f. 1. does not ſhew the lip ſo well as the poſition of the flowers. As however he mentions but two white ſtripes in his deſcription, ſo many only being viſible, as the ſegments naturally ſtand in our *communis*, we have little doubt of his ſynonym. The *communis* of the Linnæan herbarium is our's, and has winged ſeeds, ſo that we truſt this name will remain fixed, as belonging to the moſt common and general ſpecies, whatever Linnæus might comprehend under it as varieties.

28. G. *ſegetum*. Ker in Curt. Mag. t. 719. Dryandr. in Ait. Hort. Kew. ed. 2. v. 1. 102. (G. communis; Bulliard. Herb. de la France, t. 8. Sm. Fl. Græc. Sibth. v. 1. 27. t. 37, 38. Lamarck Illuſtr. t. 32. Tourn. t. 190. G. italicus; Ger. em. 104.)—Leaves many-ribbed. Spike one-ranked. Flowers horizontal; upper ſegment diſtant; three lowermoſt equal, each with a linear-lanceolate bordered ſtripe.—Native of corn-fields in the ſouth of Europe, common in Italy, Greece, and the neighbouring countries, flowering in the ſpring; hardy, but not frequent in gardens. It is diſtinctly repreſented in the Hortus Eyſtetenſis, by the name of *Victorialis rotunda;* Ord. Eſt. 4. t. 10. f. 2, though the other *Gladioli* of that huge book are leſs preciſe. This is diſtinguiſhable from the two laſt by the diſtance between the uppermoſt lobe of its *bloſſoms* and the two next, which are peculiarly narrow; while the *ſeeds*, according to Mr. Ker, are round, with a ſomewhat pulpy coat, not flattened and winged as in the whole of the genus beſides, which is a moſt material ſpecific diſtinction, and even forms an exception to one of the generic characters. Mr. Ker ſuſpects the exiſtence of other European ſpecies, ſtill confounded as varieties of theſe, and which may perhaps account for anomalies and incongruities in the figures of authors. Whether t. 38. of Flora Græca may be one of theſe, we muſt ſubmit to future enquiry. Though ſmall, it is ſaid to be a native of fertile ground; the three upper ſegments ſeem more approximated, and the three lower ones united by a longer baſe, than in t. 37, our G. *ſegetum;* but this we learn merely from the figure, nor was the artiſt acquainted with the characters ſubſequently found out in this tribe, ſo as to give peculiar authority to what he has expreſſed in his drawing. The acquiſition of living ſpecimens at ſome future time can alone ſettle the queſtion.—It is proper to mention that G. *ſpicatus* of the Linnæan herbarium, alluded to by Mr. Ker, is a Siberian ſpecimen, with very broad lateral ſegments to the corolla, and as far as we can judge ſeems rather to be *communis*, if not, as is poſſible, a ſpecies hitherto undefined. It is probably different from the African plant of Van Royen, intended in Sp. Pl. ed. 1, nor has it the authentic marks of originality. What might chance to be compared with it in the Bankſian herbarium, when none of the parties preſent had any preciſe ideas about theſe plants, we cannot anſwer for, but our ſpecimen was then voted to be *communis*.

29. G. *imbricatus*. Linn. Sp. Pl. 52. Lamarck. Dict. v. 2. 723.—Leaves many-ribbed, ſpike of numerous, crowded, upright flowers; upper ſegment rather diſtant; three lowermoſt nearly equal.—Gathered by Gerber near Luban in Livonia. His own ſpecimen in the Linnæan herbarium is the only one we have ſeen, nor do recent writers appear to know any thing of this ſpecies, which appears to us very diſtinct, akin to the three laſt in *leaves* and habit; but differing widely in its curved aſcending *ſpike*, and crowded erect *flowers*, which are ſmaller than thoſe of G. *communis*, of a purple or crimſon colour, pervious at the baſe, in conſequence of a conſiderable diſtance between the claws of the upper and lateral ſegments, while their upper parts ſeem to fold over each other; but of theſe characters we cannot, of courſe, ſpeak abſolutely, from the dried flowers; the three lowermoſt ſegments ſeem equal and rather narrow. No white ſtripe is diſcernible in their preſent condition. The *leaves* riſe above the ſpike of flowers, and have each an oblique point, but this may not be conſtant.

Whatever ſpecies of *Gladiolus* (excluſive of ſuch as are now referable to the genera *Sparaxis*, *Anomatheca*, *Tritonia*, *Watſonia*, *Melaſphærula* or *Babiana* of Mr. Ker), may be found here and there in authors, we decline deſcribing without ſeeing living ſpecimens. The diſcordance between ſeveral of the figures, above quoted for the ſame ſpecies, proves how variable many of them are, eſpecially from accidental circumſtances in cultivation. The Botanical Magazine is now become a faithful and valuable repoſitory of this family, ſo that however botaniſts may differ about definitions, the memory of the plants can never be entirely loſt.

GLADIOLUS, in *Gardening*, compriſes plants of the tuberous-rooted, flowery, perennial kind; of which the ſpecies moſtly cultivated are the common ſword-lily, or corn-flag (G. communis); the imbricated flowered gladiole (G. imbricatus); the ſquare-ſtalked gladiole (G. triſtis); the narrow leaved gladiole (G. anguſtus); and the ſuperb ſcarlet gladiole (G. cardinalis).

There are ſeveral varieties of the firſt ſpecies, as the Italian and French corn flags, with the bluiſh, the white, and the ſmall purple coloured.

Method of Culture.—In the firſt ſort and varieties the culture may be readily effected by planting the off-ſets from the old roots in the beginning of the autumn in the places where they are to grow. And the other ſorts may be raiſed in the ſame way as well as by ſeeds. Theſe ſhould be planted in a warm border, and be protected in the winter by glaſs or ſome other means, when there is a neceſſity for it, as during very ſevere weather, &c.

When increaſed by ſeed it ſhould be ſown towards the end of Auguſt, in pots filled with light earth, placing them in a ſhady ſituation at firſt, but afterwards where they may be expoſed to the ſun, being protected during the winter in a hot-bed frame, free air being admitted when the weather is mild. In the ſpring the pots ſhould be removed to a ſhady ſituation, with only the morning ſun. When the ſtems decay, the roots ſhould be taken up and kept in ſand in a dry place till the time of planting. In the ſecond year's planting they ſhould be put in ſeparate ſmall pots, filled with mould formed from the turf or ſward.

With reſpect to the old roots they may be taken up every two or three years, to have the off-ſets taken off from them, in order to their future increaſe.

All the ſorts afford a fine effect and variety in the flower borders and other parts among other plants of the flowery kinds, being properly arranged in mixture with them.

GLADIUS, SWORD. *Jus Gladii*, or *right of the ſword*, is uſed, in our ancient Latin authors, and in the Norman laws, for ſupreme juriſdiction.

Camden, in Britannia, writes "Comitatus Flint pertinet ad gladium Ceſtriæ:" and Selden, Tit. of Honour, p. 640. "Curiam ſuam liberam de omnibus placitis, &c. exceptis ad gladium ejus pertinentibus."

And it is probably from hence, that at the creation of an earl, he is *gladio ſuccinctus*; to ſignify, that he had a juriſdiction over the county.

GLADIUS *piſcis*, in *Ichthyology*, a name uſed by many for the ſword-fiſh, called alſo the *xiphias*, which ſee.

GLADKA, in *Geography*, a fort of Ruſſia, in the government of Caucaſus, on the Malva; 36 miles W. of Kiſliar.

GLADWIN. See IRIS.

GLADWIN, JOHN, in *Biography*, the late organiſt of South Audley chapel, was the firſt performer on the organ at Vauxhall, after the building of the orcheſtra in the middle of the gardens, and the eſtabliſhment of a regular band. He was a pleaſing player in his day, and a worthy man, who lived to a great age, and died in 1799.

GLAIR *of Eggs*, is the ſame as the white of eggs, and is uſed as a varniſh for preſerving paintings. For this purpoſe it is beat to an unctuous conſiſtence, and commonly mixed with a little brandy or ſpirit of wine, to make it work more freely, and with a lump of ſugar to give it body and prevent its cracking; and then ſpread over the picture or painting with a bruſh.

GLAIZE, AU, in *Geography*, a S.S.W. branch of the Miami of the lake in America, which interlocks with St. Mary's river. By the treaty of Greenville, the Indians have ceded to the United States a tract of land, ſix miles ſquare, at the head of its navigable waters, and ſix miles ſquare at its confluence with the Miami, where port Defiance now ſtands.

GLAMA, in *Zoology*. See CAMELUS.

GLAMMISS, in *Geography*, a ſmall town in the county of Forfar, Scotland, contains 385 houſes, and 1931 inhabitants. Here are two ſmall manufactories of yarn, and coarſe linen cloth. The earls of Strathmore formerly poſſeſſed, and occupied a noble caſtle in this pariſh. The remains of this baronial fortreſs are ſtill very conſiderable, and occupy a commanding ſcite on the banks of the river Dean. In this pariſh are ſeveral ancient obeliſks, or ſtone croſſes; alſo many cairns. Theſe are traditionally ſaid to commemorate the murdered king Malcolm II. Glammiſs is divided into two parts reſpectively, called the New, and the Old Town.

GLAMORGANSHIRE, the ſouth maritime county of South Wales, is ſuppoſed to have derived its name from having afforded a temporary, though inſecure, retreat to an ancient prince, at a very early period of Britiſh hiſtory. The ſtory is briefly recapitulated by Spenſer, in his Chronicle of Britiſh kings. (Fairy Queen, b. ii. c. 10.) Glamorgan was in ſucceeding ages an independent ſovereign principality, diſtinct, as thoſe who profeſs to be acquainted with the ancient hiſtory of Wales aſſert, from the rule and government of South Wales. The principality, or ſovereign lordſhip of Glamorgan, as theſe perſons ſay, contained the preſent counties of Glamorgan and Monmouth, the ſouthern and eaſtern parts of Brecknockſhire, and that part of Herefordſhire lying to the weſt of the river Wye.

The lordſhip of Glamorgan was ſubdivided, at an early period, into a great many petty lordſhips, in every one of which their lords exerciſed "jura regalia," reſerving, however, to the ſubject a right of appeal to the court of the chief lord, or, as he was termed, the lord paramount. There are at leaſt 50 ancient buildings ſtill remaining in the diſtrict, univerſally underſtood to be the halls in which the courts of legiſlation and of juſtice were held for the reſpective petty lordſhips. They are now commonly called "Church-houſes," and belong to the pariſhes in which they ſtand. They are at preſent uſed as ſchool-rooms, and occaſionally for dancing; an amuſement ſtill common in Glamorganſhire, though now beginning to decline. The ground-floor apartments under theſe halls are uſed as alms-houſes for the poor of the pariſh. From ancient ſurveys and other accounts of the lordſhips it appears that before the reformation a market was held in each of theſe halls every Sunday morning, till the tolling of the firſt bell, which is ſaid to have been intended as a notice for the buſineſs of the market to ceaſe. The ſecond bell was a ſignal of preparation for church, and the third for the commencement of divine ſervice, during which no door, but the church door, was allowed to be ſeen open.

This county, extending about forty-eight miles from eaſt to weſt, and 27 from north to ſouth, is bounded on the N. by Brecknockſhire, on the E. by Monmouthſhire, from which it is ſeparated by the river Remny, on the S. by the Briſtol channel, and on the W. by Caermarthenſhire. The greateſt part of the ſea-coaſt forms a ſemi-circular courſe; the weſtern extremity being formed into a narrow beak between the open channel on the one hand, and an arm running round to the Caermarthenſhire coaſt on the other. (See GOWER.) An ample account of the manner in which the lordſhip of Glamorgan was obtained by its conquerors, is to be found in Powel's Hiſtory of Wales, written in the time of Elizabeth, or in Evans's edition of Wynne's Hiſtory of Wales. The following abſtract is taken from Malkin's work. Jeſtin ap Gurgant, a petty prince of odious character, waged war, in the year 1088, againſt Rees ap Tudor, and was aſſiſted by Eneon ap Collwyn. Unable to make any impreſſion on his enemy's dominions, Jeſtin commiſſioned Eneon to go to England, and to procure ſome more powerful ally. His propoſitions were eagerly received by Robert Fitzhawen, and twelve other Norman adventurers, who came to Glamorgan on an expedition, profeſſedly for the purpoſe of retrieving the affairs of Jeſtin. The allies, marching againſt Rees ap Tudor, came up with his forces on the borders of Brecknockſhire. In a battle which enſued at a place called Hirwin, Rees was entirely defeated: and in his flight was taken priſoner, and put to death. On this occaſion, Jeſtin betrayed his characteriſtic treachery, by violating his agreement with Eneon, to whom he had promiſed his daughter in marriage, as a recompence for his ſervices. Eneon, juſtly offended, was determined on revenge; and therefore, when the Normans, after having fulfilled their engagements, and having obtained ſatisfaction for their ſervices, quietly returned home, Eneon repreſented the injuries he had ſuſtained by the treachery of Jeſtin, and alſo the hatred of the country to its tyrant. He alſo ſtated how eaſy it was to obtain poſſeſſion of this feeble country, with the aid of the different princes at variance with Jeſtin. R. Fitzhawen, and his ſoldiers of fortune, availing themſelves of the favourable moment, turned their arms againſt their employer, who was unprepared for ſo formidable a reverſe, and overran the country; whilſt Jeſtin ſaved himſelf by flight, and died ſoon after, unlamented and unrevenged. Fitzhawen, upon a diviſion of the conquered territory, took for his own ſhare the caſtles of Cardiff and Kenſig, with the market town of Cowbridge, and the demeſne of Llantwit; appropriating to himſelf the lands belonging to them, together with the ſovereignty of the whole country. The other parts were diſtributed in various proportions among his followers. Eneon ap Collwyn, in particular, poſſeſſed Caerphilly, with Jeſtin's daughter in marriage, the prize which occaſioned the conteſt. (See WALES.) With reſpect to the pictureſque character of this county, it is diſtinguiſhed by unbounded variety. It has ſea, mountains, valleys and rivers; and it is ſaid to reſemble North Wales in general aſpect more than any of the ſix counties. Its mountains are not ſo high as thoſe of Brecknockſhire, but they preſent, in a conſiderable degree, the appearance of Merionethſhire, by their extreme abruptneſs, which imparts an air of wildneſs to the country, and of elevation exceeding the reality to them. They differ, however, in one material reſpect, that they exhibit greater traces of cultivation and occupancy. Glamorganſhire lies under the imputation of want of wood; but this is only true of its level and moſt cultivated parts. The obſervation does not apply either to its eaſtern or weſtern extremities. Thoſe who know the banks of the Taff, the two Ronthas, and the Cunno, the wilds of Abudarr, and Yſtradyvodwg, have ſeen ſuch woods and groves as are rarely to be found. The magnificently clothed hills of Margam, Bagland, Britonferry, and the vale of Neath, unite the beauties of cultivation with the unfelled luxuriance of foreſt ſcenery. Glamorganſhire produces with ſufficient liberality oak, aſh, beech, and all the common foreſt-trees, except elm, which is obſerved not to be indigenous. On the north and north-eaſt ſides this county is very mountainous; and in ſome parts preſents rugged rocks, and in others a ſoil covered with plenty of fine wood, and concealing rich mines of coal and iron. A tract of land can ſcarcely any where be found more inviting to ſcientific cultivation than the vale of Glamorgan, between the mountains and the ſea; and yet it is obſerved that the agriculture of this county does not keep pace with the fertility of the ſoil. In addition to natural fruitfulneſs, they have lime every where at command for manure; and this facility affords a ſtrong temptation to that act of injuſtice which the farmers call "driving the land." In Glamorganſhire, good land, ſituated near a conſiderable town, lets almoſt as high as within five miles of London; but land among the northern hills, ſcarcely reclaimed, and from its locality irreclaimable to any very lucrative purpoſe, is of courſe low in its rent, and occupied only by tenants, natives of the hills, and unacquainted with the ſuperior advantages and comforts enjoyed by the farmer in the vale. Another circumſtance which materially affects the value of farms, is right of mountain; where that is attached to an eſtate, it compenſates in ſome degree for diſtance from markets or poverty of ſoil. Theſe conſiderations are applicable to other counties as well as Glamorganſhire. But what diſtinguiſhes and enriches this county above all the reſt is the profuſion of coal, iron, and lime-ſtone, with which it almoſt every where abounds. The earth, indeed, of which it is compoſed, taken externally and internally, ſeems to be full of every thing neceſſary to the uſe and convenience of man. Manure, metal, and the means of manufacturing that metal, are all found on the ſame ſpot; ſo that induſtry is exerted at the leaſt poſſible expence, and conſequently to the greateſt poſſible advantage. The rivers, and mountain torrents, ſo remarkable in this diſtrict, afford an ample ſupply of water for all the purpoſes of life, as well as the means of procuring that artificial and cheap conveyance which is among the moſt ingenious improvements of the preſent age. With reſpect to that moſt extenſive bed of lime-ſtone, of which nearly the whole of Glamorganſhire forms only a part, it commences with the eaſtern extremity of the county, and, taking a direction due weſt, runs in a ſtraight line to Swanſea bay, appearing again in Gower, and, having paſſed under Caermarthen bay, is ſeen to occupy in great part the ſouth and weſt of Pembrokeſhire; it then takes its courſe through St. George's channel, and is found in Ireland in that exact bearing which unqueſtionably marks its continuity.

The air on the N. ſide of the county is ſharp, occaſioned by the long continuance of the ſnow on the hills; but on the S. ſide mild and temperate, occaſioned by the ſea-breezes. That in the vicinity of Margam is deemed peculiarly ſalubrious.

The antiquity of the cottages is a ſtrongly marked feature in the appearance of this county. Many of them are probably as ancient as the caſtles, to which they were attached. Their architecture is particularly deſerving of notice. The pointed door-ways, and pointed windows, ſufficiently evince their date; and though Welch towns are univerſally cenſured by ſtrangers, for the inelegance and inconvenience of their houſes, the direct reverſe is the fact with reſpect to the habitations of the peaſantry. There is one circumſtance, beſides their general ſtructure, that of many of which is the ancient Gothic, which adds to the reſpectable appearance of the cottages, and that is, the univerſal practice of lime-whitening them. This has been the cuſtom of the county from very remote ages, and is extended even to the barns and ſtables, to the walls of yards and gardens. It is noticed and praiſed in the moſt ancient Welch poems, and certainly evinces a very early ſenſibility to the arts and decencies of life. The price of proviſions in this county has of late very much increaſed, and is comparatively very high, on account of the increaſed demands of the manufacturing diſtricts, which are numerous. The price of labour is equally enhanced from the ſame cauſe. The increaſe of population, owing to the influx of commerce, and the magnitude of its eſtabliſhments at Swanſea, Merthyr-Tydvil, Neath, Aberavon, Melin Gruffydd, near Cardiff, where are the largeſt tin works in the kingdom, &c. afford another reaſon why the cheap comforts and elegancies of life are no longer to be ſought for here.

The dreſs in Glamorganſhire is not ſo ſtrongly marked as in ſome other counties, except that the women univerſally adopt the man's hat; but they wear it with a very good grace, and are remarkably neat in their attire, as well as comely in their perſons, and graceful in their carriage; which may probably be attributed to the habit of dancing, which is their favourite amuſement. Their modes of greeting are unuſually affectionate, ſometimes bordering on the ludicrous, particularly among the women, who are conſtantly ſeen ſaluting each other at market, and on the moſt ordinary occaſions of buſineſs, as well as on occaſions of diſtreſs. At a wedding it is the cuſtom of all who are invited, both men and women, to ride full ſpeed to the church porch, and the perſon who arrives there firſt has ſome privilege or diſtinction at the marriage feaſt. In caſe of death, the bed on which the corpſe lies is always ſtrewed with flowers, and the ſame cuſtom is obſerved after it is laid in the coffin. It is an invariable practice, both by day and night, to watch a corpſe; and the hoſpitality of the country is no leſs remarkable on melancholy than on joyful occaſions; for the invitations to a funeral are very general and extenſive; and the refreſhments are not light, and taken ſtanding, but ſubſtantial and prolonged. The grave of the deceaſed is conſtantly overſpread with plucked flowers for a week or two after the funeral: the planting of graves with flowers is confined to the villages, and the poorer people. It is very common to dreſs the graves on Whitſunday, and other feſtivals, when flowers can be procured.

The Roman ſtations, forts, and camps, in this county, are generally underſtood to be at Cardiff, Caerphilly, and Caera, which lies between Wenvoe, a large handſome houſe built in the caſtellated form, and the Cardiff road. The great Roman road was over Newton Down, leaving the preſent road on the right, and paſſes through Kenfig to Margam, and as ſtraight as the nature of the country will admit, through Aberavon pariſh to Neath. Glamorganſhire contains one epiſcopal town, *viz.* Llandaff, and ſeveral others, as Cardiff, the capital of the county, Caerphilly, Llantriſent, Cowbridge, Bridgend, Neath, Merthyr-Tydvil, and Swanſea; which ſee reſpectively. The principal rivers are the Remney, the Taff, the Elwy, the Ronthas, great and ſmall, the Ogmore, the Cunno, the Nedd or Neath, the Tawe or Tave, and the Loghor. In this county are ſeveral rail-ways and canals. (See CANAL.) The canal from Merthyr-Tydvil to Cardiff was completed in the year 1798. From the tide-lock, where it enters Pennarth harbour, up to the town of Cardiff, it is navigable for ſhips of 400 tons; but from Cardiff to Merthyr-Tydvil, it is navigable for barges of 100 tons. The head of this canal at Merthyr-Tydvil is 568 feet five inches higher than the tide-lock two miles below Cardiff, where it falls into Pennarth harbour. This canal has upwards of 40 locks upon it in the ſpace of 26 miles, which is its whole length; and it is croſſed by more than 40 bridges. For an account of the bridge with one arch upon Taff; ſee BRIDGE. In a vale S. W. of Cardiff, near Duffrin houſe, and not far from the village of St. Nicholas, are ſome ancient monuments, ſuppoſed to be druidical. The moſt remarkable of theſe monuments is a grey ſtone, which claſſes among thoſe pieces of antiquity called Cromlechau. (See CROMLECH.) This monument is ſupported by five large ſtones, encloſed entirely on the eaſt, weſt, and north ſides, and open to the ſouth, forming a conſiderably large, though low room, 16 feet in length, 15 wide, and, at the eaſt end, ſix feet high, but only 4½ at the weſt end. The rubbiſh about it prevents the inveſtigation of its original height. The ſupporting ſtone to the north is 16 feet long; that on the weſt end about nine feet in length. At the eaſtern extremity three ſtones are ſet cloſely together; the middle ſtone is 4½ feet wide, the northern ſtone of theſe three about three feet, and the ſouthern nearly two feet in width. Theſe ſtones, ſtanding upright, ſupport a large ſtone on the top, which forms the roof of this rude apartment. The length of this horizontal ſtone is 24 feet; it is 17 feet in its wideſt part, and of different breadths at other places; it is 10 feet at one extremity, and 12 about the middle; and from two feet to two and a half thick. The area of the top-ſtone, therefore, having for its mean breadth 13½ feet, and 24 feet for its length, will contain 324 ſquare feet; whence it appears that it is nearly thrice as large as that of the famous cromlech, near Newport in Pembrokeſhire. Near this cromlech are other heaps of ſtones called Carneu or Cairn. Of theſe cromlechs different opinions have been entertained. Some have ſuppoſed them to be places of ſhelter for the Druids, who always worſhipped in the open air, and after them, for the firſt Chriſtian prieſts, in rain and other inclemencies of the weather; others have ſuppoſed them to be oratories, from the tops of which they delivered their diſcourſes; and others again, that they were altars on which victims were offered in the times of Druidiſm.

Glamorganſhire is divided into ten hundreds, and 118 pariſhes, which, in 1801, contained 71,525 inhabitants, of whom 6903 were employed in trade and manufacture, and 18,515 in agriculture. Two members are returned for Glamorganſhire to the Britiſh parliament, *viz.* one for the county, and one for the boroughs, Cardiff, &c. Malkin's South Wales.

GLAMOUR, or GLAMER, an old term of popular ſuperſtition in Scotland, denoting a kind of magical miſt believed to be raiſed by ſorcerers, and which deluded their ſpectators with viſions of things that had no exiſtence, altered the appearance of things really exiſting, &c.

GLAN, a river of France, which runs into the Nahe, three miles E. of Sobernheim.—Alſo, a river of Carinthia, which riſes near Koſtnberg, and joins the Gurck, four miles E. of Clagenfurt.

GLAND, in *Anatomy*, is a name applied to thoſe organs of the body, which ſeparate from the blood conveyed to them by their blood-veſſels various ſubſtances, generally of a fluid nature, and diſcharge them through one or more tubes, called excretory ducts. The term however has been, and is employed more extenſively, having been applied to various organs, which, although analogous in their ſtructure, on ſuperficial obſervation, to thoſe already deſignated, do not reſemble them at all in their functions. Thus, the ſmall bodies belonging to the lymphatic ſyſtem have been called lymphatic or conglobate glands; although the knowledge hitherto acquired by phyſiologiſts concerning the action of theſe bodies, and their anatomical relations and connections do not warrant us in aſcribing to them any function ſimilar to thoſe exerciſed by the glands properly ſo called: the account of theſe will be found under the articles ABSORBENTS and ABSORPTION. The pineal, thyroid and thymus glands, the renal capſules and the ſpleen, have all been included in the glandular ſyſtem of the body, but will not be conſidered in this article, as we know nothing at all of their offices, and have no reaſon to ſuppoſe that they ſecrete any fluid. Our definition will include the ſalivary, lacrymal, and Meibomian glands, the tonſils, the ceruminous glands of the ear, and the ſebaceous glands of the face, in the head; the mammary glands in the cheſt; the liver, pancreas, and kidneys in the abdomen; the proſtate, teſticle, Cowper's glands, and glandulæ odoriferæ about the penis; and the extenſive ſyſtem of mucous glands about the head and trunk. Theſe parts, although differing widely from each other in many reſpects, agree in a ſufficient number of points to allow of their being arranged in one organic ſyſtem, which has been named the glandular: the other organs juſt enumerated, belonging to this only in name, are excluded from the arrangement by their texture and properties, their mode of vitality and functions. The extremities contain no parts belonging to the glandular ſyſtem; the fluids formed in the different organs of this apparatus belong almoſt entirely to the organic functions, while the limbs are particularly deſigned to execute the offices of the animal life.

As the phyſiology of theſe organs cannot be conveniently ſeparated from the hiſtory of their ſtructure, we ſhall conſider the vital properties as well as the organization of the glandular ſyſtem; and we ſhould make a very unnatural and arbitrary diviſion of the matter, if we did not give at the ſame time a view of ſecretion in general. We ſhall preſent the reader, in the firſt place, with an enumeration and arrangement of the ſecreted matters; we ſhall proceed, ſecondly, to give a general view of the organization of the glandular ſyſtem; and ſhall exhibit, in the third and laſt place, the opinions of phyſiologiſts concerning the mode of action of the glands and the ſubject of ſecretion in general. The reader will obſerve that the preſent article is of a general nature; the ſtructure of the particular organs will be deſcribed on other occaſions, and detailed accounts of the nature and properties of the various fluids will be found under their reſpective titles, or in other articles of the work.

The blood, apparently an homogeneous fluid, is compoſed of various matters, which chemical examination can detect and ſeparate. It contains gelatine, albumen, fibrine, acids, alkalies, earths, ſaline and colouring matters, which are employed for the renovation of the ſolids and fluids of the body. It preſents theſe to the various organs, which, by converting them into their own ſubſtance, derive the means of ſupplying the waſte occaſioned by the natural actions of the parts, or form out of them various products, diſtinguiſhed by new characters, and extraneous to their own compoſition.

tion. The former of theſe proceſſes is nutrition or aſſimilation; the latter ſecretion: they reſemble each other in their commencement, in which the organ, by ſome powers of a nature entirely unknown to us, but peculiar to living bodies, and forming part of that complicated notion, which we expreſs by the term vitality, ſelects from the blood ſuch principles as ſuit its nature or functions; but they differ in the employment of what is thus ſelected, which is retained in the body, and aſſimilated to the already exiſting organization in the former caſe, and applied to ſome other purpoſe in the latter. The ſubject of nutrition does not come under our notice at preſent.

The products of ſecretion reſult from an eſſential change in the compound conveyed to the organ, from a new combination of the principles contained in the blood, which is transformed by the ſpecific action of the various organs into different fluids, retained in or expelled from the body, according to the qualities of each. Hence, there are organs which, after forming certain fluids, collect and retain them; while others ſeparate and expel their ſecretions from the body. The object of the ſecretions is, to collect thoſe which are deſtined to fulfil important uſes in the body; while that of the excretions is, on the contrary, to expel matters which would be injurious to the frame. The two functions then of ſecretion and excretion reſemble each other in moſt reſpects: there is in both a ſeparation and collection of fluids. The difference conſiſts in this, that in the former caſe the ſeparated fluid remains in the body, while it is ſoon expelled in the ſecond. Thus ſecretion always precedes excretion; and, in order to underſtand the latter, it is neceſſary to know how the former takes place.

The word ſecretion, derived from *ſecerno*, I ſeparate, ſignifies ſimply the act of ſeparating; and its phyſiological import is conveyed in that notion. It denotes, in phyſiology, that function of a living body, in which various fluids, differing from the blood and from each other, are prepared from the common maſs of the blood, the ſame fluid being conſtantly formed in the ſame organ. No part of phyſiology is more obſcure, and more difficult in its inveſtigation, than this very function. Malpighi, who had beſtowed great labour on the ſtructure of the glands, and was conſidered to have unveiled, in a great meaſure, the myſteries of their organization, confeſſes his ignorance on this ſubject; and, as the avowal, from ſuch a quarter, is intereſting, we ſubjoin the paſſage, obſerving that the remarks here made, concerning the kidnies, apply equally to all other ſecretions. He ſays of the urinary ſecretion, "quanam arte id contingat obſcuriſſimum: licet enim glandularum miniſterio totum hoc ſubſequi rationi ſit conſonum, quoniam tamen minima illa, ſimplexque meatuum in glandulis ſtructura nos latet, ideo quædam tantum meditari poſſumus, ut huic quæſito probabiliter ſatisfaciamus. Neceſſe eſt hanc machinam interna configuratione ſeparationis opus peragere; an vero his, quæ ad humanos uſus paſſim uſurpamus, quibus fere conſimilia effigimus, conſonet, dubium; licet enim occurrant analogæ ſpongiæ, incerniculi, fiſtularum cribrorumque ſtructuræ, cui tamen ex his conſimilis undequaque ſit renum fabrica, difficillimum eſt aſſignare, et cum naturæ operandi induſtria fecundiſſima ſit, ejuſdem ignotæ nobis reperientur machinæ, et quas nec mente quidem aſſequi licet. Illud miror tam copioſa, diverſaque corpora ſeparari per has glandulas in naturæ ſtatu, exit enim ſubſtantia aquea cum ſalinis, ſulphureis et conſimilibus particulis, et ex morbo etiam abſceſſuum reliquiæ, et totius quandoque corporis inquinamenta ſeparantur detentis ſanguineis particulis," &c. De Viſcerum Structura; De Renibus, cap. 6. The whole buſineſs is carried on in the minute, and, as we may call them, elementary parts of the viſcera and glands, the ſtructure of which eludes the reſearch of our ſenſes, and can ſtill leſs be developed by reaſoning or reflection. Obſervation cannot follow the work throughout; nor does it admit of elucidation by experiment, like ſome other ſubjects which have been explained by artificial imitation of the proceedings of nature.

Unwilling to confeſs their ignorance and leave their ſyſtems imperfect, phyſiologiſts have attempted to raiſe, on hypotheſes, that ſtructure, for which anatomy afforded no foundation. Their notions, reſting merely on probabilities and looſe analogies, have flouriſhed and fallen in ſucceſſion; and we ſhall find that the liſt of truths and aſcertained facts is much ſhorter than that of opinions and errors.

The compoſition of the ſecreted fluids preſents various differences in the nature and proportions of their conſtituent parts. They poſſeſs, in common, all the general characters which belong to animal ſubſtances: but each has certain particular diſtinctive qualities, depending on the various ſimple or compound principles, the union of which determines its ſpecific nature. Thus, ſetting aſide the reſemblance of all our fluids, conſidered as animal productions, fat does not reſemble bile; the latter is very different from milk; which, again, has no reſemblance to the ſalivary, gaſtric, pancreatic, ſeminal fluids, &c. which muſt be referred to ſo many different claſſes.

The arrangement of the animal fluids is more difficult than we ſhould have expected at firſt ſight. The falſe and imperfect notions, which were long entertained of their chemical compoſition, lead to claſſifications founded on the uſes to which they ſeemed to be deſtined. Thoſe employed in the nouriſhment and growth of the body were called recrementitious, ſuch as chyle, blood, ſerum, lymph, &c. The excrementitious included thoſe which are expelled from the body; as the urine, perſpiration, &c. A third claſs was made up of ſuch as partake of the characters of both theſe; of which a part is rejected as noxious, while the reſt is retained, in order to anſwer ſome particular purpoſe. Under the head of excremento-recrementitious humours, were arranged the ſaliva, bile, pancreatic juice, mucus of the inteſtines, &c. The objections to ſuch an arrangement are too obvious to need enumeration. This diviſion, as well as that before alluded to, of excretions and ſecretions, cannot be adopted with any benefit, while the nature and objects of many ſecretions are ſo little underſtood, that we cannot determine whether they are expelled as noxious, or ſerve very uſeful purpoſes in the economy. The bile, for example, has been very commonly deemed an excrementitious fluid, but by a completely arbitrary aſſumption: what proof have we that perſpiration ſeparates any thing noxious from the blood? For what reaſon is the ſecretion of the pancreas placed in one rather than in the other of theſe diviſions?

Pitcairne, who was followed by Michelotti, divided the animal ſecretions in a manner which has, at leaſt, the merit of ſimplicity, and leads to no falſe notions concerning their uſes; he diſtinguiſhed them merely as being thick or thin.

Haller diſtributed the fluids into four claſſes, according to the chemical notions of his time, and to the degree of complication in their elements. 1. The aqueous fluids. Theſe have a very large proportion of water in their compoſition; hence they are diſtinguiſhed by their fluidity, and have no ropineſs. Fire diſſipates them almoſt entirely, excepting a very ſmall proportion of earthy reſidue; neither alcohol nor acids coagulate them. Beſides a little earth, they contain ſome ſaline and oily matters. Many of our fluids belong to this diviſion. Some are expelled from the body, and are ordinarily deemed excrementitious; ſuch are the urine, which is not coagulable in the natural ſtate; the inſenſible Sanctorian perſpiration, and the pulmonary exhalation. Sweat is a mixed fluid, containing oily or ſebaceous matter, together with water. Several of the fluids, which are deſtined to ſerve particular purpoſes in the animal economy, contain very little except water. This is the caſe with the ſecretion of the proper ſalivary glands, with that of the pancreas and lacrymal gland; with the perfectly pure and tranſparent aqueous humour of the eye, and other watery fluids in the ſame organ.

2. Mucous fluids. Theſe differ from water in being leſs fluid; they are tenacious, ſo as to adhere to ſolid bodies, and ropy. They mix with water, are inſipid and inodorous, and nearly colourleſs. The evaporation of their aqueous parts reduces them into hard and dry cruſts. Acids do not coagulate them; but alcohol has a ſlight effect. They yield, on diſtillation, a large quantity of water, volatile ſalt, oil, and a carbonaceous reſidue. To this diviſion belong the lubricating fluids, which are poured out over the extenſive ſurfaces of the reſpiratory, digeſtive, urinary, and genital organs, and all the parts connected with them.

3. Gelatinous fluids; which are coagulable by heat, warm water, alcohol, and acids, remain fluid below 148° Fahrenheit; and have a mild or ſlightly ſaline taſte. Haller places in this order the ſerum of the blood, the lymph conveyed by the abſorbents, the water of the amnios, the ſerous exhalations of the circumſcribed cavities, the lymph of the cellular ſubſtance, and the fluid of the Graafian ovula. He alſo places in this diviſion the ſynovia of the joints, and the fluid of the tendinous thecæ; obſerving, at the ſame time, that theſe are partly compoſed of oily matters.

4. Oily fluids. Theſe are repreſented by Haller as more perfectly animalized productions: they are freed from the ſuperfluous quantity of water, and are inflammable; or at leaſt contain much of that matter which takes fire and deflagrates. At their firſt production they contain much water, ſo as not to be capable of inflammation, nor to poſſeſs their peculiar characters, but rather to reſemble mucus or gelatine: they undergo changes afterwards, which deprive them of their aqueous parts, and render them more viſcid and oily. The fat and the medullary ſubſtance of the bones, are the moſt extenſive ſpecimens of this order: it contains alſo ſebaceous matters of various kinds, as the greaſy cutaneous matter, the Meibomian ſecretion of the eye-lids, that of the glans penis, and of the external organs in the female. The bile, cruor of the blood, milk, and proſtatic fluid, belong to the ſame claſs.

Such are the four diviſions, in which Haller has arranged the animal fluids: he obſerves that ſeveral, being of a mixed nature, do not belong excluſively to either claſs, but ought, from the diverſity of their principles, to be referred to more than one: indeed there is hardly any, which can be rigorouſly ſaid to conſiſt of a ſingle element. Then, again, many evidently contain more fluids than one, formed ſeparately in the firſt inſtance, each in its appropriate organ, and afterwards mixed together. Thus the ſemen contains the ſecretions of the teſtis, proſtate, and veſiculæ; the ſweat is made up of the water of perſpiration with the cutaneous oil; the tears are a mixture of water, mucus, and ſebaceous matter; ſpittle contains water and mucus, &c.

The vaſt improvements in the ſcience of chemiſtry ſince the time of Haller muſt neceſſarily have ſubverted the baſis of the arrangement juſt deſcribed; which, when conſidered by a chemiſt of the preſent day, would be found open to objection at all points. The deficiencies of the claſſification are too obvious to render it neceſſary that we ſhould particularize them.

Blumenbach has claſſed the products of ſecretion on a ſomewhat different principle. "The ſecreted fluids," ſays he, "diſplay on one hand ſo much variety, while on the other they ſeem to be joined by ſo many points of affinity, that their arrangement in claſſes muſt be in great meaſure arbitrary. They may, however, be diſpoſed in the following order, according to the ſlighter or more eſſential changes and modifications which their elements, contained in the maſs of the blood, undergo in the ſecretory organs. Milk may be placed in the firſt rank, as conſiſting apparently of a very ſimple modification of chyle, and formed from the blood by a very eaſy proceſs after the influx of the chyle. The watery ſecretions come next, ſo called from their fluidity and tranſparency, although they differ materially from water in the nature of their conſtituent elements, particularly in containing a portion of albuminous coagulable matter—including the fluids of the eye; the tears, the matter of perſpiration, the exhalations in the cellular ſubſtance, and in the thoracic and abdominal cavities, to which the liquor pericardii and the fluid of the ventricles ſeem to be analogous. The urine, ordinarily referred to the aqueous fluids, is diſtinguiſhed by very remarkable peculiarities. The ſalivary fluids, concerned in the functions of maſtication, digeſtion, and chylification, ſeem to be rather more changed. Then follow the mucous ſecretions, ſpread over the ſurfaces of moſt of the viſcera belonging to the natural and generative functions, as well as the cavities of the noſe, larynx, and reſpiratory organs. The mucus in the interior of the eye, as well as that under the epidermis, do not appear to differ eſſentially from the preceding. Under the title of adipous fluids may be claſſed, beſides the common fat, the medulla of the bones, and the ſebaceous matter of the ſkin (including alſo the cerumen of the ears). The greaſy matter formed under the prepuce about the corona glandis of the male, and the ſimilar production in the female pudenda, may be referred to the ſame claſs; as well as the ſecretion of the Meibomian palpebral glands. The liquor of the amnios, and the ſynovial fluids, are commonly deemed gelatinous; but their real nature is not yet underſtood, neither is that of the fluid, hitherto unnamed, thrown out in the uterus under the venereal ſtimulus, known. The fluid contained in the early months of conception between the chorion and amnios, that of the veſicula umbilicalis, and that which ſurrounds the veſſels of the umbilical chord, is as yet little underſtood. The contents of the Graafian veſicles, and the proſtatic fluid, ſeem to be truly ſerous or albuminous. The male ſemen is quite a peculiar product, not to be compared to, or claſſed with, any other: and the ſame remark will hold good alſo of the bile." Inſtitut. Phyſiolog. ſect. 32.

The diviſion of this able phyſiologiſt would be natural and inſtructive, if the animal fluids deviated from the nature of chyle by gradations which could be eaſily perceived and marked. But we really cannot eſtabliſh among them any order correſponding to their natural compoſition; and the differences obſervable between chyle and fat, between the aqueous fluids and bile, conſtitute intervals, which we cannot appreciate or meaſure. Indeed there are often ſo many differences and ſo few relations between one fluid and another, that we can ſcarcely compare them at all.

The vaſt progreſs which chemiſtry has made of late years, and the valuable diſcoveries with which the analyſis of animal ſubſtances, as well as other parts of the ſcience, has been enriched; might have led us to expect that the claſſification of the fluids would have been reformed according to their conſtituent principles, and brought into a condition correſponding to the reſt of the ſcience. Fourcroy has indeed given ſuch a diſtribution of the ſubject in his Elements of Chemiſtry; but he does not ſeem to value the arrangement very highly, as he has not continued it in his laſt great work, the "Syſteme des Connoiſſances Chimiques." In proportion as the various animal products are analyſed with more accuracy, they are found to poſſeſs ſpecific characters which diſtinguiſh them from each other; and therefore render it impoſſible to refer them without impropriety to any general heads: accordingly in the moſt recent and able chemical works, they are enumerated and conſidered ſeparately. In this point of view, therefore, the exactneſs and perfection of modern analyſis renders our attempts at a general arrangement of the animal fluids unavailing; and it has only ſerved hitherto to ſhew the defects of ſuch methods.

Dumas, in his "Principes de Phyſiologie," adopts a different plan, which he calls a natural phyſiological one, and to which he aſcribes the advantage of connecting cloſely the knowledge of the fluids with that of their uſes. "This method," he obſerves, "which is the moſt natural and uſeful of all, is to refer the fluids to the various organic ſyſtems in which their ſecretion takes place, to make a claſs of humours for each ſyſtem, to conſider each of them as inſeparable from the ſyſtem to which it belongs, and to conduct the ſtudy of both together. We ſhall therefore have as many different claſſes or ſpecies of fluids as there are organic ſyſtems in the body. This ſimple and natural method of conſidering the ſubject appears to me to be preferable to the more laboured arrangements founded on the eſſential nature and chemical compoſition of the fluids, becauſe it is not expoſed to that uncertainty, which the imperfection, the variations, and even the progreſs of our knowledge concerning the nature and properties of animal matters, muſt unavoidably occaſion. It is, moreover, the moſt eaſy and inſtructive way to conſider the ſecreted fluids in their relations to the ſolid organs, with whoſe functions they are concerned. The diſtribution of the animal fluids with regard to the ſeven organic ſyſtems of which the human body is compoſed, will be better underſtood by preſenting it in a tabular view, where their relations, influences, and uſes, will be immediately perceptible.

Fluids of the nervous or ſenſitive ſyſtem.	Fluid of the ventricles of the brain, Aqueous, vitreous, and cryſtalline humours of the eye, Tears, Meibomian ſecretion, Mucus of the noſe, Cerumen, Fluid of the labyrinth of the ear, Saliva.
Of the muſcular or moving ſyſtem.	Fibrine, Seroſity, Fat.
Of the vaſcular or calorific ſyſtem.	Mucus of the trachea and air-veſſels, Fluid of the pericardium, ——— pleuræ, Pulmonary exhalation, Blood.
Of the viſceral ſyſtem or organs of ſupply.	Mucus of the mouth, pharynx, and œſophagus, ——— ſtomach, ——— inteſtines, ——— kidney and bladder, Gaſtric fluid, Pancreatic fluid, Inteſtinal fluid, Exhalation of the abdominal cavity, Bile, Liquor of the renal capſules, Urine.
Of the lymphatic or collecting ſyſtem.	Reſidue of all the fluids, and of nutrition, Lymph, Fat of the cellular tiſſue, Mucous fluid.
Of the ſexual or reproductive ſyſtem.	Proſtatic liquor, Mucus of the urethra, ——— vagina, Seminal fluid, Exhalation of the tunica vaginalis, Contents of the ovarian veſicles, Liquor amnii; Meconium.
Of the bony or ſupporting ſyſtem.	Gelatine, Medulla, Synovia.

Of the fluids juſt mentioned, ſome are ſecreted in certain organs belonging to their reſpective ſyſtems; *e. gr.* thoſe of the conglomerate glands, of the glandular viſcera, &c.; others are formed over whole organic ſyſtems, without any particular apparatus, as the exhalation in the cellular membrane, that of the circumſcribed cavities, &c.; while others are not the produce of ſecretion, but move freely through all parts of the ſyſtem in which they are concerned, as the blood and contents of the abſorbing ſyſtem. With the latter we have nothing to do at preſent; neither does the organization, from which the fluids of the middle claſs are produced, come under our conſideration in this article, but it will be deſcribed in INTEGUMENTS, MEMBRANE, and CELLULAR SUBSTANCE.

The phyſiological theory of the ſecretions muſt be founded on a perfect knowledge of the nature of the animal fluids, and of the ſtructure of the ſecretory organs. The ſolution of the intereſting problems ariſing out of this ſubject, can be expected only from the union of anatomy, enlightened by juſt views of phyſical ſcience, with chemiſtry, ſupported and directed by phyſiological obſervation. The ſecretory organs are of various kinds, and preſerve a conſtant relation to the kind of ſecretion, and the manner in which it is effected. Thoſe fluids, which ſeem to be derived from the blood, with the leaſt change, are not produced by a complicated organic apparatus. The exhalation, which moiſtens the ſurfaces of the circumſcribed cavities, the aqueous vapour of the lungs, and the cutaneous perſpiration are formed by organic ſyſtems, compoſed chiefly of vaſcular ramifications, without poſſeſſing any thing that is at all analogous to glandular ſtructure. The arrangement of the fibrous tiſſue of muſcles, and of the bony fabric, admit of the ſame remark; if we ſuppoſe that theſe organs habitually ſecrete fibrine or bony matter. But theſe are caſes, which come under the deſcription of nutrition, and in this ſenſe all parts of the body may be called ſecretory organs,

gans. The mucous fluids, which appear to differ more conſiderably from the materials in the blood, are generally ſeparated by particular glands, which are called crypts or follicles, contained in the ſubſtance of the membranes or viſcera. But it ſeems probable, that theſe alſo may be ſeparated from the vaſcular ramifications of a ſimple membranous tiſſue without any expreſs glandular ſtructure, as in the caſe of ſeveral mucous membranes. It remains therefore for us at preſent to explain, in a general way, the anatomical ſtructure of the various glands, by which the other animal fluids are ſecreted.

The glandular differs from moſt other ſyſtems, in the animal economy, in this circumſtance, that its peculiar tiſſue is not exactly identical in all the organs belonging to it. The fibres of any voluntary muſcle would ſerve equally well to compoſe any other of the ſame kind. Tendinous fibres, cartilaginous and bony ſtructures, are the ſame every where. The ſubſtance of the liver, on the contrary, is widely different from that of the kidney; which again is very diſtinct in its character from that of the ſalivary glands. The glandular ſyſtem, therefore, is marked in its various parts with very few general attributes, which alſo ſuffer many exceptions.

Situation, forms, diviſion, &c. of the glandular ſyſtem.—Glands have two different ſituations in the body. Some are ſubcutaneous, as the breaſts and ſalivary glands; others deeply ſeated, as the liver, kidnies, pancreas, and moſt of the mucous glands, and conſequently, not expoſed to the action of the external bodies. Many of them occupy ſituations where there is much motion, as the ſalivary glands near the jaw, the mucous in cloſe contact with a plane of muſcular fibres, the liver in the vicinity of the diaphragm, &c. Theſe facts have led to the ſuppoſition that the neighbouring motion, extraneous to their functions, determined the excretion of the ſecreted fluids. But, in the firſt place, the palatine glands, the pancreas, the teſticles, and even the kidnies, are ſo ſituated, as to be out of the way of ſuch external aſſiſtance. And we obſerve, further, that mucus is ſecreted as abundantly by the pituitary membrane, as in any other part, although there is no muſcular plane here; that the lining of the bladder produces an equally copious ſupply, when the viſcus is paralytic; and that various cauſes augment the ſecretions, without any connection with the circumſtance firſt alluded to, as ſialagogue medicines, or the ſight of food in the caſe of ſalivary glands. We cannot doubt, therefore, as Bordeu has obſerved, that this mechanical cauſe has nothing to do with the matter, and that the eſſential cauſe of all excretion conſiſts in a peculiar vital action.

Some glands are ſingle, as the liver and pancreas; others are arranged in pairs, as the kidnies, ſalivary, and lacrymal glands. The latter are ſimilar on both ſides of the body; but the reſemblance cannot be compared, in reſpect to its exactneſs, to that of the double organs in the animal life. One kidney is lower than the other; their arteries, veins, and nerves, are not analogous in length or ſize; often various notches exiſt in one, and not in the other: the ſame obſervations will apply to the ſalivary glands.

Generally the forms are not determined in a very certain manner in this ſyſtem: they are ſubject to innumerable modifications in volume, direction, and the different proportions; and differ remarkably, in theſe reſpects, from the preciſe and rigorous laws which govern the conformation of the organs of animal life. Take ſome one organ, by way of example, from both lives. A ſmall brain will be found to poſſeſs a corpus calloſum, thalami optici, and corpora ſtriata of correſponding ſize; while, on the contrary, a large liver often has a ſmall lobulus Spigelii, and *vice verſâ.* A kidney will often be larger in its upper portion only, or in the lower. Theſe variations in the animal life affect the whole organ: while they frequently are obſerved in ſome part only in the organic. Bichat, who makes this remark, endeavours to explain the fact, by his opinion concerning the neceſſity of a harmony of action in the animal life. If one ſide of the brain were developed more than the other; if one eye, one ear, or one ſide of the noſe exceeded the correſponding organs, the operations of the mind, the ſenſe of ſight, hearing or ſmelling, would be inevitably diſturbed: while the ſecretion of bile or urine would go on equally well, although ſome particular part of the ſecreting organs were proportionally larger or ſmaller than the others. The glands, which are ſurrounded by membranes, as the liver, kidnies, and even the pancreas, are leſs ſubject to theſe variations of figure, than thoſe which are contained in the cellular ſubſtance, without any membranous covering, as the ſalivary, lacrymal, mucous glands, &c. Thoſe of the latter deſcription in the mouth, and along the trachea, are never alike in two ſubjects. The parotid ſometimes is prolonged over the maſſeter, and at others leaves that muſcle uncovered; varies in its breadth, &c. When either of a pair of glands is ſo diſeaſed, as to be incapable of continuing its function, that on the oppoſite ſide of the body either increaſes in bulk, as we may ſometimes obſerve in the kidnies; or its ſecretion is augmented.

The ſurface of ſuch glands as are not covered by membranes is uneven and tuberculated; it may be in contact with muſcles, veſſels, nerves, &c. even with bones, as in the ſalivary and lacrymal glands. In general, they are ſurrounded by leſs cellular tiſſue, than organs which have conſiderable motion. That which is in immediate contact with them is denſe, like the exterior covering of arteries and veins, but it is not ſo firm. It does not uſually contain fat; and by iſolating the gland to a certain degree, it is analogous to the peritoneal covering of the liver, or to the proper membrane of the kidney or ſpleen. Anatomiſts have very commonly divided the glandular ſyſtem into the conglobate and conglomerate glands. The former name denotes the gland-like bodies belonging to the lymphatic ſyſtem, and was deſigned to ſhew that each formed only one maſs. The latter term is moſt properly applied to the ſalivary and lacrymal glands and pancreas, which are made up of numerous ſmaller particles united together. It cannot well be given to the liver and kidnies, which poſſeſs nothing of a conglomerate ſtructure; and theſe, accordingly, have been generally called glandular viſcera.

Organization of the Glandular Syſtem.

1. *Peculiar tiſſue of this ſyſtem.*—The glandular tiſſue differs from moſt others, in poſſeſſing no marks whatever of a fibrous diſpoſition. Its component elements are not placed by the ſide of each other, according to longitudinal or oblique lines, as in the muſcles, the fibrous ſyſtem, the bones, nerves, &c.; but they are heaped together, by a kind of confuſed, and, as it were, caſual approximation, and adhere together but weakly. Thus, while organs, which poſſeſs diſtinct fibres, have conſiderable powers of reſiſtance, particularly in the direction of their fibres, glands are torn eaſily by ſlight degrees of violence. The broken ſurface is uneven, full of projections and depreſſions, which diſtinguiſh theſe organs from cartilage; the rupture of which is generally ſmooth. The proſtate, tonſils, and mucous glands reſiſt much more powerfully than the liver and kidnies, in which the phenomenon juſt mentioned is the moſt eaſily obſervable. The pancreas and ſalivary glands are elongated by any diſtending force, without tearing; but this circum-

ſtance ariſes from the abundant cellular tiſſue diſtributed throughout their ſubſtance, and not from any peculiar property of their glandular tiſſue. Their lobes are ſeparated in proportion as the intermediate cellular filaments are elongated.

The glandular tiſſue, which anatomiſts have generally called *parenchyma*, is diſpoſed in three different ways. 1. In the ſalivary, lacrymal, and pancreatic glands, which are properly called conglomerate, the organ is made of diſtinct portions, connected together by a looſe and copious cellular texture, the intervals of which tranſmit veſſels and nerves. Theſe are again made up of ſmaller lobes united in the ſame way; and the diviſions are more eaſily purſued when water has penetrated into the connecting ſubſtance. Repeated diviſions ſhew us ſmaller and ſmaller component portions, till we come at laſt to very ſmall bodies, ſtill conſpicuous to the naked eye, and called glandular acini (grains glanduleux, Fr.) Theſe component parts are firmer in proportion to their ſmallneſs, as they are ſurrounded and connected to the adjoining portions by ſhorter and firmer cellular ſubſtance. We can eaſily follow the 2d, 3d, and even the 4th diviſion of theſe lobes with the ſcalpel. The acini are of a roundiſh figure and pale colour, and diſtinguiſhable from any thing of a muſcular nature by the abſence of fibres. When examined with magnifying glaſſes, they are ſeen divided into ſmaller portions by cellular interſtices, and we can hardly come to an end of theſe diviſions, if we employ ſucceſſively greater magnifying powers. 2. There are no traces of the primary diviſions juſt deſcribed, into the larger and ſucceeding lobes, in the liver and kidnies. They conſiſt of an uniform and even tiſſue made up of glandular acini, cloſely united together into one ſubſtance. The connecting cellular ſtructure of theſe particles, if there be any, is very ſmall in quantity and ſhort; hence the facility with which theſe bodies may be torn, and the kind of granulations which their rupture preſents. 3. The proſtate, tonſils, and all the mucous glands, have no appearance either of primary or ſecondary lobes or acini. The firſt of theſe conſiſts of a denſe parenchyma: the latter of a ſoft and almoſt pulpy ſubſtance. They cannot be torn, like the liver and kidnies.

Controverſy concerning the ſtructure of the glandular acini.—It is eaſy to proceed thus far in analyſing the compoſition of the glands; but theſe reſearches do not at all contribute to explain the mechaniſm of ſecretion. In the hope of accompliſhing that object, anatomiſts began, as ſoon as the improved condition of the ſcience furniſhed the means of proſecuting ſuch inveſtigations, to ſubject the various ſecretory organs to a very attentive and cloſe examination, and endeavoured to ſhew the nature of the acini, into which moſt of the glands were ultimately reſolvable. The aid of magnifying glaſſes, and of anatomical injections, was reſorted to on this occaſion; but the opinions of two individuals, who had devoted much time to the ſubject, were completely at variance, and gave riſe to a controverſy, which had at leaſt this good effect, that it occaſioned a very thorough examination of the ſubject. Malpighi taught that the acini are hollow; that the arteries diſtributed on their ſurface depoſit the ſecreted fluid in their cavities, and that it is conveyed thence by an excretory duct; that the union of theſe tubes forms larger excretory canals, &c. He deems the mucous glands of the alimentary canal, mouth, &c. to be the moſt ſimple forms of glandular ſtructure, and conſiders that the larger glands differ only in conſiſting of an aggregation of ſuch ſimple ones. "Glandula, qua palatum, œſophagus, inteſtina, et conſimiles partes copioſe ditantur, eſt omnium ſimpliciſſima, et idea reliquarum glandularum. Hæc itaque folliculo membranoſo ſeu loculo conſtat, qui ovali, interdum rotunda, quandoque lenticulari, vel oblonga conſtat forma; concavitate pollet, quæ ut plurimum in vaſculum excretorium aperitur, quo ſeparatus humor in peculiarem capacitatem, vel foras extra pellitur. Circa loculum ſeu folliculum vaſa ſanguinea et nervi diramantur, et ut conjectura aſſequi licet, carneæ fibræ circumducuntur, vel ſaltem ſub plano extenſi muſculi locantur, ut in ventriculo, et œſophago patet. Huic proximæ ſuccedunt glandulæ, majori loculorum numero ditatæ, quales ſunt in facie, in labris, in quibuſdam cutis partibus, circa pudendum et palatum: excretorio namque vaſculo, interdum oblongo multiplices appenduntur loculi membranoſi in ipſum hiantes, circa quos ſanguinea vaſa et nervi ramificantur." Epiſtola Reg. Soc. Londin. Dicata, in Opp. Poſthum.

In the Exercitationes de Structura Viſcerum, he endeavours to prove that the larger glandular bodies are formed on the ſame principles with the parts juſt alluded to. He examines the liver by removing the external membrane, macerating it in water, boiling, &c. and employs the microſcope. "In compingendo itaque hepate talis videtur firma naturæ methodus: vaſa in ramos hinc inde diſperguntur; ad ſingulas autem vaſorum propagines, licet etiam exiles, lobuli appenduntur, conicam ut plurimum ſervantes figuram: conſimilem etiam in pancreate, cæteriſque conglomeratis glandulis obſervamus.—Glanduloſi acini, quibus lobulus componitur, cum peculiarem circumſcriptionem habeant, neceſſario propria et ipſis figura, quæ ut plurimum hexagona, vel plurium laterum eſt: hinc etiam neceſſe eſt, ut ad invicem, præter vaſorum ramos, peculiaribus membranoſis vinculis nectantur, et interſtitia aliqua emergant, quæ in piſcibus et imperfectioribus magis conſpicua ſunt, in perfectioribus autem obſcurantur. Ad ſingulos autem, hoſque minimos lobulos, multiplices vaſorum rami derivantur. Tota jecoris moles ex his duobus coaleſcit, glanduloſis ſcilicet acinis, et diverſis vaſorum propaginibus; quare, ut aliquod ex his commune opus emanet, neceſſe eſt, ut inter glandulas et vaſa commercium intercedat." Exercit. Anat. de Hepate, cap. 2. He deſcribes ſimilar acini as exiſting in the kidnies, ſpleen, and cortical ſubſtance of the brain. And he defends his opinions on this ſubject in general, by arguments drawn from various ſources, as the appearances of diſeaſe, &c. which cannot be allowed to prove much on either ſide.

The opinion oppoſed to that of Malpighi, conſiders all the viſcera and glands to conſiſt of veſſels and cellular ſubſtance, without any membranous cavities interpoſed between the arteries and the excretory ducts. This doctrine was particularly ſupported and extended by Ruyſch, who, although he was not remarkable for quickneſs or learning, exceeded moſt of his contemporaries in his opportunities of diſſection, which were very ample, and continued for nearly eighty years, and in the art of injecting and preparing the organs of the body in various ways. His obſervations carried the greater weight, becauſe he was averſe to hypotheſes, and taught only what he ſaw. In his youth he admitted, with other anatomiſts, the glandular acini of the viſcera. But, when he found, as he proceeded in his anatomical labours, that membranes, naturally perfectly white, exhibit innumerable veſſels after injection, that the ſubſtance of the viſcera is filled almoſt entirely with injected fluids, and may be reſolved into a mere vaſcular contexture by maceration in pure water, he gradually changed his opinion, and began to teach that the viſcera and the conglomerate glands, and even moſt of the ſimple ones, are compoſed entirely of veſſels, from which the excretory tubes are continued without any intervening medium. Injections in the dead body ſeem to prove the latter circumſtance, as fluids in ſome inſtances paſs very readily from the blood-veſſels into the excretory ducts; *e. gr.* in the kidney and liver. As Ruyſch continued his inveſtigations, he found that the bodies conſidered as glandular and hollow acini by Malpighi, are mere blood-veſſels. After accurately injecting the liver and kidney, and macerating them in water, he found them reſolved into ſmall cluſters of blood-veſſels, and proved this ſo clearly by his preparations, that Boerhaave, who had been a warm defender of Malpighi's doctrine, in defence of which he wrote the Epiſtola de Fabrica Glandularum, ad F. Ruyſch., was induced to renounce his opinion. The elegant preparations of Ruyſch, and his appeal to the evidence of diſſection, and other anatomical inveſtigations, brought moſt anatomiſts over to his opinions, which, indeed, are generally received in the preſent day. Haller gives the following ſummary of his opinions on this ſubject. "Viſcera nempe ſecretioni deſtinata, eorumque imprimis acinos, glandulaſque conglomeratas, meris componi vaſculis, celluloſæ telæ ope conjunctis, eo cum vinculi robore ut conſiſtat acinus, aque ſui ſimilibus, laxioribus filis ſibi annexis, totus et integer deduci poſſit. In quolibet præterea acino, vaſorumve glomere, ex eadem ſententia, ductus excretorius eſt, pluresve ductuli, qui de arteriola minima, tanquam ramulus minor et ſanguini impervius, decedere videtur, quæ fabrica in rene certo reperitur, in aliis quidem colis magna cum veri ſpecie ex conjectura admittitur. Secretio adeo a vulgari ſanguinis circuitu hactenus differt, quod in iſta quidem arteriola minima cylindrica, in venam ſibi æqualem, aut ampliorem continuetur, quæ ſanguinem recipere apta ſit, in humorum vero ſeparatione ductus excretorius, rubro vaſculo arterioſo minor, tanquam ramus ex eo vaſculo prodeat." Element. Phyſiolog. lib. 7. ſect. 2. § 14. The opinions and arguments of Ruyſch may be collected in his anſwer to the letter of Boerhaave mentioned above, in ſome of his other epiſtles, and in various of his Theſauri. He has given ſeveral figures repreſenting the diſtribution of the minute veſſels in various organs, and proves ſatisfactorily that the bodies called acini by Malpighi are merely minute veſſels: he ſhews this concerning the ſpleen and brain, as well as in the glandular viſcera. On the ſubject of this controverſy, we may obſerve, that its importance does by no means warrant the pains beſtowed on it, and the noiſe made by the combatants in conducting it. The nature of the inveſtigation, which is carried on entirely in the minute elements of the body, and proſecuted by means of magnifying glaſſes, injection, maceration, and corroſion, renders the concluſions, which we arrive at, in great meaſure, uncertain; and the parts, of which the ſtructure is ſought, are ſo exceedingly ſmall, that neither opinions can be conſidered as clearly demonſtrated, or ſatisfactorily refuted. The mode, in which ſecretion is effected, is equally obſcure, whichever of the two ſuppoſitions we may adopt: neither of them ſolves the myſtery. Let us admit with Ruyſch that the excretory tube is continuous with the ſecreting artery; ſhall we then underſtand how ſuch infinitely diverſified products, all differing from each other, and from the blood, are formed from the common maſs of that fluid? Shall we be able to point out the preciſe ſpot in the continuous canal where the blood ends, and the bile, urine, or milk begins? and to explain *how* the change is effected? If, on the contrary, we ſuppoſe, with Malpighi, that arteries, ramifying on ſmall membranous cavities, depoſit the new products in thoſe receptacles, our ignorance of the points in queſtion is neither more nor leſs complete than in the other caſe. Too much labour has been already ſpent on theſe idle diſquiſitions; modern anatomiſts have judged wiſely in abandoning them, and in preferring the taſk of collecting facts concerning the natural and diſeaſed ſtructure and functions of our frame.

With ſuch impreſſions, concerning the value of theſe purſuits, we were much diverted, at obſerving the complacency with which Ruyſch, the great authority of the two laſt centuries on the ſtructure of glands, contemplates his own doctrines, and the ſang-froid with which he repreſents his own diſcoveries, as the immediate produce of a direct divine revelation. "Placuit bonitati divinæ hæc revelare meis laboribus jam ſenilibus. Invidi, et inimici mei hæc ridebant in initio, ſed Deus cui ſoli omnis gloria et honor, hæc ita benedixit poſtea," &c. Epiſtola Anatom. ad v. c. H. Boerhaave.

The organization of all the glands is by no means ſo uniform as to admit of our referring the mode of glandular ſecretion to any one mechaniſm. The mammary gland and teſtis do not reſemble the texture of the organs already deſcribed. In both of theſe, which again are widely different in all their ſenſible properties from each other, there is a vaſt congeries of ſecretory tubes, infinitely convoluted, with vaſcular ramifications copiouſly diſtributed among them. In the ultimate elementary parts of theſe glands, as far as our ſenſes can purſue them, we diſcover nothing but minute, ſerpentine, and very ſlender tubes; which are particularly obvious in the teſtis, without any trace of Malpighian or Ruyſchian acini. In the breaſt, indeed, the exiſtence of theſe bodies has been a matter of diſpute, and arguments, not deficient in plauſibility, have been adduced on both ſides of this important queſtion, which, like many religious myſteries, is involved in juſt ſo much obſcurity, as to make it a very ſuitable ſubject for polemical exercise.

The organs of the mucous ſecretion, in general, do not fall within the deſcription already given of the glandular ſtructure. Theſe ſeem to exhibit, in many inſtances, a very ſimple form of gland, of which, however, the action is no more underſtood, than that of the more complicated kinds. They conſiſt of ſmall receptacles, lined by the membrane covering the part, receiving the ſecretion, and pouring it out by a ſingle orifice in the centre. Very ſimple glands of this kind are ſeen at the root of the tongue: their figure is circular or elliptical; the cavity is lined by a thin membrane, ſurrounded by a pulpy vaſcular ſubſtance, which cauſes a ſuperficial prominence, in the centre of which is a ſimple aperture, affording mucus on preſſure after death.

In other inſtances, the membranous part is more conſpicuous, and the glandular ſubſtance leſs conſiderable, or indeed hardly perceptible, ſo that the whole ſeems to be formed merely of membrane. Theſe have been called cryptæ, folliculi, &c. Their figure is generally circular or oval, and they are lined by continuations of the membrane, to which they belong. They are placed in the cellular ſubſtance, and may poſſeſs more or leſs of the pulpy vaſcular matter. They have ſimple excretory tubes, commencing from the hollow of the membranous cavity, and terminating by open orifices on the ſurface of the part to which they belong, as the mouth, fauces, trachea, or inteſtines. Preſſure forces the ſecreted mucus from the open orifice. To this claſs may be referred the glands of the lips, cheeks, epiglottis, pharynx, and œſophagus, thoſe of the ſoft palate, trachea, ſtomach, and inteſtines.

Theſe more ſimple kinds of crypts or follicles are united in different inſtances, ſo as to compoſe larger maſſes. Sometimes they are ſimply contiguous, connected by looſe cellular ſubſtance, and poſſeſs each its proper duct: *e. g.* at the back of the tongue, and about the arytenoid cartilages. Such have been called glandulæ congregatæ. In other inſtances, numerous follicles, included in a common covering, depoſit their mucus in one or more large cavities, into which ſeveral follicles open. The tonſils afford an example, and have been called glandulæ conglutinatæ.

The ſecretion of mucus is often performed in a ſpecies of ſtructure, which does not ſeem to poſſeſs any thing of a glandular nature: in ſmall membranous canals, which will admit briſtles for about half an inch in length, ending by blind extremities in the cellular ſubſtance, and terminating by oblique apertures on the ſurfaces of the mucous membranes to which they belong. Neither acini nor round follicles can be diſcovered opening into ſuch canals, which are technically named ſinuſes or lacunæ, and which, in the urethra, have a perfectly ſmooth ſurface. Some of theſe are ſimple, as in the ſeptum narium, the urethra of both ſexes, the entrance of the vagina, &c.; others are ramified, as in ſome inſtances in the male urethra; in the neck of the uterus, &c.

The glands, which produce various matters of an unctuous deſcription, appear to be very ſimple in their ſtructure, but they are moſtly ſo ſmall as to prevent us from entering into much detail concerning their organization. The ceruminous glands of the ear are ſmall round bodies, diſperſed in the interſtices of the cellular ſubſtance, and each of which poſſeſſes a duct, penetrating the integuments of the meatus auditorius, and ending on its ſurface by an open mouth. They ſeem to conſiſt of ſimple membranous cavities. The organs, which ſecrete ſebaceous matter, in various parts of the integuments, do not ſeem to differ eſſentially from theſe. They are round membranous cavities, with their ſides covered by numerous vaſcular ramifications, opening on the ſurface of the part to which they belong, with or without the intervention of a ſimple duct. Where they produce a fluid which concretes, it may be expreſſed from them in the form of a ſlender white thread. The areola of the nipple, the nymphæ, and the other external female organs, the corona glandis of the male, the noſe, and particularly the cavity between its ala and the cheek, the upper lip, and the hollows of the external ear, poſſeſs numerous glands of this deſcription. The Meibomian apparatus of the eye-lids is only a rather complicated ſpecimen of the ſame ſtructure; ſeveral ſimple glands open into a common duct.

The proſtate poſſeſſes a peculiar ſtructure, which can hardly be referred with propriety to any of the ſpecies firſt enumerated.

The glandular tiſſue, cut in ſlices and dried in the air, loſes its original colour, acquires a dark hue, and even a blackiſh tint in the liver and kidney, on account of the large quantity of blood which they contain: if the latter viſcera are repeatedly waſhed, before they are dried, they continue to appear greyiſh. The glandular tiſſue, in its dried ſtate, is remarkably hard and brittle. If kept moiſt and expoſed to the air, it becomes putrid very rapidly, and exhales in that ſtate a highly diſagreeable odour. A greater quantity of ammoniacal matter is formed. The liver is particularly diſtinguiſhed for the inſupportable ſtench cauſed by its putrefaction. The kidney goes leſs rapidly into that ſtate. When boiled, the glandular ſubſtance produces at firſt a greyiſh ſubſtance, which troubles the water uniformly at firſt, and is then collected in an abundant froth at the top. This product is moſt abundant in the preſent, the muſcular, mucous, and cellular ſyſtems; and leaſt in the cartilaginous, tendinous, fibrous, &c. The froth produced by its boiling is of a deeper colour, and ſeems to contain more numerous principles, than that derived from the white organs.

Like all other ſyſtems, the glands grow hard at the firſt periods of ebullition, but inſtead of becoming ſofter afterwards, as the others do, the continued boiling makes them more and more hard; ſo that after five or ſix hours of ebullition, their firmneſs is triple or quadruple that which belongs to them naturally. This phenomenon is moſt remarkable in the liver. When removed immediately after the firſt corrugating effects of the hot water, they do not diſplay the elaſticity which the other ſyſtems poſſeſs at this time. A tendon or muſcle in ſuch a ſtate, if drawn, reſtores itſelf immediately, while a ſlice of liver breaks. The abſence of fibrous matter perhaps is the real cauſe of this difference. The ſudden action of naked fire criſps and corrugates the ſurface, as in all the other ſolids, and produces a hard exterior cruſt.

Maceration in water produces different effects on the different glands. The liver reſiſts longer than the kidney, which, after two months, is reduced to a reddiſh pulp ſwimming in the water, while the former ſtill preſerved its form and denſity, and had undergone no other change than from a red to a blueiſh brown colour. The ſalivary glands exhibit much of the whitiſh, unctuous and firm matter, which is ſeen in all cellular organs after long maceration. This does not ariſe from an alteration of the glandular tiſſue, but from the fat contained in the abundant cellular texture of theſe parts.

Acids act on the glandular tiſſue nearly as upon the others. They reduce it into a pulp, varying in its colour, and in the promptitude of its formation according to the nature of the acid employed. The ſulphuric acts moſt quickly, and gives a black pulp, while the nitric renders it yellow. They act much more ſlowly on the glands after boiling than before.

Generally ſpeaking, the glands are much leſs digeſtible than moſt other animal ſubſtances; particularly in their boiled ſtate: for coction produces in them quite oppoſite effects to thoſe which it exerts on the cartilages, tendons, and all the fibrous organs, which are rendered leſs denſe, more gelatinous and viſcous, and more ſpeedily diſſolvable by the gaſtric juice. The glands would probably be digeſted more eaſily, if eaten raw. Liver is leſs digeſtible in proportion as it is longer boiled. Bichat made a comparative trial of it in a raw and dreſſed ſtate: the former was reduced into a pulp in the ſtomach of a dog, when the latter had undergone a very ſlight alteration.

Excretory tubes.—All glands have tubes for the purpoſe of conveying away the fluids, which they ſeparate from the blood; and as theſe canals are only found in glands, their conſideration belongs to that of the peculiar tiſſue of the gland. The excretory ducts have an uniform origin in all glands. They ariſe like veins, by an infinite number of capillary tubes, which appear to begin at the acini, where theſe exiſt. Each acinus is ſaid to have an arterial and venous, as well as an excretory tube. Ariſing in this way from all the interior of the gland, they ſoon unite together, into more conſiderable tubes, which generally run in ſtraight lines through the glandular tiſſue, unite to each other, and form at laſt one or more large tubes.

Glands are to be diſtinguiſhed into three kinds, with reſpect to their excretory tubes. 1. Some tranſmit their ſecretion through ſeveral ducts, each formed by ſmaller ones, and opening near together, but diſtinctly, and without any communication. In ſome caſes theſe ſeparate apertures are found on a more or leſs diſtinct prominence, as in the breaſt, proſtate, and ſublingual glands. Sometimes the orifices are found in a depreſſion, in a kind of cul-de-ſac, as in the tonſils, the foramen cæcum of the tongue, &c. 2. Other and more numerous glands pour out their fluids by a ſingle tube, and there is nothing remarkable in general in the orifice. 3. Some glands depoſit the produce of their ſecretion in a reſervoir, where it is retained, in order to be expelled at particular times. Such are the kidnies, liver, and teſticles. In this caſe there muſt be two excretory tubes; one to convey the ſecretion from the gland to the reſervoir, and the other to tranſmit it to its final deſtination.. Theſe reſervoirs are therefore evidently connected with the excretory tubes.

Although the two firſt claſſes of glands have no reſervoirs, we may in ſome degree regard the different ramifications of their excretory tubes as ſupplying their place. Theſe, indeed, as well as in the glands, which have reſervoirs, are habitually full of the ſecreted fluid. Under whatever circumſtances the individual may have died, we may always produce a conſiderable flow of proſtatic fluid by preſſure on the gland. The papilla of the kidney affords urine on the preſſure, ſections of the liver ſhew bile in the hepatic ducts, and the lactiferous veſſels are full of milk, for which there is no other reſervoir. From variations in the quantity of fluid, in the latter inſtance, the greater or leſs ſize of the breaſt, during ſuckling, entirely depends.

It appears in general that the paſſage of the ſecreted fluids in the excretory ducts is much ſlower than that of blood in the veins, or of lymph in the abſorbing veſſels. Urine is conſtantly flowing through the ureters; but a much greater proportion of blood would paſs through a vein of equal diameter, while the bladder was filling. The rate of motion however varies under different circumſtances, the ſaliva is excreted much more quickly during a meal, and urine paſſes off much faſter after watery drinks.

The ſize of the excretory tubes varies very conſiderably. 1. Where ſeveral are produced from one gland, they are very ſmall, and ſometimes ſcarcely perceptible. They run in a ſtraight line, have no communications, and open immediately on quitting the gland. 2. Thoſe which are ſingle are larger; bearing a proportion however to the ſize of the gland, excepting the hepatic duct, which is manifeſtly very ſmall in compariſon to the bulk of the liver. They paſs for ſome diſtance after quitting the gland, and are produced by the union of ſuch tubes as belong to the laſt mentioned claſs; ſo that if their iſolated excretory tubes were to be united together, a common ſingle duct would be formed reſembling thoſe of this ſecond kind. The pancreas is the only inſtance in which the common duct is concealed in the ſubſtance of the gland: and there is no other inſtance, but the teſtis, where it forms convolutions, ſo as to be much longer than the courſe through which it paſſes.

Whatever the arrangement of the excretory tubes may be, they all pour their fluids either on the ſurface of the body, as in the ceruminous and ſebaceous glands, and the breaſt; or on the ſurface of mucous membranes, as the mucous, ſalivary, pancreatic and hepatic excretories. The ſkin and mucous membranes, therefore, are the only parts moiſtened by glandular fluids; no ducts terminate on ſerous or ſynovial ſurfaces. The excretories of the pretended articular glands would form an exception to this obſervation, if the glands exiſted. They never terminate in the cellular membrane; and if a communication ſhould take place, by accident, abſceſſes are formed by the ſupervening irritation, as in urinary fiſtulæ: or inflammation occurs in the track of the extravaſated fluid, producing adheſions, which preſerve the cellular ſyſtem from more extenſive infiltration. Thus the alimentary canal may be regarded as a kind of general excretory, ſuperadded to thoſe of the liver and pancreas, &c., and expelling in one maſs all the fluids ſeparately poured through their reſpective ducts into its cavity. Indeed, all ſecreted fluids ſeem deſigned to be thrown out of the body. Separated from the maſs of blood, they are heterogeneous to it, and do not enter the general circulation again in a ſtate of health.

All the excretory ducts have an internal mucous membrane, which is a continuation of the cutaneous or mucous ſurface, on which they terminate. In addition to this they all poſſeſs an exterior ſubſtance, including the mucous canal, and differing conſiderably in the particular glands. It is a very thick and peculiar ſubſtance in the vas deferens: an extremely denſe and cloſe texture, reſembling that of the arteries and veins in the hepatic and ſalivary tubes, &c. The latter is very different from ordinary cellular ſubſtance. It does not appear that theſe tubes poſſeſs any membrane beſides the tiſſue juſt deſcribed, and the mucous lining. Every excretory tube has its blood-veſſels. The ureters receive very manifeſt arterial branches from the renal and ſpermatic arteries: the hepatic artery ſupplies the biliary tubes, and the Stenonian duct has its branches from the tranſverſalis faciei. Various nerves from the ganglia accompany the blood-veſſels; but they never form ſuch intricate plexuſes as round the arteries.

The excretory ducts poſſeſs chiefly the vital properties of the mucous ſyſtem, which has the greateſt ſhare in their formation. Their ſympathies are, therefore, nearly of the ſame kind.

2. *Of the other Syſtems belonging to the formation of the Glands.*

Cellular ſubſtance.—Glands differ much in the proportion of this tiſſue, which they contain, and may be divided accordingly into two claſſes. It is very abundant in the ſalivary organs, in the pancreas, and lacrymal gland, and in all ſuch as have a conglomerate or granulated ſtructure and white appearance. Every gland of this claſs is divided into lobes very diſtinctly iſolated by grooves filled with this texture, and determining the tuberculated ſurface which characterizes the exterior of the organ. Each lobule, and every glandular acinus, down to the ſmalleſt diviſion, is covered by cellular ſubſtance: hence the whole conſiſts of an aſſemblage of ſmall diſtinct bodies, connected together only by the circumſtance of their excretory tubes being united to form a common duct, and which we could conceive to be perfectly capable of exerciſing their functions if actually ſeparate. We ſee this in the parotid; where ſmall acceſſory portions are often ſeen in the courſe of the duct, completely unconnected with the principal gland. The ſubmaxillary and ſublingual are ſometimes continuous, ſometimes iſolated. The cellular tiſſue in theſe glands often contains an abundance of fat. This is particularly obſervable in the breaſt, the volume of which ſometimes depends on the ſize of the gland, ſometimes on an accumulation of the adipous ſubſtance; a difference, which is very eaſily recognized by the touch. Hence the quantity of milk is not always in proportion to the apparent ſize of the mammæ. In the proper conglomerate glands, however, the adipous ſubſtance ſeldom amounts to a very conſiderable quantity. The connecting threads are very ſhort and ſlender in the teſtis. In thoſe glands, which have a denſe parenchyma, as the liver, kidney, proſtate, and mucous organs, there is very little cellular tiſſue, and hence the facility with which ſome of them may be torn. Their ſubſtance never contains fat. The unctuous ſtate of the liver in various diſeaſes does not invalidate this obſervation; for the fat then enters into its compoſition as an eſſential element of the organ, and is ſubſtituted in place of the colouring matter, which diſappears; it is not contained in cells. Fat may be ſeen alſo in the interior of the kidney, but it is round the pelvis, and not in the proper parenchyma of the gland. The tonſils, proſtate, and mucous glands never contain any. Serous fluids are never thrown out in the ſubſtance of glands, which have a cloſe parenchyma; they are not affected in caſes of the moſt general and extenſive anaſarca. We cannot, however, doubt the exiſtence of cellular tiſſue in ſuch glands: maceration demonſtrates it. The fungous tumours, growing from theſe organs, contain much of it; and it is principally ſeen round the veſſels, as in the capſula Gliſſoni. This texture, indeed, is often diſeaſed, while the proper ſubſtance of the gland remains

ſound:

found: hence the developement of ſteatomatous tumours in the liver, of ſerous cyſts in the kidnies, and of hydatids in both, without the ſecretion being at all diſturbed. The liver is ſometimes encreaſed three or four-fold by internal tumours, without its proper tiſſue being augmented: the latter forms a kind of ſepta between the ſwellings in which the biliary ſecretion goes on.

Blood-veſſels.—Glands, which are not ſurrounded by a membrane, receive their arteries from all quarters. An abundance of ſmall branches from the neighbouring trunks penetrates the ſurface of the ſalivary and lacrymal glands, the pancreas, &c. They firſt run between the lobes, penetrate into the ſmaller diviſions, and are finally diſperſed on the acini. The branches coming from different quarters anaſtomoſe freely in the gland.

Where the organ is ſurrounded by a membrane, as in the liver, kidney, teſtis, &c., the arteries penetrate on one ſide only, generally at a more or leſs deep notch, and in a ſingle conſiderable trunk, which, however, is ſometim[illegible] divided into a few ſmaller branches. The pa[illegible] the artery enters, is always the fartheſt removed from th[illegible] action of external bodies; a remark, which is commo[illegible] all important organs, as the lungs, inteſtines, ſpleen, &c. The convex ſurface of theſe, where the veſſels are the ſmalleſt, and where hæmorrhage would conſequently be attended with the leaſt danger, is always turned outw[illegible] When it has entered the gland, the main artery quickly [illegible]vides into various branches, which diverge and are ſubdi[illegible] as they approach the convexity. They have various branches in the body of the organ, as they proceed, and end by producing a large number of capillaries, covering the ſurface of the organ. Sometimes they come through, are viſible on the ſurface, and ramify between it and the inveſting membrane. The moſt favourable method of obſerving the diſtribution of the arterial ſyſtem in theſe organs is to inject them with hard injection, and to deſtroy the animal ſubſtance by means of immerſion in muriatic or nitric acids: a caſt of the vaſcular ſyſtem, even to its very minute diviſions, may be obtained in this way, and ſuch preparations, on account of their elegance, are contained in all cabinets. Ruyſch, who was remarkable for his dexterity in theſe proceſſes, found that the ſmall arteries were differently arranged in the different organs. In the kidney they are convoluted, ſo as to form, through the whole ſubſtance of the organ, ſmall granular bodies leſs than a pin's head, which are the acini already alluded to. The ſurface of the liver is covered, after a ſucceſsful injection, with innumerable capillaries arranged in a ſtellated form, and giving the appearance of little tufts of minute arteries, when the part is corroded, which have been compared to camel's hair pencils; and this arrangement has been termed the penicillous. A ſimilar diſpoſition is obſervable in the ſpleen.

Some have conceived that the large arterial trunks of glands communicate to the organs an interior motion very favourable to the execution of their functions. Theſe bodies are placed, for the moſt part, in the trunk, and therefore near to the heart; and their veſſels generally enter after a ſhort courſe, ſo that the impulſe has been conſidered, from this cauſe, to be more powerful. The ſpermatic artery is a remarkable exception to this obſervation, and the ſlowneſs of the ſeminal ſecretion has been explained from this cauſe. We own that we cannot diſcover any very convincing arguments in proof of theſe poſitions.

The veins accompany the arteries throughout, in their diſtribution to the glands; we have no diſtinction here of a ſuperficial and deep-ſeated ſet. The liver is the only example in which red blood enters on one ſide, and black goes out in the oppoſite direction.

Blood of the glands.—The quantity of blood contained habitually in theſe organs differs remarkably in the different parts of the ſyſtem. 1. The conglomerate glands contain very little. It imparts no colour to theſe organs, which are whitiſh in their appearance, and only require the water to be changed two or three times in maceration. 2. The mucous glands, proſtate, and teſticle contain a larger quantity. 3. The liver and kidney have ſuch a conſiderable portion, that they differ widely in this reſpect from the reſt of the glandular ſyſtem. They contain a large quantity even after death from hæmorrhage, or when the glands are ſuddenly removed from a living animal. Hence, when we macerate theſe organs, it is neceſſary to renew the water at leaſt twelve times before it ceaſes to be bloody: when we preſerve them in alcohol, long previous maceration is neceſſary, to prevent the ſpirit from becoming turbid by the blood. This large quantity of blood occaſions the glands now under conſideration to be heavier than the other parts of the ſyſtem; hence, too, ariſes their diſtinguiſhing red colour, which is not more eſſentially inherent in their tiſſue, than in [illegible]s ſurfaces or muſcles: in fact repeated waſhings will diſ[illegible]. The [illegible] tiſſue, as white is that of the muſcular fibre. The hue of the kidney ſeems to be leſs immediately influenced by the blood. It retains a degree of redneſs after frequent renewals of the macerating water; and the pulp produced by leaving it in water for ſome months, with frequent changes, ſtill has a red tint, although leſs deep than in the recent ſtate. Does the ſtate of the ſecretion influence the quantity of blood contained in glandular organs? Is there more blood ſent to the kidney, when the urinary fluid is ſeparated abundantly, than when it paſſes off ſlowly? or is there leſs returned by the veins in the former caſe?

Nerves.—Glands receive two kinds of nerves. 1. The lacrymal and ſalivary glands, the tonſils, &c. are ſupplied almoſt excluſively from the cerebral nerves. 2. The teſticles, proſtate, and liver, derive nearly an equal portion from the brain and the ganglia. 3. The kidney and moſt of the mucous glands, &c. are almoſt entirely ſupplied from the ganglia. Theſe remarks apply to thoſe nerves only, which are unconnected with the arteries; for each arterial trunk penetrating a gland, is ſurrounded by a nervous network belonging to the ſyſtem of the ganglia, and very manifeſt in the larger organs, as the liver and kidney, where the plexuſes come from the ſemilunar ganglion, in the ſalivary glands, where it is derived from the ſuperior cervical, in the teſtis from the lumbar, &c.

The nerves are ſmall compared to the ſize of the glands. We muſt not decide on this ſubject from thoſe which enter the parotid and ſubmaxillary; for the nerves merely traverſe thoſe organs, leaving a few branches behind them. But the liver obviouſly poſſeſſes as ſmall a ſupply as any organ in the economy, which receives nerves at all. Nerves enter the glands, like the veſſels; that is, they come in on all ſides where there is no ſurrounding membrane; and enter at the notch in other caſes. They divide and ſubdivide, as ſoon as they reach the gland, and are quickly loſt. There are never any ganglia in the interior of theſe organs.

We know but little of the exhaling and abſorbing veſſels in the ſubſtance of glands, where they are merely ſubſervient to the purpoſes of nutrition.

Properties of the Glandular Tiſſue.

1. *Properties derived from their Organization.*—Theſe are

very ſlightly marked in this ſyſtem, probably from its texture not partaking at all of the fibrous nature. In order that an organ ſhould be ſuſceptible of elongation and ſubſequent contraction, without injury, its component particles muſt poſſeſs a certain degree of coheſion; and this attribute particularly belongs to fibre. The glandular ſyſtem, too, is ſubject much leſs frequently to cauſes of diſtention and contraction, than thoſe which are made up of fibres. Where the liver contains a large quantity of blood after death, in conſequence of the venous ſyſtem being overloaded, its bulk remains the ſame: its ſubſtance is compreſſed by the veſſels. The enlargement of the teſticle in gonorrhæa, and of the parotid glands under certain circumſtances, and their ſpeedy ſubſequent reduction, prove that theſe organs poſſeſs a certain degree of extenſibility and contractility. Are the liver, kidney, and other internal glands ſubject to ſimilar acute enlargements? The phenomena now alluded to may take place in the cellular tiſſue of the glands, and therefore ſuppoſe a leſs degree of extenſibility in the proper ſubſtance of the gland than might at firſt have been ſuppoſed.

2. *Vital properties of the glands, and phyſiology of ſecretion.*—The remainder of the inveſtigation is much more difficult than what we have already gone through. The nature and properties of the fluids, and the ſtructure of the ſecreting organs, may be determined in a great meaſure by the evidence of our ſenſes: but when we endeavour to explain why each particular fluid is ſeparated by its reſpective organ, the determination of the queſtion implies a knowledge of the hidden ſtructure of the minute elements of our body, about which we muſt either be ſilent, or attempt conjectural explanation, at ſome riſk of expoſing ourſelves. The object then is, to ſhew, why, in the healthy ſtate of the body, ſaliva, and no other fluid, is conſtantly ſeparated from the blood in the parotid gland, bile in the liver, and urine in the kidney; and how it happens that the nature of the ſecretion never changes, ſo that urine ſhould be formed in a ſalivary gland, ſaliva in the kidney, bile in the mammary glands, &c. The difficulty of the undertaking is increaſed, and the proſpect of arriving at a ſatisfactory concluſion diminiſhed, by this circumſtance; that in the different claſſes of fluids, each is not conſtantly ſeparated in an organ of a particular ſtructure. If that were the caſe, it would only be neceſſary to determine the relation which the ſtructure of the gland bears to the nature of the ſecreted fluid: but the very contrary is the caſe. Fluids of each kind are produced by every variety of glandular apparatus: thus water is formed by the arteries of the ſkin, without any glandular arrangement, by conglomerate glands, in the inſtance of the ſalivary apparatus, and by a glandular viſcus in the caſe of the kidney: mucus is ſecreted by membranous ſurfaces, and by different kinds of glands; and laſtly, oily matters are poured from the arteries of the cellular membrane, from various ſebaceous glands, from the veſſels of the ſkin, from the liver, &c. Again, there are inſtances in the body, of organs, which we ſhould, *à priori*, have pronounced, without heſitation, to be glandular, and which yet perform no ſecretion. Such are the ſpleen and thyroid gland, to which we may perhaps add the thymus and renal capſules. The ſpleen is a remarkable inſtance of the arrangement of the minute arteries, called the penicillous, which is ſeen alſo in the liver, and conſidered to have much connection with the peculiar functions of the ſecretory organs. In this place, too, we ſhould mention the curious facts, concerning the formation of certain fluids, under particular circumſtances, by other glands than thoſe which ordinarily produce them.

Haller has collected, in his great work, a vaſt number of facts of this deſcription; of which, if we ſhould reject all that may ſeem inſufficiently authenticated, there will remain quite enough to prove the point deciſively. To the chapter in which theſe details are contained, he prefixes this ſentence: "fere quilibet humor per quodcunque colum ſeparari poteſt;" and the caſes which he cites, fully juſtify his concluding paragraph: "Quando hæc exempla repetemus, conſtabit, non ejuſdem unice claſſis diverſos humores ſua inter ſe cola commutare, ſed etiam per muci organa aquam, per muci, aquæ et adipis cola lympham et ſanguinem, per aquæ, muci et lymphæ vias adipem, bilem ſanguinemque ſecerni, atque adeo omnino, nullum in animato corpore ſeparatorium organum eſſe, quod non omnium claſſium humores ſuis cum dotibus ſecernere queat." Element. Phyſiolog lib. 7. cap. 1. §. 9. When theſe circumſtances are conſidered, it will very probably be ſuſpected that the cauſes of the differences in the ſecreted fluids cannot be traced in the obvious ſtructure of the glands; but that the reaſon why a peculiar fluid and no other is ſeparated from each gland, in the healthy ſtate of the body, lies much deeper, and flows from ſome conditions of the organs, which are inacceſſible to our ſenſes. We ſhall endeavour to illuſtrate the ſubject as far as well authenticated facts will aſſiſt us, and ſhall mention the opinions which have been moſt prevalent on the ſubject. It will be an eaſier taſk to ſhew how unſatisfactory moſt of theſe are, than to ſubſtitute any thing more rational in their place. We proceed to point out the vital properties of the glands.

No part of the ſyſtem poſſeſſes animal contractility, or the power of voluntary motion. Different glands ſeem to be differently circumſtanced with reſpect to the correſponding ſpecies of ſenſibility. The peculiar and oppreſſive ſenſation occaſioned by compreſſion of the teſticle, is well known. Conſiderable and continued preſſure on the parotid gland has produced great ſuffering; but large nerves paſs through this organ. The liver may be injured in a living animal, without cauſing any of the uſual ſigns of pain; and Haller makes the ſame obſervation concerning the glandular ſyſtem in general, but his ſtatement is not perfectly explicit: "Univerſæ glandulæ experienti minime irritabiles videntur, neque vehementer aut morbos ſentiunt, aut illatas a profectore injurias." Elem. Phyſiol. t. 2. p. 377. Stones in the kidnies often cauſe very ſevere pain. From theſe apparently contradictory circumſtances, we can only conclude that animal ſenſibility, which is variouſly modified, may exiſt in organs, where certain agents do not excite it at all, while others develope it very readily. In fact, various morbid alterations render this property very manifeſt in the glands. The pain of inflammation bears, indeed, a peculiar character in the glandular ſyſtem; it is generally obtuſe and heavy.

Properties of the organic life.—Senſible organic contractility does not exiſt in the glandular ſyſtem: but the two other organic powers are exhibited in their higheſt ſtate of developement, and are almoſt conſtantly in operation, being concerned in ſecretion, excretion, and nutrition. Organic ſenſibility enables the gland to diſtinguiſh in the maſs of blood thoſe materials which are ſuitable to its ſecretion; and by its inſenſible contractility, it has the power of rejecting whatever is heterogeneous. The blood contains the materials of all the ſecretions, of the nutrition of all organs, and of all the exhalations. From this common reſervoir each gland draws what is requiſite for its ſecretion, each organ for its nutrition, and every ſerous ſurface for its exhalation. The peculiar mode of organic ſenſibility enables each living part to diſtinguiſh what its functions require. The whole buſineſs of glandular action reſts on the two powers juſt mentioned; and as this action is nearly conſtant, they are almoſt inceſſantly exerted.

It is evident that all glandular affections muſt imply a diſorder in the powers above-mentioned; ſince diſeaſes of an organ are particularly determined by alterations of the leading properties; of thoſe which conſtitute the peculiar life of the part. Obſervation proves this: we ſee theſe properties, when augmented or diminiſhed, producing on one ſide increaſed ſecretion, as in diabetes, mercurial ſalivation, cholera morbus, &c.; on the other, a decreaſe or even ſuſpenſion of the function, as in acute diſeaſes, where all the ſecretory tubes ſeem, as it were, cloſed for a time; for inſtance, in ſuppreſſion of urine, dry ſtate of the mouth, &c. On other occaſions the nature of the glandular ſenſibility is changed, and it harmonizes with ſubſtances which are not admitted in the healthy ſtate: hence the innumerable varieties of the ſecreted fluids under circumſtances of diſeaſe. The cyſtic bile in the dead body preſents numerous varieties of taſte, ſmell, colour, and conſiſtence. The numerous alterations of the urine are well known. The ſaliva is leſs liable to change; but how different is it in many diſeaſes from its ordinary condition. Nothing can leſs reſemble urine or bile than the fluids often diſcharged from the bladder and liver: whence then ariſe theſe differences? from the variations in the organic ſenſibility bringing the part into a relation with thoſe ſubſtances, which were foreign to it in the natural ſtate. Thus the ſame gland, without any change in its ſtructure, but merely by altered modifications of its vital powers, may be the ſource of infinitely varying fluids. Might not this be carried ſo far as to allow that the kidney, by aſſuming a ſenſibility analogous to that of the liver, may actually form bile? why ſhould it not ſecrete bile, ſince it does ſeparate other fluids ſo widely different from the urine?

In the healthy ſtate, the mode of ſenſibility in each gland is nearly uniform; and the ſecreted fluid is conſequently nearly the ſame in its compoſition and properties. But the mode is changed by numerous cauſes in diſeaſe. An hyſterical attack comes on; ſuddenly the kidney refuſes to tranſmit the principles which colour the urine, and that fluid is conſequently diſcharged limpid; as the paroxyſm ſubſides, the natural type of the ſenſibility is reſtored, and the urine has its accuſtomed characters. In an epileptic fit, a thick frothy ſaliva is diſcharged from the mouth in abundance; as the attack goes off, the ſalivary ſecretion returns to its natural ſtate.

The various changes in the organic ſenſibility, and the inſenſible contractility of the glands, do not affect the function of ſecretion only; but when they laſt for ſome time, they influence nutrition alſo. From the diſturbances of this proceſs ariſe thoſe various organic affections, of which the glandular ſyſtem offers the moſt abundant harveſt to the pathological anatomiſt. We cannot avoid noticing, in diſſecting rooms, the numerous diſeaſes obſerved in this part of the body compared to others. The glands, the ſkin, the mucous, ſerous, and cellular ſyſtem, hold the firſt rank in this reſpect; and in all theſe the two properties above-mentioned exiſt in the higheſt degree, and are called into action, not merely by nutrition, but alſo by various other functions, which reſide in the capillary ſyſtem, as exhalation, abſorption, and ſecretion.

The preceding account of the phyſiology of ſecretion, chiefly derived from the "Anatomie Generale" of Bichat, ſeems to amount to little more than this, that each ſecretory organ produces its peculiar product, in conſequence of its poſſeſſing peculiar vital properties, which, when variouſly modified under particular circumſtances, enable the organ to ſeparate very different fluids from the blood. And this we believe to be a pretty correct ſtatement of the extent of our knowledge of this ſubject. But anatomiſts and phyſiologiſts, not ſatisfied with this ſimple fact, have endeavoured to develope the exact mechaniſm of the proceſs, and it will be neceſſary for us to recount ſome of their opinions. In all obſervations on this ſubject, it will be well for us to remember that ſecretion is not confined to the animal kingdom, but prevails alſo in the vegetable world. We frequently obſerve the ſap giving origin to peculiar and different juices in the various parts of the ſame plant, and reaſoners from analogy have gone ſo far as to admit the exiſtence of a glandular ſyſtem in vegetables. We ſhall be induced, by this circumſtance, not to lay too much ſtreſs on the peculiar ſtructure of the ſecretory organs in the more complicated animals, as eſſential to the buſineſs of ſecretion. Many of the facts already noticed, concerning the ſeparation of perfectly ſimilar, or at leaſt very cloſely reſembling fluids, by means of totally diſſimilar organs, will tend to the ſame deduction. And this mode of argument may be ſtill further ſupported by various examples in comparative anatomy; where we find fluids of the ſame claſs ſecreted in animals of different orders, in organs of very different external appearance. The kidnies of birds are really conglomerate in their ſtructure; and a fluid, exactly reſembling the pancreatic of warm-blooded animals is formed by the tubular pyloric appendages, variouſly conſtituted in different genera of fiſhes.

Of the different explanations, by which phyſiologiſts have ſucceſſively attempted to elucidate the function of ſecretion, moſt are completely hypothetical and improbable. In moſt inſtances it has been aſſumed that the various animal fluids are all contained in the blood; and ſecretion, according to this opinion, conſiſts ſimply in their ſeparation by means of the glands. Differences in the diameter, length, and folds of the veſſels, and ſuppoſed varieties in the holes with which the glandular ſyſtem is ſuppoſed to be perforated, have been employed as the means of rendering the mechaniſm of ſecretion intelligible; hence the expreſſions of ſieves, filters, and ſtrainers, ſo frequently employed in phyſiology. We are diſpenſed from the neceſſity of commenting on the glaring abſurdity of comparing a gland to a ſieve or filter, and of deciding which of theſe mechanical explanations is the moſt exquiſitely fooliſh, by the completely gratuitous nature of the fundamental propoſition. The modern analyſes of the blood have no longer even the ſhadow of an excuſe for regarding this fluid as a mixture of all the animal liquors, and for ſuppoſing that it is formed of ſaliva, bile, gaſtric juice, urine, &c. ſince we can diſcover no trace of ſuch fluids in it. Although all the elements neceſſary to form theſe products, as well indeed as thoſe of the ſolids, are in fact found in the blood, they exiſt in it in a different ſtate of combination. The blood is manifeſtly an homogeneous liquor, capable of forming all animal matters from the moſt tranſparent and pure water, as the cutaneous exhalation, to the firm fabric of the bony ſyſtem; from it are formed ſaliva, bile, and urine; and it ſerves alſo for the nutrition of muſcles, membranes, and nerves; but none of theſe modifications of animal ſubſtance are contained in it perfectly formed.

Their precipitation, ſays Fourcroy, in the tiſſues to which they belong, cannot be regarded as a ſimple ſeparation; ſince it is accompanied by a modification in the properties, nature, and compoſition of each. Thus the cerebral pulp is not exactly the ſame albuminous matter as that in the ſerum of the blood; the gelatine is not iſolated in this fluid, as in the membranous tiſſue; the muſcular fibrine is not completely identical in its character with that which exiſts in the blood; and the phoſphate of lime is not aſſociated in the latter to the gelatinous ſubſtance, which unites its particles in the bony ſyſtem. Hence ſecretion always implies ſome change or modification in the matter which reſults from its exerciſe. Connoiſſ. Chim. ſect. 8. ord. 4. art. 5.

Another notion, as deſtitute of all ſolid foundation as the former, is, that the blood undergoes certain changes as it arrives at the glands; that it aſſumes a peculiar compoſition before it penetrates the organ. It has been aſſerted that the blood-veſſels are ſo arranged as to produce particular modifications in the contained fluid, and that this is a diſpoſition preparatory to the final proceſs. The hepatic ſecretion has been conſidered to afford the cleareſt example of ſuch previous changes. The ſtructure and number of the veſſels which ſurround and enter the organ, the proportion of thoſe which carry blood or white fluids, the different temperatures ſuppoſed to depend on theſe proportions, in a word, all thoſe points of organization which can poſſibly influence the nature of the blood, are ſaid to be ſufficiently diverſified in order to produce in the chemical properties of the fluids a diſpoſition favourable to the formation of ſaliva in the neighbourhood of the ſalivary glands, of urine in that of the kidney, &c. This diſpoſition, depending on the vaſcular apparatus, has been repreſented to conſiſt particularly in a retardation, acceleration, cooling or warming of the blood, or in the loſs, by abſorption, of ſome of its principles. But what ſenſible cauſe can produce theſe effects? Does not the blood flow through the trunks which are going to the glands juſt as in other veſſels? In ſhort, what is the change? The ſuppoſition in queſtion is a complete aſſumption; not ſupported by a ſingle fact, and contrary to obſervation as far as our knowledge hitherto extends. For we can detect no difference in the blood drawn from the carotid, ſpermatic, hepatic or renal arteries. We have been ſurpriſed to find this opinion adopted and ſupported by Fourcroy; but the whole of his remarks on the ſubject in the "Syſteme des Connoiſſances Chimiques," ſect. 8. ord. 4. art. 5. do not contain a ſingle proof, and afford an example of vague and completely illogical ſtatements. We do not mean to deny that there may be particular conditions of the whole maſs of blood favourable to certain ſecretions. Thus, after drinking copiouſly of watery fluids, we find a much larger portion of urine ſecreted; and the cutaneous exhalation is often augmented from the ſame cauſe.

In our endeavours to diſcover the mechaniſm of ſecretion, it will be beſt for us to ſelect the moſt ſimple mode of this function. Now the exhalation from ſerous membranes, and the mucous fluid covering the ſurface of many cavities in the body, are examples of this kind. We can diſcover nothing in theſe organs but vaſcular ramifications united by cellular ſubſtance. Injected fluids in the dead body follow the ſame route which the ſecreted liquors follow in the living ſtate. And the ſame obſervation may be applied alſo to the caſe of ſecretions in ſome of the more complex inſtances. "Water," ſays Haller, "tinged with colouring matter, iſinglaſs, or oil of turpentine, thrown into the arteries of a young ſubject, and occaſionally even ſuet, in the experiments of Ruyſch and Albinus, have exuded in numerous ſmall drops from the ſkin, after the removal of the cuticle in warm water, ſo as to imitate very cloſely the proceedings of nature. I have alſo repeatedly ſeen water, coloured with blue, and injected into the lungs through the inferior cava, run out with much froth from the trachea. In the kidney, water, air, or ſuet will paſs through excretory tubes continuous with the arteries into the infundibula and pelvis. Oil of turpentine and quickſilver have paſſed into the chamber of the aqueous humour from the arteries: in the ſame way injected water imitates the courſe of the tears, and exudes abundantly from the whole internal ſurface of the eye-lids." Elem. Phyſiol. t. 2. p. 374. Phyſiologiſts have indulged in conſiderable diſputes concerning this kind of ſecretions. "Some," ſays Blumenbach, "aſſert that all ſeparation of fluids from the maſs of blood is accompliſhed merely by pores in the blood-veſſels, and thoſe, as they ſay, of an inorganic nature; while others deny altogether the exiſtence of ſecretory pores. I ſuſpect that this difference of opinion muſt be reſolved into a verbal diſpute. On the one hand, I muſt confeſs, unequivocally, that I know not what notion to form of inorganic pores in an organized body, ſince all the openings in ſuch bodies muſt belong to their organic nature, and be regulated by their vital properties. On the other ſide I do not conceive that the orifices or pores in the coats of the veſſels, the exiſtence of which cannot be doubted, differ eſſentially, in regard to their functions, from the cylindrical ducts, in which ſecretion is performed in the conglomerate glands, and in the glandular viſcera: ſince it is probable that the ſeparation of fluids depends more on the vital properties than on the forms of the ſecretory organs." Inſtitut. Phyſiolog. ſect. 32. § 469, note *b*.

However ſimple the proceſs of ſecretion may be deemed in the caſe juſt ſpecified, and however cloſely the proceedings of nature may be imitated by the experiments with injections, we ſhall ſtill find ourſelves entirely ignorant of the eſſential circumſtances of the proceſs; *i. e.* we cannot explain the formation of the new product from the blood, and the formation of ſuch totally different new combinations in organs where no difference of ſtructure can be detected.

Thoſe, who wiſh to ſee the various attempts at explaining the mechaniſm of ſecretion, may find ample gratification in the third ſection of the ſeventh book of Haller's great work: where he gives his uſual detail of all that has been written on the ſubject. The reader will be very willing to ſpare us the taſk of recounting all theſe dreams, and the ſtill more diſguſting toil of refuting them. We ſhall merely mention one opinion, on which phyſiologiſts lay ſome ſtreſs even in the preſent day. This refers the difference of the ſecreted matters to the peculiar arrangements of the minute arteries of the glands. Ruyſch, who excelled in the art of making anatomical preparations, was led to remark, in his employment of injections, that the ultimate arterial ramifications differ in the different ſecretory organs, and indeed that there are characteriſtic differences in this reſpect in all the ſtructures of the body. This explanation may poſſibly be true, and we cannot perhaps completely overthrow it: but this is all that we can ſay in its behalf. We muſt obſerve, in the firſt place, that a correct account of the facts, and an exact deſcription of the different vaſcular networks, is yet a deſideratum; for the queſtion concerns the very ſmalleſt capillaries, from which the tubes conveying the new product commence. Now the larger ramifications, ſuch, for inſtance, as will admit ſeveral globules, do not differ ſufficiently from each other to account for the diverſity of the fluids produced in the various organs. Indeed ſimilar veſſels often produce the moſt oppoſite products. The ſtructure of the cortex cerebri, of the ſpleen, and of the placenta, is very much alike with the moſt diſſimilar reſults. The veins, too, are arranged like the arteries, as we ſhould conclude, certainly not for the purpoſes of ſecretion. Very different arrangements of blood-veſſels may be ſeen in various membranes which produce the ſame kind of exhalation.

Recourſe has been had to the ſcience of chemiſtry, in order to explain the function of ſecretion, but no aſſiſtance has been hitherto derived from this ſource in unfolding the myſtery. That the changes, by which the new products conſtituting the animal fluids are produced from the blood are purely chemical, cannot be doubted, but we are equally in the dark as to the circumſtances which determine or modify theſe alterations. We cannot doubt indeed that the whole eſſentially depends on a vital power of which chemiſtry can neither detect the nature, nor appretiate the force. If, however, we cannot be very ſanguine in expecting from this ſcience a developement of the immediate agent by which ſecretion is effected, much light may, probably, be thrown on ſome parts of the ſubject by accurate chemical inveſtigations. We may apply generally the obſervation of Dr. Thomſon concerning the kidnies: "the changes operated on the blood in the kidnies are at preſent altogether unknown; but they muſt be important. Provided the method of analyſing animal ſubſtances was ſo far perfected as to admit of accurate concluſions, conſiderable light might be thrown upon this ſubject, by analyſing with care a portion of blood from the emulgent artery and vein ſeparately, and aſcertaining preciſely in what particulars they differ from each other." Syſtem of Chemiſtry, vol. 5. p. 749. Fourcroy, too, in conſidering how far ſecretion admits of explanation on chemical principles, ſpeaks rather of what may be done than of what has been effected in this way. "Hitherto chemiſtry can only furniſh ſome general ſtatements on this ſubject; and, if we look to this ſcience for an explanation of the cauſes and products of the ſecretions, and for a demonſtration of what paſſes in every kind of ſecretion in particular, we muſt wait till the experiments are much more numerous, the inveſtigations more exact, and the animal analyſes conſiderably multiplied. We muſt determine the temperature, conſiſtence, and nature of the cerebral blood, of that in the vena portarum, and in the renal arteries, before we can underſtand the mechaniſm of the ſecretions performed in the brain, liver, and kidnies." Syſt. des Conn. Chimi. v. 10, p. 385.

We ſhould always bear in mind, in our attempts at chemical explanations of the animal functions, that the effects of the vital power are more particularly obſervable in counteracting and preventing the exertion of thoſe affinities, by which dead animal matters are regulated; and conſequently, that if ſecretion be an example of chemical affinity, it is ſo modified by the vital powers, that we can have very little hope of imitating it by experiments out of the body.

In what manner, and to what extent, are the ſecretions influenced by the nerves? The fact that glands have a ſupply of nerves, leads us to expect *à priori* that the effects of their operation will be very obvious; but the laws, which regulate this matter, are hitherto by no means clearly aſcertained, and even the kind of influence is very obſcure. There is a want of direct evidence, from experiment, on this ſubject. "I divided," ſays Bichat, "the nerves of the teſticle in a dog: the gland inflamed and ſuppurated; but the latter occurrence ſhews that nervous influence is not neceſſary for ſecretion, ſince ſuppuration is accompliſhed in a manner analogous to that of the latter functions. Phyſicians know very well that paralyſed limbs may inflame and ſuppurate. Erection and expulſion of the ſemen may occur, when the lower half of the body is paralyſed, and when the nerves of the proſtate at leaſt muſt have entirely loſt their influence. An example was related to me of a ſoldier, who contracted a gonorrhæa in this ſtate. In complete paralyſis of the bladder, mucus is ſtill ſecreted in ſufficient abundance. The noſtril of the affected ſide is as moiſt as uſual in hemiplegia; and an equal quantity of cerumen is produced in the meatus auditorius of the ſame ſide. The glands of the uvula do not ceaſe to act where that organ is paralyſed. After cutting the nerve of the eighth pair on one ſide in a dog, the air-veſſels are equally full of mucus on that ſide. In the convulſed ſtate of ſuch parts as poſſeſs glands, where the nerves of theſe organs muſt conſequently be unuſually excited, there is no augmentation of the ſecretion." Anatomie Generale, tom. 4. p. 604. We may obſerve further, that when the influence of the brain on the organs of the animal life is completely ſuſpended in apoplexy or compreſſion, where ſenſation and voluntary motion are loſt, the ſecretions continue undiſturbed. On the other ſide we may adduce numerous phenomena, which can be accounted for only through the agency of the nervous ſyſtem. Under this head we may mention the flow of ſaliva on the ſight of food, the increaſed lacrymal ſecretion produced by various affections of the mind, the ſuppreſſed diſcharge from the ſkin from the ſame cauſe. The urinary ſecretion is often ſuddenly affected in hypochondriacal perſons; diſtreſſing news will occaſion it to be ſecreted in great abundance, and of a very pale colour; and many remarkable inſtances have been recorded, where the biliary ſecretion has been decidedly and ſuddenly affected by mental emotions. It has been aſſerted, but we know not on what authority, that a cow, after being milked by the ſame individual for a long time, will give much leſs milk, if the operation be performed by a ſtranger. Theſe and other analogous facts have led many phyſiologiſts to admit of a nervous influence in the affair of ſecretion; the mode and degree of this action have been variouſly eſtimated. De Berger conceives that the tone of the ſecretory organs was kept up by the nervous fluid; De Natura Humana, p. 122. Queſnay referred the differences of the ſecreted fluids to various degrees of ſenſibility in the ſecretory veſſels; Eſſais ſur l'Econ. Anim. t. 3. p. 437. De Bordeu aſcribed great influence to the nerves on the ſecreting arteries; Recherches ſur les Glandes, p. 352. Stahl and his followers, who aſcribed the power of guiding the vital motions to the ſoul (anima), conceived that it governed the buſineſs of ſecretion alſo; and A. F. Hoffman aſcribes the difference of the fluids entirely to the anima, which regulates the ſecretory orifices by ſphincters and valves, now cloſing them to prevent the entrance of particles heterogeneous to the fluid intended to be formed, and now opening them for the entrance of the ſuitable molecules; Nov. Hypotheſ. Phyſiolog. p. 13. After recounting theſe opinions, Haller obſerves that they aſcribe too great an influence to the nerves, and reminds his reader that ſecretions of various kinds are performed in plants, without the aſſiſtance of nerves; and that balſams, reſins, gums, and coloured milky fluid is formed from the common liquor taken in by the roots of the vegetable. On this ſubject we may obſerve, with Bichat, that the expreſſion *nervous influence* has generally been uſed by phyſiologiſts in a very indefinite manner. When the irritation, diviſion, or paralyſis of a nerve ſupplying a voluntary organ interrupts, or entirely deſtroys its functions, we can obſerve and appretiate the influence of the nerves on ſuch organs; but, with what propriety can we employ the ſame term to deſignate the power, which the nerves may poſſibly have over the ſecretory organs, when their diviſion or paralyſis does not at all diſturb the functions of the part?

The ſecretions may be affected by the direct action of external irritants, although mechanical or chemical irritation in the living body produces no ſenſible motion or contraction of the organ. Thus, any acid matter will augment the flow of mucus from thoſe ſurfaces which ſecrete it; and the ſlighteſt irritation of the conjunctiva increaſes the ſecretion of the lacrymal gland. The preſence of food in the mouth excites the ſalivary organs; and the act of ſuckling or milking produces a ſecretion of milk, &c. &c.

The ſame powers by which ſecretion is effected accompliſh the paſſage of the fluid, when produced, through its excretory tubes; it is the inſenſible organic contractility by which this is effected. Experiments on the ducts of glands in living animals, ſhew that they are not affected by chemical or mechanical irritation, and hence many have concluded that they poſſeſs no power of contraction; but the phenomena render it neceſſary to allow them ſuch a property, which may exiſt in parts, although the trials juſt mentioned ſhould not render it obvious. External preſſures and extraneous influence of other kinds have been reſorted to, in order to account for the expulſion of the fluids contained in excretory tubes, on the idea that theſe canals poſſeſſed no contractile powers in themſelves. Such explanations are quite gratuitous aſſumptions in all caſes; and in many inſtances are totally and manifeſtly inadequate, becauſe the organ is expoſed to no agency of the kind.

The ſecreted fluid in ſome inſtances is not conveyed immediately to the point of its ultimate deſtination; but is either retained in the excretory tubes, or kept in particular reſervoirs; and it has been ſuppoſed that various changes take place in its nature and properties under theſe circumſtances. "Frequentiſſime," ſays Haller, "hoc mechaniſmo natura utitur, ut humorem ſecretum retineat, perficiat, inſpiſſet, ad deſtinatos uſus contemperet, legitima occaſione effundat." Elem. Phyſiol. t. ii. p. 445. The urinary and gall-bladders are the moſt remarkable inſtances of this deſcription: we may mention alſo the veſiculæ ſeminales, and the mucous ducts of the urethra and female organs of generation. That the ſecreted fluids in theſe, and in ſeveral other inſtances, are conſiderably altered after the time of their firſt production, cannot admit of a doubt, as mere inſpection is ſufficient to prove it; the particular changes produced in each caſe will be conſidered in the account of the various organs. The opinions entertained concerning the general effects of theſe reſervoirs, are, that the fluids are inſpiſſated by an abſorption of theſe aqueous parts, that they are depurated, or rendered more perfect, and variouſly mixed together: it is added, that their retention in the heat of the living animal body in many inſtances renders them acrimonious, and that this change, in many caſes, as in the bile and ſemen, promotes the views of nature. Theſe notions are not very conſiſtent with each other, nor very clear in themſelves: the latter ſuppoſition, concerning the acrimonious tendency of the fluids, is founded on the obſervation of the changes occurring out of the body, and is not at all warranted by obſervation of the living ſubject, in which chemical alterations are reſiſted by the vital powers.

We have every reaſon to ſuppoſe that much of the ſecreted fluids is taken up and carried into the circulation by the abſorbents; but our knowledge does not enable us to determine the exact extent or nature of the modification, which the function of ſecretion undergoes from this cauſe. The experiments of Bichat prove that the various animal products, even thoſe which we ſhould at firſt have regarded as the moſt noxious, may be introduced into the venous ſyſtem without eſſential injury to the animal; ſo that the blood may be deemed a common fluid, receiving and retaining various principles, which may vary according to circumſtances. "I injected," ſays Bichat, "into the jugular veins of ſeveral dogs, cyſtic bile taken from other dogs opened at the ſame time. During the firſt days they appeared weary, did not eat, were very thirſty, had a dull look about the eyes, and were conſtantly lying down; in a little time, however, they gradually recovered their original vigour. I have ſince employed human bile in ſimilar experiments: the reſults were the ſame, except that hiccough and vomiting took place ſoon after the experiment. In one inſtance the animal died three hours after the injection; here I had uſed bile of an extremely deep black colour, like thick ink, ſuch as is occaſionally ſeen in the gall-bladder, and ſeems to form an eſſential part of the black vomitings obſerved in certain caſes. When ſimilar trials were made with ſaliva, the conſequent languor was leſs ſenſible. I then tried mucus of the noſe ſuſpended in water. Laſtly urine itſelf, not of the aqueous kind, but that of coction, was employed; the conſequent illneſs was more ſevere, but one animal only died, and I ſuſpect that this fatal event happened from the unguarded introduction of a little air at the time of the experiment." Anatomie Generale, t. 4. p. 587. He obſerves afterwards that the injection of any animal fluids into the carotid artery is immediately fatal, from the effects produced on the brain: but they may be thrown with impunity into other parts of the arterial ſyſtem, as, for inſtance, into the crural artery.

Sympathies of the glandular ſyſtem.—Theſe may be divided into the paſſive and active. The glandular tiſſue is very readily influenced by various excitements, either in the natural ſtate, or in diſeaſes, which conſtitute its paſſive ſympathies. The caſes in which the excitation of other organs augments glandular action, are particularly obſervable in the mucous ſyſtem. Moſt of the excretory ducts open on ſurfaces of this nature; and examples of the obſervation occur in the flow of ſaliva determined by the preſence of food in the mouth; in that of urine produced by catheters retained in the bladder; in the ſeminal excretion produced by irritation of the glans; the flow of tears from irritation of the conjunctiva or pituitary membrane; and in that of bile during the paſſage of the food into the ſmall inteſtine.

The glandular ſyſtem frequently exhibits paſſive ſympathies in diſeaſe; the organic properties are brought into action under theſe circumſtances, the animal ſenſibility being very ſeldom developed ſo as to produce pain. The innumerable varieties in the quantity or quality of fluids ſeparated by the glands under circumſtances of diſeaſe ariſe principally from ſympathetic influence. Thus the ſalivary apparatus moiſtens the mouth, or leaves it dry; fills it with a viſcid or a thin fluid, &c. The mucous organs cover the tongue with matters of moſt varying conſiſtence, thickneſs, and colour; and this occurs from ſympathy with various ſtates of the ſtomach. The liver, kidney, and pancreas are influenced in very numerous ways; wherever any organ in the animal economy is affected, theſe are deranged; their ſecretion is increaſed, diminiſhed, or altered, and frequently even inflammation and ſuppuration ſupervene. The affections of the liver from injuries of the head are well known; and the lacrymal ſecretion is variouſly modified in inflammatory and malignant fevers, ſo as to produce various appearances of the eyes. Weeping in various mental affections is another example of ſympathetic influence. The teſticles and proſtate exhibit fewer inſtances of ſuch ſympathies, probably becauſe their functions are ſo much more iſolated. The relations which connect the breaſts and uterus are remarkable, and frequently obſerved. In the ſequel of conſiderable acute diſeaſes, particularly fevers, the action of the glands is often conſiderably affected, and copious evacuations, called critical, the nature of which is not yet clearly explained, take place.

The active ſympathies are leſs frequent than thoſe of the preceding claſs; but diſeaſes exhibit inſtances of them. Inflammations of the liver, kidney, ſalivary ſyſtem, &c. ſhew various phenomena produced ſympathetically in other ſyſtems.

Bichat, in his Anatomie Generale, gives the following view of the characters which diſtinguiſh the vital properties of the glandular ſyſtem.

1ſt. *Peculiar vitality (vita propria) of each gland.*—The vitality of the glands, reſulting from the preceding powers conſidered in a ſtate of action, is not uniform in the whole ſyſtem; becauſe the ſtructure varies in every inſtance, and each tiſſue poſſeſſes a peculiar modification of vitality. Hence reſult many phenomena noticed by Bordeu. 1. There are certain matters on which alone each gland can act in the natural ſtate. Thus the ſalivary apparatus does not form bile, the liver does not ſeparate urine, &c.; and on this principle the difference of the ſecretions is founded. In the ſame way cantharides act particularly on the urinary organs; mercury on the ſalivary glands, &c. 2. Each gland has its particular mode of ſympathy. Thus the liver acts eſpecially on the brain, the kidney influences the ſtomach, the uterus and breaſts affect each other, &c. 3. Each glandular inflammation has a peculiar character: that of the kidney is different from that of the liver or teſticle; the inflamed proſtate has very different ſymptoms from the teſtis in ſuch a condition. 4. Every gland has peculiar diſeaſes, or ſome at leaſt to which it is more expoſed than others. Hydatids, which are very common in the liver, are never ſeen in the ſalivary glands or teſticle. Sarcocele is extremely common, while nothing is more unfrequent than an enlarged parotid. The liver alone exhibits that peculiar alteration, which conſtitutes the fatty ſtate; and is the moſt frequent ſeat of ſteatomatous tumours. Phyſicians, who have not been converſant with the inſpection of morbid caſes, uſe the vague and inſignificant terms of obſtruction and induration for every kind of glandular enlargement. The increaſe of ſize is the only common character of ſuch affections, while the nature of the tumour is entirely different. 5. Every gland preſents ſome peculiar modifications in what are called the critical evacuations, occaſionally conſequent on acute diſeaſes. 6. The different vitality of the glands occaſions them to re-act at very different intervals, in conſequence of direct irritation, or ſympathetic excitation. The lacrymal gland, for example, pours out ſuddenly an abundant ſecretion, when irritated; while the kidnies or pancreas can be excited only very ſlowly.

2d *Character. Inactive ſtate of the vital powers.*—The glands are ſubject to habitual alternations of increaſed and diminiſhed action. The animal functions are eſpecially influenced by ſleep, which completely ſuſpends them. The action of the glands is only partially diminiſhed at certain times, except in diſeaſe, when it is ſometimes completely ſuſpended. Bichat compares the ſleep of the animal life to the intervals of intermittent fevers, where the apyrexia is complete: and the ſleep of the glands to thoſe of remittent fevers, where the ſymptoms are merely diminiſhed in degree. Saliva flows into the mouth abundantly during maſtication; it merely moiſtens the cavity at other times. The pancreas and liver pour out their ſecretions profuſely, while the food is in the duodenum: they act much leſs intenſely during the ſtate of abſtinence. The kidney is particularly exerted ſome little time after a meal. The intermiſſions in the action of the breaſts are almoſt as complete as thoſe of the organs of animal life. Every mucous gland has its particular period of ſecretion: it is, when the ſurface, on which the duct opens, is in contact with any ſubſtance either retained in the cavity, or paſſing through it. We muſt, therefore, form this notion of the office of the glands; that they conſtantly ſeparate a fluid from the blood, but that they are more active at certain periods, and conſequently furniſh a more abundant ſupply.

This remittence of the glandular action, ſays Bichat, depends on a cauſe analogous to that of ſleep, which ariſes, in the animal life, from the fatigue experienced by the organs of ſenſation and locomotion, after a continuance of action. The laſſitude, of which the glands are ſuſceptible, is not generally marked by any painful feeling; yet there is in the breaſt, after long ſuckling, a kind of dragging ſenſation, and actual pain is felt in the teſtis after emiſſion has been repeated two or three times.

3d *Character.*—The vitality of the glands is never encreaſed at the ſame time in the whole ſyſtem. When one is in action, the others are in a ſtate of remiſſion. We might conceive, ſays Bichat, that there is only a determinate quantity of vital powers for the whole, and that one cannot be exerted unuſually without a correſponding diminution in the reſt. The digeſtive apparatus is accommodated to this law. At firſt the ſalivary ſyſtem produces an abundant ſecretion; then the ſtomach comes into action; thirdly, when the chyme enters the duodenum, the liver and pancreas are principally exerted; at the fourth period, the mucous glands of the large inteſtine act; and laſtly, the kidney exerciſes its peculiar office to evacuate the reſidue of the fluids. All the glands cannot act at once; as, in the external movements, certain muſcles are always in a condition of repoſe, while others are contracted. The moſt improper time for coition is during digeſtion, becauſe the mucous, pancreatic, hepatic ſecretions, &c. muſt then be performed at the ſame time with that of the teſticle. In diſeaſes, the ſecretion of one gland is encreaſed at the expence of others. This character of the glandular ſyſtem is only an example of the general character belonging to all the vital powers, by which, when increaſed at one point, they are proportionally diminiſhed in ſome other ſituation. Hence large abſceſſes, conſiderable tumours, and dropſies are always attended with debility of the glandular action. On the ſame principle is founded the uſe of bliſters, ſetons, moxa, cauteries, &c. which do not act, as old phyſicians ſuppoſed, by evacuating any morbid matters, but by putting an end to the irritation in the diſeaſed part, by means of that which they determine in ſome other organ.

4th *Character.*—Influence of climate and the ſeaſons on the vitality of the glands. From the preceding character is derived another phenomenon, which may be conſidered peculiar to the glandular ſyſtem; *viz.* that it is in general more active in winter than in ſummer, in cold than in warm climates. Warmth, by relaxing the integuments, increaſes the cutaneous diſcharge at the expence of that of the glands; while the action of cold is the inverſe of the preceding. Hence the ſame fluid, introduced into the body, is expelled in ſummer by the ſkin, in winter by the kidnies.

5th *Character.*—Influence of ſex on the vital properties of the glands. Is the vitality of theſe organs more active in the male than in the female? In thoſe which are ſubſervient to digeſtion, the lacrymal and urinary ſecretion, &c. the two ſexes exhibit very little difference. In the generative ſyſtem, the male poſſeſſes the addition of teſticles and proſtate, the female of mammary glands; ſo that here there is a compenſation. But the influence of the former on the animal economy very much exceeds in its force that of the latter.

Developement of the Glandular Syſtem.

1. *State of this ſyſtem in the fœtus.*—Although the ſecre-

tions poſſeſs very little activity in the fœtus, the glands in general are large. The ſalivary glands and pancreas are larger than in the ſequel: the bulk of the liver is enormous; and the kidnies conſiderably exceed their adult volume. It is not yet aſcertained whether the ſame obſervation applies to the mucous glands. The form and colour are different in ſeveral from what they afterwards exhibit. The texture partakes of that ſoftneſs and delicacy, which are common to the whole body; and they abound with fluids. In reſpect of their ſecretions, they ſeem to be in a condition analogous to that of remiſſion in the adult: indeed, they produce ſtill leſs than at that time. In fact, all the reſervoirs would not ſuffice to contain the produce of their ſecretion, if theſe were as much produced in a given time, as after birth. Is this becauſe the black blood, which they contain, does not furniſh ſuitable materials? or rather, becauſe the actions concerned in the compoſition of the body predominate ſo remarkably over thoſe of the other kind? All the matter brought to the organs remains in them, and affords the materials of the rapid growth, which is then taking place: conſequently, the ſecretions, which are deſigned chiefly to get rid of the reſidue of nutrition, are then inactive. Moreover, digeſtion introduces into the blood none of thoſe principles, which, not being required for nutrition, are expelled nearly as they enter, without having belonged to the compoſition of the organs; ſuch as the greateſt part of the drink.

2. *State of the glands during growth.*—This ſyſtem acquires a ſudden increaſe of energy at the time of birth. Red blood now circulates through its veſſels; and the extremities of the excretories are ſtimulated in various ways, as, by the food in the caſe of thoſe which open on the alimentary canal, by the air in the reſpiratory apparatus, &c. The organs are ſo much the more ſenſible to this ſudden excitation, in proportion as they were before unaccuſtomed to it. Yet many of the ſecretions are carried on with leſs activity during the firſt years of life, than in the ſequel, as thoſe of the ſalivary glands, liver, &c. Affections of the glandular ſyſtem are not the leading ones in the firſt years of life. The lymphatic *glands*, as they are called, and not the parotids, form the ſwellings ſo frequent about the neck. Hepatic affections are rare at this time. All the ſecretions connected with the generative proceſs hitherto do not exiſt. The organs, which are particularly employed at any age, are chiefly affected by acute and chronic diſeaſes at that time; while thoſe, by which no important function is exercifed, ſeem to be overlooked. All affections of the teſtis and chord are unfrequent before puberty, while the proceſs of nutrition alone is carried on in theſe organs. The glandular tiſſue is for a long time ſoft and delicate in the child; and it has not that property of becoming hard in conſequence of boiling, which we have mentioned as belonging to it in the adult.

3. *State of the ſyſtem after growth.*—We have already ſpoken, in the article Generation, of the organs which come into activity at puberty, and of the influence which they exert on the frame. At this time all the ſyſtem acquires a greater firmneſs in its texture. Towards the fortieth year the digeſtive glands ſeem to be predominant in the economy, and the liver is eſpecially obſervable among thoſe. Now bilious affections are moſt numerous; and the influence of thoſe paſſions, to which the bilious temperament ſeems to diſpoſe, is moſt obſervable.

4. *State of the glands in old age.*—At this time the organs gradually become more hard in their texture: but their colour changes leſs than that of moſt parts. The liver, kidney, &c. are nearly as full of blood as in the adult; while the muſcles, pale and colourleſs, contain a ſmaller proportion than before. It ſeems that this fluid firſt quits the ſkin and muſcles, which are fartheſt from the heart, and is concentrated in the nearer organs: thus the ſecretions are ſtill abundant in old perſons, while the muſcular and nervous powers are conſiderably weakened. The kidnies and liver ſtill ſeparate their particular ſecretions in large quantity. The activity of the generative ſyſtem has long ceaſed. The active exertion of the glands which are ſtill employed may be referred to two cauſes. The decompoſition of the body is very marked at this time, and much matter is conſequently thrown out by certain glands. The decay of the old ſubject is a phenomenon exactly oppoſite to that of growth in the fœtus. The ſkin, ſhrivelled and hardened, ceaſes to throw out the products of decompoſition, and the glands ſupply its place.

Generally ſpeaking, life ceaſes moſt gradually in the glandular ſyſtem. In the bodies of old perſons we ſee the gall and the urinary bladders ſtill full of their reſpective fluids. Compreſſion of any gland, even of the proſtate, ſhews that it contains much fluid; even more than we obſerve in the young ſubject. It is alſo a remarkable phenomenon that all the chief internal organs, as the liver, kidney, heart, lungs, &c. ſtill preſerve a conſiderable ſhare of vitality, while the parts ſubſervient to ſenſation and locomotion are nearly exhauſted, and the ties, which connect the individual to ſurrounding objects, are conſequently nearly deſtroyed. Haller, Element. Phyſiolog. tom. 2. Dumas, Principes de Phyſiologie, t. 4. Bichat, Anatomie Generale, t. 4.

Gland, in *Vegetable Phyſiology*, (*glandula*, a little kernel,) is defined by Linnæus as "a ſmall tumour, diſcharging a fluid." This fluid is always ſome peculiar ſecretion. The calyx and ſtalks of the Moſs Roſe, and of many other Roſes in ſome degree, are covered with prominent glands, diſcharging a viſcid aromatic liquor. Between the ſerratures of the leaf of *Salix pentandra*, the Bay-leaved Willow, is a ſeries of ſuch glands, whoſe exudation is a highly fragrant yellow gum-reſin, to which the fine-ſcent of that leaf is chiefly owing, and ſeveral other Willows are provided with ſimilar, though leſs perfumed, ſecretions. On the footſtalks of the Guelder-roſe, *Viburnum Opulus*, are very large and elaborate glands, whoſe diſcharge however is comparatively trifling, while various ſpecies of Paſſion-flower bear cup-ſhaped glands, on their footſtalks, producing a conſiderable quantity of very ſweet honey. Theſe therefore bear more analogy to thoſe glands, appropriated to ſome flowers, and called, from their produce, nectariferous glands, or nectaries. Such occur in *Geranium*, and in the Cruciform plants, conſtituting the Linnæan claſs *Tetradynamia*. In the latter the nectariferous glands occaſionally exhale a powerful ſcent, eſpecially in *Siſymbrium tenuifolium*, Engl. Bot. t. 525.

The kinds of glands above-mentioned, being of a ſecretory nature, certainly bear a great analogy to the glands of the animal body, but it appears that the more general and important ſecretions of vegetables are accompliſhed through membranes, whoſe organization and phyſiology are inſcrutable to our powers of inveſtigation. S.

Glands, *Diſeaſed.* See Bubo, Lues Venerea, Scrofula, Bronchocele, &c.

Glands *of Birds and Fiſhes.*—See *Anatomy of* Birds, and Fish.

GLANDEN, in *Geography*, a town of Pruſſia, in Natangen; 30 miles E. of Brandenburg.

GLANDERS, in *Veterinary Science*, a filthy diſeaſe in a horſe, ſo called, probably, from the ſwelling of the ſubmaxillary glands that accompanies it; and conſiſting in a corrupt ſlimy matter, running from the noſe, of a different colour, according to the degree of the malignity, or as the infection has been of a ſhorter or longer continuance; being white, yellow, green, or black, ſometimes tinged with blood.

Authors aſcribe it to various cauſes: ſome to infection; ſome to a diſorder of the lungs; others to the ſpleen; ſome to the liver; and others to the brain. After it has been of ſo long ſtanding, that the matter is of a blackiſh colour, which is uſually in its laſt ſtage, they ſuppoſe it to come from the ſpine; and hence they call it the *mourning of the chine.*

Kernels and knots are uſually felt under the caul in this diſorder; and as theſe grow bigger and more inflamed, ſo the glanders increaſe more. The progreſs of the diſeaſe is extremely uncertain; as ſome horſes will endure it for many years, without any other obvious inconvenience than a ſlight diſcharge and the enlargement of the glands under the jaws; and inſtances have occurred in which theſe ſymptoms have diſappeared for ſeveral weeks, and returned, perhaps, with no augmented virulence. In moſt caſes, however, the courſe of the malady is more rapid; the bones and cartilages of the noſe are ſpeedily eroded by the malignity of the ulcers, from which an abſorption commences, and conveys the poiſon into the circulation, gradually and fatally contaminating the whole frame. Neither the appetite nor the condition of the glandered horſe ſuffers materially in the early or mild ſtage of the complaint. When, however, it has ſpread its dominion over the thoracic viſcera, forming ulcers in the ſubſtance of the lungs and in the wind-pipe, great pain and difficulty of reſpiration are experienced, the diſcharge becomes very conſiderable, the appetite is injured, and the body of the unfortunate animal exhibits a picture of extreme diſtreſs; and unleſs the humanity of the owner does not induce him to terminate his ſufferings, the diſeaſe will, by tardy ſteps, afford relief to the wretched animal by diſſolution.

M. La Foſſe, farrier to the king of France, has taken great pains, by repeated diſſections, to diſcover the ſource and cauſe of this diſorder, and to aſcertain the proper and effectual method of cure. He has diſtinguiſhed ſeven different kind of glanders, four of which are incurable. The firſt proceeds from ulcerated lungs, the purulent matter of which comes up the trachea, and is diſcharged through the noſtrils, like a whitiſh liquor, appearing ſometimes in lumps and grumes: the ſecond is a waſting humour, that uſually ſeizes horſes at the decline of a diſeaſe cauſed by too hard labour, and proceeds from the lungs: the third is a malignant diſcharge, which ſometimes attends the ſtrangles, falls upon the lungs, and is diſcharged at the noſtrils: the fourth is when an acrimonious humour in the farcy ſeizes theſe parts: the fifth ariſes from a horſe's taking cold: the ſixth is a diſcharge from the ſtrangles, which ſometimes vents itſelf at the noſtrils: the ſeventh, or real glanders, is that above deſcribed.

M. La Foſſe, after examining, by diſſection, the carcaſes of glandered horſes, and making a ſtrict ſcrutiny into the ſtate of the viſcera, aſſiſted in his enquiry by ingenious anatomiſts for the ſpace of ten years, affirms this diſeaſe to be altogether local, and that the true ſeat of it is in the pituitary membrane which lines the partition along the inſide of the noſe, the maxillary ſinuſſes or cavities of the cheek-bones on each ſide of the noſe, and the frontal ſinuſſes or cavities above the orbits of the eyes; that the viſcera, as the liver, lungs, &c. of glandered horſes are, in general, very ſound; and, therefore, that the ſeat of the diſorder is not in thoſe parts, as many authors have aſſerted.

He found theſe cavities more or leſs filled with a viſcous ſlimy matter; the membrane, which lines both them and the noſtrils, inflamed, thickened, and corroded with ſordid ulcers, which, in ſome caſes, had eat into the bones. He obſerves, that, when glandered horſes diſcharge matter from both noſtrils, both ſides of the membrane and cavities were affected; but when they ran at one noſtril only, that ſide only was found diſtempered; and if one gland only was affected the horſe diſcharged from one noſtril only: but if both were affected, the diſcharge was from both. It has been obſerved, that the glanders in horſes very much reſembles a diſorder in men, called *ozena.*

In this diſeaſe, if the matter ſticks to the inſide of the noſtrils, like glue or ſtiff paſte; if the inſide of the noſe is raw, and appears of a livid or leaden hue, and the matter becomes bloody, fœtid, and of an aſh-colour; theſe ſymptoms are very unfavourable; but when only a limpid fluid is firſt diſcharged, and afterwards a whitiſh matter, the gland under the jaw does not much increaſe, and the diſorder has been of no long continuance, a ſpeedy cure may be expected. The cure of the milder kind of glanders may firſt be attempted by injections and fumigations. When theſe latter ſymptoms appear, the horſe ſhould firſt be bled, and treated as in the common diſorder of cold; and then, let an emollient injection, prepared with a decoction of linſeed, marſh-mallows, elder, chamomile flowers, and honey of roſes, or ſuch like, be thrown up as far as poſſible with a ſtrong ſyringe, and repeated three times a day: if the running is not leſſened or removed in a fortnight by theſe means, a reſtringent injection may be prepared with tincture of roſes, lime-water, &c. and the noſtrils fumigated with the powders of frankincenſe, maſtic, amber, and cinnabar, burnt on an iron heated for that purpoſe, the fumes of which may eaſily be conveyed through a tube into the noſtrils. When the diſeaſe is inveterate, recourſe muſt be had to the operation of trepanning, which M. La Foſſe performed on three horſes, two of which diſcharged from one noſtril only, and the third from both: he trepanned the two firſt on that ſide of the head which was affected, and the other on both ſides, and found that the wound and perforation filled up with good fleſh in twenty-ſix days, and the horſes ſuffered no inconvenience from the operation. The method of performing this operation will be underſtood by means of *Plate* XIX. *Miſcellany, fig.* 1, and the following explication: B, B, are two lines repreſenting the bounds of the cerebellum, or back part of the brain, which commences from the line D. C C is a line, where the ſuperior part of the ſinus frontalis commences, together with a view of the bottom of the ſinus, terminating between the lines D and E, where appears a ſubſtance in the form of a pear, which is the os ethmoides, or ſieve-like bone through which the olfactory nerves paſs, communicating ſenſibility to the pituitary membrane. E repreſents the beginning of the maxillary ſinus, terminating at M: the ſhaded ſpace between theſe lines repreſents the great cavities. F is a bony partition, ſeparating this ſinus into two parts that have no communication: of which partitions there are ſometimes two, repreſented by F and G. Some horſes have neither of theſe. N ſhews the place of the cornets or horns; O, the redoubling; P, their middle part; Q, the lower part of them: and M, the bony pipe or canal which guards the maxillary nerve: A A is the ſeptum narium, dividing the noſe from top to bottom, and ſeparating the two noſtrils; L ſhews the place where the trepan ſhould be applied, when there is reaſon to apprehend that the glanders is ſpread into the frontal ſinus; E is the place where it ſhould be applied to cleanſe the maxillary ſinus, though the round ſpot between D and E is preferable, becauſe one orifice in this place will ſerve to waſh all the parts, both above and below, with one injection. H ſhews the place where another perforation ſhould be made, as a drain for diſcharging the foul matter waſhed away by the injection; and this hole, kept open by a hollow leaden pipe, would, in all recent caſes, be ſufficient. I repreſents the injection thrown in by the ſyringe, which flows out by the orifice and the noſtril K; and, during this part of the operation, the noſtrils ſhould be held cloſe. If there ſhould be two bones in the maxillary ſinus, it is abſolutely neceſſary to pierce through both, with a ſtiletto or ſharp-pointed tuck, as in the figure. The trepan ſhould be directed towards the interior part of the noſe, to prevent its being obſtructed by the roots of the teeth. R is the trepan, S the handle which turns it, and T the ſaw-part to be applied to the bone. The ſurgeon's trephine will anſwer the purpoſe for this operation; but before the inſtrument is applied, a circular piece of the ſkin, of about the ſize of half a crown, ſhould be firſt cut off with the membrane which covers the bone. The ſyringe ſhould be large enough to contain half a pint of injection. The injection firſt uſed ſhould be of a deterſive nature, as a decoction of birth-wort, gentian, and centaury, to a quart of which may be added two ounces of Egyptiacum and tincture of myrrh; and when the diſcharge abates, and the matter becomes of a thick conſiſtence and white colour, this injection may be changed for barley-water, honey of roſes, and tincture of myrrh; and for completing the cure, Bates's alum-water, or a ſolution of colcothar, vitriol, lapis medicamentoſus, and ſuch like, in lime-water, will ſerve to dry up the moiſture, and to reſtore the tone of the relaxed glands. For this purpoſe Dr. Bracken recommends the following mixture: Take of alum and white vitriol powdered, of each four ounces; calcine them in a crucible; when cold, powder the calx, and mix it with a gallon of lime-water and a quart of vinegar, and decant the mixture clear for uſe. The perforations that are made in this operation ſhould be kept open, after the uſe of the injection, by fitting to the upper one a piece of cork waxed over, and a hollow leaden tent to the lower, through which there will be a conſtant drain of matter from the ſinuſes; and both may be ſecured by a proper bandage. The growth of the fleſh ſhould be alſo checked by rubbing with cauſtic medicines, or applying the actual cautery. The cure will be expedited, by giving every day a quart or three pints of a ſtrong decoction of guaiacum chips, by purging at proper intervals, and putting a rowel into the horſe's cheſt: and if theſe fail, mercurials may be adminiſtered with the phyſic, and the alterative powders with lime-water may be given and continued for ſome time.

The following remedy is ſaid to have ſucceeded, in fifty caſes out of ſixty, for curing the glanders, without trepanning. Keep the horſe a day or two with ſmall quantities of choice hay, and ſcalded bran; then blow up his noſtrils as much aſſarabacca, in fine powder, as will lie on a ſix-pence, evening and morning, giving him for drink ſmall lime-water, during four or five days: then boil two ounces of elecampane roots in a quart of drink, till they mix, and give it once a day during three or four days more; then boil two handfuls of the white moſs that grows on oaken pales, in two quarts of milk, till one is conſumed; ſtrain it and ſqueeze the moſs, and give the milk juſt warm: repeat this for four or five days: about an hour after the horſe has had his drink each day, take a piece of ſweet butter, about the ſize of an egg, and about half an ounce of brimſtone finely powdered, and work them well together; then take two clean gooſe feathers, as long as they can be procured, and make a hole in each of the quill ends, in which faſten two long threads; then anoint the feathers well with the mixture, and roll them in dry flour of brimſtone: open the horſe's noſtrils, and thruſt the feathers up into his head, faſtening the threads to the top of his head, to prevent their dropping out: ride him an hour or two morning and evening, and let him ſtand half an hour after he returns to the ſtable before the feathers are taken out: purſue this courſe eight or nine days, bathing his head with camphorated ſpirits of wine, and afterwards confining his head over a tub of hot grains, that he may breathe the ſteam. A rowel may prevent a relapſe.

After all that has been ſaid, it is now generally allowed, that no effectual remedy for the glanders has yet been diſcovered. The operation of trepanning has never been attended with permanent ſucceſs; and whatever relief has been obtained from the uſe of various medicines, it has been merely temporary, and the diſeaſe has been pronounced incurable. But though all attempts for curing the glanders have hitherto proved ineffectual, the inquiry ſhould be purſued, and efforts for this purpoſe ſhould be renewed till the veterinarian's ingenuity and perſeverance are crowned with ſucceſs. The analogy ſubſiſting between the glanders and the venereal diſeaſe has led ſome practitioners to recur to the uſe of mercury, but the ſucceſs attending it has been very partial. Profeſſor Coleman mentions a ſingle caſe which occured at the Veterinary College, in which the glanders yielded to the treatment employed, which was that of repeated and long-continued doſes of calomel, carried to the extent of ſalivation. This ſolitary caſe led to many trials of a ſimilar nature, but, unhappily, without the ſucceſs which was hoped for by the profeſſor, who exerted his wonted ingenuity to improve the hint which this ſingle inſtance afforded. Others have made ſimilar efforts in this way, with only a temporary abatement of the ſymptoms, but without ultimate ſucceſs. Some years ago, great expectations were formed, from the uſe of the mineral acids in the venereal diſeaſe; and trials were made with theſe in ſome caſes of glanders, which were ineffectual. The late profeſſor of the Veterinary College, M. St. Bel, made a variety of experiments for aſcertaining the nature of this diſeaſe, and for inveſtigating an effectual remedy, whilſt he was profeſſor of the veterinary ſchool at Lyons; he has recorded the caſes that fell under his notice, with his method of treatment, which was very diverſified and multifarious; but he concludes with obſerving, "notwithſtanding my failures, I think that a remedy may be found for the glanders." Many circumſtances convinced M. St. Bel, that the virus of the glanders has greater activity in ſouthern than in northern countries; and that its progreſs is more rapid in the mule and the aſs, than in the horſe; but that the former are not ſo ſubject to receive it by infection or contact as the horſe is. The uſe of verdigris having been recommended by a profeſſor of the veterinary art, Mr Lawſon, ſurgeon to the Oxfordſhire light dragoons, gave this medicine a trial in two caſes, thoſe of a horſe and mare, beginning with one drachm daily, and gradually increaſing it to one ounce. But no beneficial effect was produced. Diſſection of the horſe after three months' trial ſhewed no diſeaſe in the brain, but it was altogether confined to the ſeptum of the noſe and noſtrils.

As the glanders is a diſeaſe of ſuch virulence, known to be contagious in a high degree, and hitherto found to be incurable, it is of importance to diſtinguiſh it from other diſeaſes to which the horſe is ſubject. A cold, which has been ſometimes miſtaken for the glanders, may be eaſily diſtinguiſhed from them. In colds, there is generally a certain degree of fever, the eyes appear dull or watery, the appetite is diminiſhed, and there is almoſt always a cough. If the glands of the throat ſhould ſwell, they are not ſo cloſely attached to the jaw-bone as in the glanders, but feel looſe and moveable under the ſkin; they are alſo generally in a ſtate of active inflammation, feeling hot, and ſofter than in the glanders. In colds, both noſtrils are almoſt always affected; in the glanders it frequently happens that the diſcharge is only from one. In colds, the noſtrils are not ulcerated; in glanders this always happens, though at different periods of the diſeaſe. The ſtrangles have been ſometimes miſtaken for the glanders; but in this diſeaſe the inflamed glands very ſoon ſuppurate and burſt, by which all the other ſymptoms are generally removed, whilſt in the glanders the glands ſeldom or never ſuppurate. In order, however, to avoid all danger, it is adviſeable, as ſoon as a horſe is perceived to have a diſcharge from his noſe, to put him into a ſtable, where he can have no communication with other horſes. If the glands of the throat be enlarged and inflamed, apply a large poultice to them, ſteam the head three or four times a day, let the horſe be well clothed, and give a fever powder every day, or once in 12 hours. By theſe means, the diſeaſe, if it ariſe from a cold, will ſoon be removed. When conſiderable ulceration is perceived in the noſe, with the other concomitant ſymptoms of the glanders, the ſooner the horſe is deſtroyed, the better.

The moſt effectual method of purifying ſtables in which glandered horſes have been kept, is to remove, or carefully ſcrape, and afterwards ſcour with ſoap, ſand, and boiling water, every thing on which the horſe may have depoſited any matter, and afterward to cover every part of the ſtable with a thick coat of lime and ſize. It is a common practice with the owners of horſes, when they have had any one of them ſeized with the glanders, to bleed and purge the reſt, by way of prevention; but this method will ſerve rather to promote than prevent the diſeaſe, as it will conſiderably increaſe the action of the abſorbent veſſels, by which action the glanders are conveyed into the ſyſtem.

GLANDIUM, in *Surgery*, a name ſometimes given to an excreſcence near the anus.

GLANDORE, in *Geography*, a harbour of the ſouth of Ireland, in the county of Cork: it is a little to the weſt of Roſs, and has the village of Myros at the extremity of it.

GLANDORP, Matthias Louis, in *Biography*, a phyſician, was born at Cologne in 1595. He ſtudied firſt at Bremen, in Lower Saxony, whence his family originated, and afterwards returned to Cologne, where he commenced his medical purſuits; but, by the advice of his father's friends, he was ſoon ſent to Padua, in order to reap the benefits of ſtudying under the great maſters, who at that time were ſo diſtinguiſhed in medicine. He attached himſelf particularly to Fabricio and Spigelius; and he made ſuch great progreſs in anatomy under the latter, that he was deemed qualified to give public demonſtrations. Before returning to Germany, he received the degree of doctor in 1618. He determined to fix himſelf at Bremen, in which city he found every thing favourable to his views; and his ſucceſs in practice gained him ſo much reputation, that he was elevated to the moſt honourable offices. He was phyſician to the archbiſhop and to the republic, when he died in 1640. He left ſeveral works, adorned with plates, which contain many important obſervations on anatomy. Theſe are, 1. "Speculum Chirurgorum, in quo quid in unoquoque vulnere faciendum, quidve omittendum, præmiſſâ partis affectæ anatomicâ explicatione, obſervationibus ad unumquodque vulnus pertinentibus adjectis, conſpicitur ac pertractatur," Bremæ, 1619, 8vo. This was republiſhed in 4to. 1628, with theſe two treatiſes, 2. "Methodus medendi paronychiæ, cui acceſſit decas obſervationum:" and, 3. "Tractatus de Polypo, narium affectu graviſſimo."—4. "Gazophylacium polypluſium fonticulorum et ſetonum reſeratum," ibid. 1633, 4to.—London 1633, 4to.—He made frequent uſe of the actual cautery in the treatment of the moſt common diſorders. The whole of Glandorp's works were collected and printed in London, in 4to. in the year 1729, under the title of "Opera omnia, nunc ſimul collecta, et plurimum emendata." This collection includes alſo ſome curious tracts on Roman antiquities. Eloy. Dict. Hiſt.

Glandorp, John, a learned philologiſt, who flouriſhed in the middle of the 16th century, was born at Munſter. He ſtudied under Melancthon, and became very diſtinguiſhed for his critical knowledge. He was elected rector of the college at Hanover, but, upon ſome diſpute, he quitted in 1555, and retiring to Goſlar, was followed by moſt of his ſcholars. In 1560, he was made profeſſor of hiſtory at the univerſity of Marpurg. He died in 1564. His works are "Sylva Carminum Elegiacorum;" "Deſcriptio Gentis Antoniæ;" "Familiæ Juliæ Gentis;" "Diſticha Sacra et Moralia;" "Annotat. in Jul. Cæſaris Comment.;" "Annotat. in Ciceronis Epiſt. famil.;" "Onomaſticon Hiſtoriæ Romanæ."

GLANDULA, in *Anatomy*, the ſame as gland.

The word is a diminutive of the Latin *glans*, acorn; and is here uſed on account of ſome external reſemblance between the glands of the body and the fruit of the oak.

Glandula *Guidonis*, among *Surgeons*, is a tumor reſembling a gland; ſoft, ſingle, moveable, with roots, and ſeparate from the adjacent parts.

GLANDULE, in *Engliſh*, ſignifies a little gland. Thus the amygdalæ, or almonds of ears, are by ſome called glandules.

GLANDULOUS, or Glandular, ſomething compoſed of glands, or that abounds with glands.

The breaſts are glandulous bodies. The cortical ſubſtance of the brain is commonly reputed to be glandulous; though Ruyſch, from the diſcoveries made by his admirable injections, holds, that there is no ſuch thing as a gland therein.

The ancients diſtinguiſhed a particular kind of fleſh, which they called *caro glanduloſa*, or glandulous fleſh.

Glandulous *Body*, *glanduloſum corpus*, more particularly denotes the proſtata.

Glandulous *Roots*, among *Botaniſts*, ſuch tuberoſe roots as are faſtened together in large numbers by ſmall fibres or threads.

GLANIS, in *Ichthyology*, a ſpecies of *ſilurus*, which ſee.

GLANOVENTA, in *Ancient Geography*, a place of Britain, in the 10th Iter of Antoninus, ſuppoſed by Horſley to be Lancheſter, in the county of Durham.

GLANS, Acorn, in *Natural Hiſtory*, a fruit contained within a ſmooth but hard bark, including a ſingle ſeed; its hind-part being covered with a kind of cup, and the fore-part bare. See Acorn and Oak.

Glans *Marinus*, a name given to a genus of ſhell-fiſh, more uſually called *balanus*, and in Engliſh the centre ſhell.

Glans *Trochitifera*, a name given by Geſner, and ſome other writers, to a kind of figured foſſil, found uſually among the trochitæ and entrochi, and evidently appearing to have in ſome manner belonged to them. All the writers, who have themſelves examined the places where the trochitæ are found, have mentioned theſe under the names of glandes trochitiferæ, others under leſs determinate ones. Agricola calls them lapides informes; and Liſter, after him, rude ſtones, having impreſſions of the entrochi. See farther Philoſ. Tranſ. N° 100.

Glans *Penis*, in *Anatomy*, the rounded extremity of the organ. See Generation, *organs of*.

GLANSHAMMAR, in *Geography*, a town of Sweden, in the province of Nericia; ſeven miles N. E. of Obreo.

GLANVILL, Joseph, in *Biography*, was born at Plymouth in the year 1636, where he probably received the early parts of his education: but he purſued his maturer ſtudies at Exeter college, Oxford. He took his firſt degree in the year 1655, and removing to Lincoln college, he graduated maſter of arts in 1658, and was, about the ſame time, appointed chaplain to Francis Rous, eſq. provoſt of Eton college. The death of his patron induced him, after a very ſhort time, to return to Lincoln college, where he ſpent his time in literary and philoſophical ſtudies, till the reſtoration of king Charles II. He became acquainted with the writings of Richard Baxter, and was an ardent admirer of his preaching and religious principles. He is ſaid to have been an eager republican in politics, but, whether this be the real fact, has been much doubted. Upon the re-eſtabliſhment of monarchy and epiſcopacy, he conformed to the national church, a circumſtance that did not in the leaſt abate the eſteem which Baxter had before manifeſted for him. He became a zealous convert to the principles of the new philoſophy, in oppoſition to the ſyſtem of Ariſtotle, and publiſhed a work in their juſtification, entitled "The Vanity of Dogmatiſing or Confidence in Opinions," &c. This piece introduced him to the acquaintance of many of the perſons who afterwards formed the Royal Society. About this time Mr. Glanvill entered into orders, and was preſented to the rectory of Wimbiſh, in the county of Eſſex, and in 1662 he was inducted into the vicarage of Frome-Selwood, in Somerſetſhire. He publiſhed in the ſame year, but anonymouſly, a diſcourſe on the fundamental doctrine of the ancient eaſtern philoſophers, which he endeavoured to prove was not incompatible with revealed religion. It was entitled "Lux Orientalis: or an Enquiry into the opinion of the Eaſtern Sages concerning the Pre-exiſtence of Souls; being a Key to unlock the grand Myſteries of Providence in relation to Men's Sin and Miſery." Upon the eſtabliſhment of the Royal Society, he publiſhed his former treatiſe, corrected and enlarged, under the title of "Scepſis Scientifica; or confeſſed Ignorance in the way of Science, in an Eſſay on the Vanity of Dogmatiſing and confident Opinion." This work was dedicated to the Royal Society, and the author was almoſt immediately admitted one of its members. In 1666 he publiſhed his work, entitled "Some philoſophical Conſiderations touching the being of Witches and Witchcraft." This performance, which is ſtill regarded as a curioſity, though very little creditable to the judgment of the author, engaged Glanvill in a controverſy which laſted as long as his life. He was now preſented to the rectory of Bath, in which city he fixed his reſidence. Here he met with many opponents, who were apt to treat him but roughly, on account of his adherence to the new philoſophy, which led him to draw up a ſmall but elegant treatiſe, entitled "Plus Ultra: or the Progreſs and Advancement of Knowledge ſince the Days of Ariſtotle. In an account of ſome of the moſt remarkable late improvements of practical uſeful learning, to encourage philoſophical endeavours, &c." The author was violently attacked on this occaſion, but he defended himſelf with ſpirit and ſucceſs. His reputation was now firmly fixed, and he was frequently called upon to preach on public occaſions. At a viſitation of the dioceſe, he delivered a diſcourſe which met with general approbation, and which was frequently re-printed: it was a defence of reaſon in the affairs of religion, againſt infidelity, ſcepticiſm, and fanaticiſm of all ſorts. He next attempted to ſhew the correſpondence between religion and the new philoſophy, in a diſcourſe concerning the religious temper and tendency of the experimental philoſophy which is profeſſed by the Royal Society. "While," ſays one of his biographers, "he was entitling himſelf to the particular acknowledgments of the members of that body, by defending the reaſonableneſs and uſeful tendency of their purſuits, he alſo contributed to their collection of inſtructive and entertaining papers, ſome obſervations on the mines in the Mendip hills, and on the natural hiſtory and ſprings of Bath, which were well received, and inſerted in the Philoſophical Tranſactions." In the year 1672, Mr. Glanvill exchanged his rectory of Frome for that of Streat, in the ſame county, with the chapel of Walton annexed; and about the ſame time was made one of the king's chaplains. In 1676, he publiſhed his "Eſſays on ſeveral important Subjects in Philoſophy and Religion," conſiſting of the principal of his former pieces, reviſed and improved, with a treatiſe, entitled "Antifanatic Theology and free Philoſophy." Two years after this, his "Eſſay concerning Preaching" came out; it was written for the purpoſe of diſſuading the younger clergy from that affectation of wit and fine ſpeaking, which began to be faſhionable in thoſe times, and to recommend and enforce a plain and practical method of enforcing the moral duties of the goſpel, as the true eloquence of the pulpit. The laſt work of this worthy divine, was entitled "The zealous and impartial Proteſtant, ſhewing ſome great but leſs heeded Dangers of Popery." Mr. Glanvill died of a fever at the early age of forty-four, and Dr. Horneck publiſhed a quarto volume of Diſcourſes, &c. after his death, to which is prefixed an account of the author. As a preacher, Mr. Glanvill was eloquent and pathetic: in private life he was truly amiable and praiſe-worthy. He was author of various other tracts beſides thoſe already noticed, the titles of which are given in the Biographia Britannica. To this work the reader is referred for further particulars.

GLAREANA, in *Ornithology*, the name of a bird deſcribed by Geſner from the figure, and ſuſpected to be no way different from the ſpipoletta, a kind of lark, the Alauda *campeſtris*; which ſee.

GLAREOLA, a ſpecies of *Tringa*; which ſee.

Glareola, in *Ornithology*, a genus of the Grallæ order, founded on the natural family called by Briſſon "Perdrix de Mer," and alſo Glareola. The character of this genus conſiſts in the bill being ſtrong, ſhort, ſtraight, and turned down or hooked at the tip; noſtrils linear, and placed in an oblique poſition at the baſe of the bill; gape of the mouth large; feet four-toed, the toes long, ſlender, and connected at the baſe by a membrane; tail furcated, and containing twelve feathers. The number of ſpecies, according to Gmelin, are three, namely, Auſtriaca, Senegalenſis, and Nævia, the firſt of which, however, compriſes ſeveral remote varieties. Linnæus deſcribed this as a ſpecies of hirundo, the ſecond kind is a tringa of the ſame author, and the third, a gallinula of Ray.

Species.

Austriaca. Above grey-brown; collar black; chin and throat white; breaſt and belly reddiſh-grey. Gmel. *Hirundo marina*, Aldr. *Hirundo riparia*, Merg. *Pratincola*, Kram. *Gallinula erythropus minor*, Geſn. *Perdrix de mer*, Buff. *Sea ſwallow of Aldrovandus*, Will.

The length of this bird is nine inches; the bill black, with the baſe red; upper wing-coverts whitiſh; quill and tail-feathers duſky, the outer ſide of the firſt tail-feathers white; and the legs and naked part of the thighs in general red. The ſpecies inhabits chiefly the ſouth of Europe, and the milder parts of Aſia; towards the north it becomes more ſparingly diffuſed, and is very rarely ſeen ſo remote from the ſouthward as Britain. It abounds moſt in the plains of the deſerts towards the Caſpian ſea, in the neighbourhood of the rivers, its food conſiſting of aquatic inſects and worms.

One of the varieties of this ſpecies is called by Briſſon Glareola torquata, and by Buffon, "Perdrix de mer à collier." The plumage beneath is white; the front black, with a white ſpot on each ſide, and the collar brown. Its ſize is rather inferior to the former, and the legs blackiſh inſtead of red. This, like the other, is a noiſy reſtleſs bird, and frequents the banks of rivers, aquatic inſects conſtituting its principal food. The eggs are oblong, and uſually about ſeven in number in each neſt.

The bird called "Perdrix de mer" by Sonnerat is another variety of this ſpecies; the lower parts of the plumage, and alſo the rump, are white; and the chin ſtreaked with black, and ſurrounded by a black curved line. This was caught in the open ſea, in the latitude of the Maldivia iſles, and lived a month on flies, and bread ſoaked in water.

Two other varieties occur in the Eaſt Indies, on the coaſt of Coromandel, and are likewiſe deſcribed by Sonnerat; the firſt of theſe is brown, the under parts, with the rump and baſe of the tail white; in the ſecond, the tail-feathers are brown, having the outer ones marked with a white band.

SENEGALENSIS. Entirely fuſcous. Gmel. *Glareola Senegalenſis*, Briſſ. *Tringa fuſca*, Linn. *Perdrix de mer brune*, Buff. *Senegal pratincole.* Scarcely exceeds the former in ſize, being nine inches and a half in length, and inhabits Senegal. The ſame variety is found alſo in Siberia.

NÆVIA. Brown, ſpotted with white; lower part of the belly and vent reddiſh-white, with black ſpots; bill and legs black. Gmel. *La perdrix de mer tachetée*, Briſſ. *Gallinula melanopus*, *Rothnuſſel*, Ray. *Giarole*, Buff. *Spotted pratincole.*

Size of Glareola auſtriaca. This variety is met with in Germany.

GLARIANUS, HENRICUS, LORITUS, in *Biography*, ſurnamed *Glarianus*, from the town of Glaris, in Switzerland, where he was born in 1488. He rendered himſelf famous by his knowledge of muſic, and belles lettres; but he may more properly be ranked among dilettanti theoriſts in muſic, than a muſician by profeſſion; and his abilities, as a ſcholar and critic, have been much leſs diſputed by the learned, than his knowledge of muſic, by muſicians.

He ſtudied at Cologn, Baſil, and Paris; his preceptor in muſic was John Cochlæus; and in literature, Eraſmus, with whom he lived in ſtrict friendſhip, and by whom he was warmly recommended, in a letter ſtill extant, to the archbiſhop of Paris. He is called by Walther a philoſopher, mathematician, hiſtorian, geographer, theologian, and poet; indeed, he diſtinguiſhed himſelf in moſt of theſe characters. Gerard Voſſius calls him a man of great and univerſal learning; and for his poetry, the emperor Maximilian I. honoured him with the laurel crown.

His famous treatiſe on muſic, is entitled ΔΩΔΕΚΑΧΟΡΔΟΝ, which implies twelve modes; to which number he wiſhed to augment the eccleſiaſtical tones, which had never before exceeded eight, from the time of St. Gregory. Zarlino, and a few more, adopted the opinion of Glarianus, but ſoon relinquiſhed it, on finding that they had made no converts. Indeed, the whole twelve modes of Glarianus contain no other intervals than thoſe to be found in the key of C and A natural, or in the different ſpecies of octave, in thoſe two keys; and though his augmentation extends the compaſs of ſounds uſed in the modes, it offers no new arrangement of intervals, as may be ſeen by his title-page, when it tells us that the authentic modes are D, E, F, G, A, C, and the plagal A, B, C, D, E, G; where we perceive that A, C, E, G, are repeated, by being made both authentic and plagal.

If, inſtead of twelve modes, Glarianus had augmented the eight to twenty-four, by aſſigning two to each ſemitone in the octave, he would have done real ſervice to the muſic of his time; but his cotemporaries were not yet ready for ſuch an innovation, being ſtill held too faſt in the trammels of the church to dare uſe any other ſounds than thoſe which time had conſecrated, and authority admitted within its pale.

His book, however, contains many curious anecdotes and compoſitions of the greateſt muſicians of his time, which were excellent ſtudies for his countrymen and cotemporaries, and, if ſcored, would be ſtill very inſtructive and uſeful to young contrapuntiſts. Glarianus died 1563, aged 75.

GLARIS, or GLARUS, in *Geography*, a canton in Switzerland, formerly ſubject to the abbeſs of the convent of Seckinguen, in Suabia, but poſſeſſing a democratical form of government, under a mayor, appointed by the abbeſs, but choſen by the inhabitants; till towards the latter end of the thirteenth century, the emperor Rodolph I. obtained the excluſive adminiſtration of juſtice; and ſoon afterwards his ſon Albert purchaſed the mayoralty, which had become hereditary, and reunited in his own perſon the whole civil and judicial authority. The government of Albert, and of his deſcendants the dukes of Auſtria, was arbitrary and oppreſſive; and therefore, in 1350, Schweitz, aſſiſted by Zuric, Lucerne, Uri, and Underwalden, expelled the Auſtrians from the canton of Glarus, and re-eſtabliſhed the democracy. Glarus then entered into a perpetual alliance with its deliverers, and was received into the Helvetic confederacy, with ſome reſtrictions, which were not aboliſhed till 1450. It was then the 6th canton, but afterwards became laſt in rank of the eight ancient cantons, as they were called. The people of Glarus enjoyed their liberties unmoleſted till 1388, when the Auſtrians made an irruption into the canton, and pillaged the country and maſſacred the inhabitants. At this time 350 troops of Glarus, aſſiſted by 30 Switzers, reſiſted the whole ſtrength of the Auſtrian army, and compelled them to retire. In the 16th century the reformation was introduced into this canton; but the Proteſtants and Catholics have been accuſtomed to live together on terms of mutual toleration and friendſhip: of late the number of Proteſtants has very much increaſed, and their induſtry in every branch of commerce is obſerved to be far ſuperior to that of the Catholics. The government of this canton, previouſly to the French revolution, was entirely democratical; every perſon at the age of 16 had a vote in the "Landſgemeind," or general aſſembly, which was annually held in an open plain. This aſſembly ratified new laws, laid contributions, entered into alliances, declared war, and made peace. The "Landamman" was the chief of the republic, and was choſen alternately from the two ſects; with this difference, that the Proteſtant remained three years in office and the Catholic two. The other great officers of ſtate, and the bailiffs, were taken alſo by lot from a certain number of candidates propoſed by the people. The executive powers were veſted in the council of regency, compoſed of 48 Proteſtants and 15 Catholics; and each ſet had its particular court of juſtice. This canton comprehends 336 ſquare miles; and its population is eſtimated at 16,000 perſons; its contingent to the army, under the old government, was 400 men. According to the diviſion of Switzerland into 18 departments or cantons, in 1798, the canton of Glarus, together with the bailliages of Wallenſtadt, formed the canton of Linth; but according to the conſtitution of the 29th of May 1801, Glarus, together with the bailliages of Sergans, Werdenberg, Guſten, Uznac, and Rappenſchwell, forms the eighth canton, and deputes five repreſentatives to the diet.

This canton is entirely encloſed by the Alps, except towards the north; and there is no entrance but through this opening, which lies between the lake of Wallenſtadt and the mountains ſeparating this canton from that of Schweitz. At this entrance, the canton reaches from the banks of the Linth to the fartheſt extremity of its Alps, about 30 miles; forming a valley, which becomes narrower as you advance, and is ſcarcely more than a muſket ſhot in breadth at the burgh of Glarus. It afterwards opens by degrees, and, about a league from this burgh, is divided by the Freyberg mountains; at the point of this diviſion, the two rivers, Linth and Sernft, unite. The hillocks of the Peak in Derbyſhire, ſays Mr. Coxe, are mere mole-hills to the Alps of Glarus. Theſe ſtupendous chains of rocks are abſolutely perpendicular, approach one another ſo near, and are ſo high, that the ſun may be ſaid to ſet, even in ſummer, at four in the afternoon. On each ſide are a number of waterfalls, which excite attention. The valley terminates in an amphitheatre of mountains, and the glaciers of the canton cloſe the view. (See Linth.) All the houſes in this canton, like thoſe of Appenzel, are built of wood; large, ſolid and compact, with great pent-houſe roofs, that hang very low, and extend beyond the area of the foundation. The police in this democratical ſtate is well regulated; nor does liberty often degenerate into licentiouſneſs. Cattle, cheeſe, and butter conſtitute the principal commerce of the canton. The cattle are fed in ſummer upon the Alps; it is computed that 10,000 head of large cattle, and 4000 ſheep, are paſtured during that ſeaſon upon the mountains belonging to the canton. The inhabitants alſo manufacture linen and muſlins. Among the exports, a conſiderable article is ſlate, with which the canton abounds; the principal quarry being in the valley of Sernft, where large ſlates are dug up that ſerve for tables. Theſe quarries once furniſhed Great Britain with ſlates for writing; but this branch of trade has been ſuperſeded by the great ſlate quarries in Caernarvonſhire. A great part of this canton conſiſts of mountains, rocks, inacceſſible foreſts, and barren heaths, covered with ſnow; and it is ſubject to frequent inundations, and to the devaſtations occaſioned by tempeſts and falling rocks.

GLARNISH, a mountain of Switzerland; 7 miles W.S.W. of Glarus.

GLARUS, or Glaris, the capital of the above-deſcribed canton, ſituated upon the Linth. The town is large and populous; and the town-houſe is a handſome ſtructure; 52 miles E. of Lucerne. N. lat. 26° 58'. E. long. 9° 3'.

GLASENDORF, a town of Bohemia, in the circle of Konigingratz; 6 miles N.N.W. of Trautenau.—Alſo, a town of Sileſia, in the province of Neiſſe; 11 miles S.W. of Patſchkau.

GLASGOW, a very populous, handſome, and regularly built city, in the county of Lanark, in Scotland; ſituated on the north bank of the river Clyde, which is navigable for veſſels of 100 tons and upwards. In ancient times, and during the prevalence of the Roman Catholic religion, Glaſgow was chiefly diſtinguiſhed as an archiepiſcopal ſee, and was of courſe principally under the influence of the archbiſhop and his inferior clergy. Their power ſeems in thoſe days to have been civil as well as eccleſiaſtical, for the charters of the moſt ancient corporate bodies are held by this tenure, the civil magiſtrates being only noticed as of ſubordinate rank and authority, and the freedom fines, and other emoluments are expreſsly appropriated to eccleſiaſtical purpoſes. The revenue of the dioceſe of Glaſgow, if it may be eſtimated by the extent of lands ſubject to the payment of tythes, or (as they are called in Scotland) teinds, muſt have been very great; for thoſe burthens extended over almoſt the whole of the counties of Lanark, Renfrew, Dumbarton, Ayr, Dumfries, and Galloway, comprehending the whole ſouth-weſt diſtrict of Scotland, and perhaps a moiety of the moſt fertile land in the whole kingdom. Of this enormous revenue, ſince the reformation a ſmall part, but now of great value, has been appropriated for the ſupport of the univerſity of Glaſgow, ſome part for the payment of the parochial ſtipends, and a great part has reverted to the freeholders or their dependants, and theſe are conſtantly fluctuating as in other parts of the kingdom. The inſurrections and civil wars, which devaſtated Scotland ſubſequently to the reformation, and previous to the revolution, having diveſted Glaſgow of all that attraction which it had acquired as the archiepiſcopal and occaſionally as the royal reſidence, it appears to have been only remarkable as the occaſional ſcene of thoſe ſanguinary and ferocious conteſts for which the age was conſpicuous. It fell into the hands of the regent upon the defeat and flight of the unfortunate Mary Stewart at the battle of Langſide, two miles ſouth of the city. It was long afterwards battered and taken by Cromwell's army, and it was the refuge of the defeated party, after the battle of Bothwel bridge, fought between the regent (afterwards James II.) and the Covenanters. After the revolution it ſeems for many years to have been a place of little importance, poſſeſſing neither a ſufficient degree of wealth or refinement to render it conſpicuous for elegance or luxury, nor ſuch ſecurity or ſtrength as to make it deſirable or important as a military poſt. At the time of the Union with England, its whole population was eſtimated at only 14,000, a fact ſtated in the houſe of commons by Mr. ſecretary Dundas, (now lord Melville,) in one of the debates when the Iriſh Union was in contemplation. Subſequently to the Union, the riſe of Glaſgow in commercial importance, even under the ſucceſſive checks of the two civil wars in 1715 and 1745, of the vaſtly greater commercial embarraſſment, occaſioned by the ſuſpenſion of its colonial trade during the American conteſts, and all the ſubſequent hoſtilities produced by the French revolution, has been perhaps unequalled by any other place in the empire, or perhaps in the world. Its population, under the act of 1794, including its numerous ſuburbs, was returned at 94,000, and from the concealment which was practiſed from the idle fears of ignorant people, many of whom fooliſhly imagined that *cenſus* to be the precurſor of a military conſcription, that number is ſuppoſed to be at leaſt 30,000 ſhort of the actual amount.

Different hiſtories of Glaſgow have been publiſhed. Of theſe, one publiſhed many years ago by Mr. M'Ure, one of the city clerks, was much eſteemed, but is now conſidered as obſolete. Others have ſubſequently been written by Mr. Gibſon about 1774, and recently by Mr. Denholm, about 1796.

The limits of this article neceſſarily preclude the poſſibility of entering much into detail, nor would it be either amuſing or inſtructive to the general reader. We ſhall therefore inſert what remains concerning the preſent ſtate of this great commercial and manufacturing city under the following general heads.

1. *Situation and general ſtate of the adjacent country.*—Glaſgow is ſituated on the north bank of the river Clyde, in N. lat. 55° 52′, and W. long. from the meridian of Greenwich 4° 30′. The extreme length from E. to W., including two ſuburbs, is nearly two miles, and its breadth from the cathedral or high church to the river about one mile. The lower part of the city is nearly level, and the reſt is upon the ſouthern declivity of a hill. Perhaps no city or town in Europe is, upon the whole, more regularly planned; for all the principal ſtreets are either parallel or at right angles to each other. The chief ſtreets are better paved than thoſe of London, and generally wider; all the front buildings are of fine free-ſtone, which is found in great abundance in the immediate neighbourhood. The granite, or *whin ſtone,* for paving the carriage ways, is alſo very plentiful cloſe by the town. The houſes are very large and lofty, being more generally upon the French plan, where every floor forms a ſeparate lodging, acceſſible by a common ſtaircaſe, than upon the Engliſh, where one perſon occupies the whole premiſes. The more wealthy inhabitants, however, have almoſt univerſally adopted the Engliſh taſte in building. In the old part of the town it is indeed much to be regretted that there are too few public ſtreets, ſo that an immenſe number of buildings are crowded together, many of which are acceſſible only by narrow paſſages, which are very ill calculated either for free circulation of air, admiſſion of light, or domeſtic cleanlineſs. In the modern buildings theſe inconveniences are avoided, and whatever inconvenience may remain, muſt rather be attributed to the habits or negligence of the occupants, than to want of facilities on the part of the architects.

There are many very fine public buildings in Glaſgow, the moſt prominent of which we ſhall very briefly enumerate.

Churches.—The cathedral or high church is perhaps the fineſt ſpecimen in Scotland of that ſpecies of architecture, generally denominated Gothic. It was founded in the year 1123, and conſecrated in the preſence of king David I. in 1136. This building is more ſimilar to that of Litchfield, than to any other of the Engliſh cathedrals, but it does not appear to have ever been completely finiſhed, and certainly until lately little care has been uſed for its preſervation. After the reformation it is ſaid to have narrowly eſcaped deſtruction from the miſguided zeal of the people, who confounded the building itſelf with the religious or ſuperſtitious ceremonies which they had exploded. It now contains two churches adapted to the Preſbyterian form of worſhip, and the choir is uſed as a place of interment. The burying vaults, or cemetery, were formerly occupied as another place of worſhip for the barony or country pariſh of Glaſgow; but lately a new church has been erected for this purpoſe at the oppoſite extremity of the church-yard. The great ſpire is very lofty, and in ſome degree reſembles that of Saliſbury. The church was dedicated to St. Mungo, or Kentigern, whoſe burying-place in one of the vaults is ſtill ſhewn.

The remaining churches poſſeſs in general little claim to architectural encomium or deſcription. They are ſix in number, *viz.* the college, St. Andrew's, North Weſt, Iron, St. Enoch's, and St. George's.

St. Andrew's church is a handſome modern building, of Corinthian architecture, and is very ſimilar in appearance to the church of St. Martin in the Fields, Weſtminſter.

St. Enoch's and St. George's are alſo handſome modern buildings. Beſides the eſtabliſhed or parochial churches, there are many diſſenting chapels and meeting houſes, ſome of which are very handſome and commodious.

Priſon.—This is a large and very ſtrong building, ſituated in the centre of the city, adjoining to the Exchange. The lower part is occupied by the council-chambers, and rooms for the magiſtrates and the city clerks; the middle part of the building contains the cloſe or lock-up rooms for thoſe impriſoned upon criminal charges; and the two upper floors are allotted for the reception of civil debtors. The roofs are lofty, the apartments airy, and the building, upon the whole, commodious; but it is in contemplation to erect a new priſon, with an encloſed ſpace round it, where the priſoners may have the benefit of freſh air and exerciſe, from which they are at preſent precluded.

Bridewell.—This is a large building which ſerves as a place of confinement, or penitentiary houſe, for perſons of depraved habits convicted of petty offences. It is very well regulated, and every means of encouragement afforded for reclaiming the priſoners from their vices, and promoting habits of induſtry. Many, at the period of their confinement, have thus acquired and received conſiderable ſums, beſides the expence of their ſubſiſtence, which is deducted from their earnings.

Town Hoſpital—for the reception of poor perſons unable to maintain themſelves. The expence of this eſtabliſhment is defrayed by a tax or aſſeſſment on the inhabitants, and by the proceeds of the labour of thoſe admitted, who are ſupplied with work ſuited to their reſpective abilities. The inmates are aged and infirm perſons and deſtitute children: the latter are well educated, and when arrived at a proper age, the boys are apprenticed to trades and the girls ſent to ſervice. The economy of the houſe is ſuperintended weekly by gentlemen who act in rotation. The whole is very well managed.

Royal Infirmary—a very fine modern building, from a plan of Meſſrs. Adams'. From 90 to 120 patients are generally under cure, but the houſe contains accommodation for a much larger number when required. It is ſupported by donations, legacies, and annual ſubſcriptions; the funds at preſent amount to 10,000*l.* or 12,000*l.*, beſides what has been annually expended; the annual diſburſement is about 1800*l.* or 2000*l.*; the direction is veſted in the lord provoſt, the dean of guild, convenor of the trades, profeſſors of medicine and anatomy, preſident of the faculty of phyſicians, member for the city, and eighteen directors, ten of whom are elected by the contributors, and the others by various public bodies. The directors elected by public bodies are, one by the council, one by the merchants, one by the trades, one by the univerſity, one by the miniſters of Glaſgow, and three by the faculty of phyſicians and ſurgeons. The medical aſſiſtance is afforded gratuitouſly.

Theatre Royal.—This ſuperb houſe was erected a few years ago by voluntary ſubſcriptions, upon transferable ſhares of 25*l.* each. The total coſt was upwards of 15,000*l.* part of which ſtill remains as a debt upon the property, the whole annual rent being appropriated for its gradual liquidation. The direction of the property is in ſixteen directors, four of whom go out annually, in rotation, but may be re-elected. It is unqueſtionably the largeſt and moſt magnificent provincial theatre in Britain. The managers are merely leſſees, and the leaſe is always given for a ſhort period, ſeldom exceeding two or three years.

Concert and Aſſembly Rooms.—Theſe rooms are alſo very ſplendid, and, like the theatre, were erected by voluntary ſubſcription, upon transferable ſhares.

Univerſity.—The buildings of the univerſity having been erected at various times, and in very different ſtyles, cannot be appreciated by any preciſe ſcale of architectural taſte; but the whole has certainly an air of impoſing grandeur, and is very well adapted in every reſpect to the purpoſes for which it is deſigned. It conſiſts of four diſtinct courts, which communicate with each other, and is acceſſible from the high ſtreet by three gate-ways. Behind is a very large garden laid out in graſs and ſhrubbery, with very fine walks; it is divided into three parts, of which one is appropriated as a botanical garden, another is open as a place of exerciſe and recreation for the ſtudents, and the third, in which the aſtronomical obſervatory is ſituated, is generally reſerved as a place of retirement, for the profeſſors, or of amuſement for their families and friends.

The univerſity of Glaſgow was founded in the year 1450, by William Turnbull, biſhop of the dioceſe, and then conſiſted of a chancellor, a dean of faculty, a principal, who was alſo profeſſor of theology, and three profeſſors of philoſophy.

The profeſſions and lectures are now as follow:

A lord chancellor; an office now honorary, and held for life.
Lord rector; alſo honorary—elective annually.
Dean of faculties; choſen by the profeſſors or regents.
Principal; by the crown—preſent incumbent, Rev. Dr. Taylor.

Profeſſions.	
Divinity,	appointed by the univerſity.
Church hiſtory,	crown.
Oriental languages,	univerſity
Natural philoſophy, or phyſic,	do.
Mathematics,	do.
Moral philoſophy, or ethics,	do.
Logic,	do.
Greek,	do.
Humanity, or Latin,	do.
Civil law,	crown.
Medicine,	do.
Anatomy and botany,	do.
Practical aſtronomy,	do.
Lectures.	
Materia medica,	univerſity.
Chemiſtry,	do.
Midwifery,	do.
Natural hiſtory,	do.
Elocution,	do.
Painting and drawing,	do.

The funds for the ſupport of the univerſity are in a very flouriſhing and proſperous ſtate. Independently of the emoluments derived from the ſtudents, ſalaries and commodious houſes are allotted to every profeſſor, and theſe expences are defrayed from the funds at various times granted to the univerſity: of theſe, the funds or tythes of the pariſh of Govan, form a very prominent part. The ſtudents of the five junior claſſes, *viz.* natural philoſophy, moral philoſophy, logic, Greek and Latin, are diſtinguiſhed by wearing gowns of ſcarlet freeze; the ſtudents of the ſenior claſſes have no particular diſtinction of dreſs. The reſident members of the univerſity claim an exemption from all civil burthens and ſervices, and generally from the juriſdiction of the city magiſtracy, but acknowledge that of the ſheriff of the county, and of the ſupreme courts of Scotland.

The internal government of the univerſity is veſted in the principal and profeſſors, who, in their juridical capacity, aſſume the title of regents. Their ſupreme court is a general aſſembly of the whole faculty, who, at a remote period, aſſumed the power even of capital puniſhment. The moſt ſevere ſentence, however, which has been paſſed for many years, is that of expulſion, and even this has been very rarely exerciſed. An inferior court is the "Juriſdictio ordinaria," conſiſting of at leaſt three regents, who determine offences againſt the general order and peace of the univerſity, and puniſh by a pecuniary fine. Each profeſſor alſo poſſeſſes the power of levying ſmall fines in his own claſs for negligence, contumacy, or irregularity.

The number of ſtudents in the univerſity was eſtimated at 500 thirty years ago, and this number is now greatly increaſed. The profeſſors and ſtudents, when aſſembled for the election of a rector or any other general purpoſe, are divided into four nations, according to the places of their reſpective births, *viz.*

Glotiani—comprehending the natives of Clydeſdale, and the adjacent diſtricts of Scotland ſouth of the Forth.

Transforthani—the natives of Scotland, on the north of the Forth.

Rothſiani—the natives of the weſt highlands of Scotland and of Ireland.

Loudoniani—thoſe of the eaſtern diſtricts of Scotland, of England, America, and the colonies. The votes of theſe nations are decided by a majority, and the majority of nations decides the queſtion. In caſes of parity the deciſion is in the regents.

The univerſity of Glaſgow has recently received a moſt valuable acquiſition, by the beqeuſt of the mnſeum of the late Dr. William Hunter, of London. For the reception of this valuable legacy, a very handſome building has been erected, where it is now arranged. The muſeum conſiſts of a valuable collection of paintings, chiefly original; a very fine ſelection of anatomical preparations; a cabinet of medals, and a fine library. The medals are accounted of ſuch value, that the truſtees of the Britiſh muſeum are ſaid to have offered 25,000*l.* for them, beſides furniſhing ſuch duplicates as they poſſeſſed, and defraying the expence of an application to parliament for an act, ſo far to diſſolve the teſtator's will. This liberal offer, however, was declined.

The public library of the univerſity is alſo a collection of uncommon value. It conſiſts of upwards of 6000 volumes, and many very rare and valuable manuſcripts. In the faculty hall are ſome valuable paintings, particularly one of the "Martyrdom of St. Catharine."

Among the celebrated literary characters, which have belonged to this ſeminary, the names of Dr. Cullen, Dr. Adam Smith, and the late profeſſor Miller, are moſt recently conſpicuous.

There are many other public buildings in Glaſgow, of which it will be neceſſary to confine ourſelves to very brief notices.

The *Trades-hall*—is a fine modern building from a plan of Meſſrs. Adams'. It is uſed for the general meetings of the fourteen incorporated trades, and is alſo occaſionally occupied for concerts, balls, and other public amuſements.

Merchants' Hall—is an old building, remarkable for nothing but the ſpire, which is a very fine one. It is uſed by the body to which it belongs, in the ſame manner as the Trades-hall.

Public Markets.—Theſe are very commodious, and conſiſt of ſquare-paved courts, ſurrounded by the ſtalls where the meat is expoſed to ſale. No cattle are ſlaughtered here, and they are kept very clean and regularly inſpected.

Barracks.—Theſe are ſituated in a large area walled round, and conſiſt of three very large buildings, one of which is appropriated for officers, and two for non-commiſſioned officers and privates. Their complement is 1072 men, but they will lodge, on emergency, 4 or 500 more.

Town-Houſe.—a fine old building adjoining to the priſon. Only one hall is retained by the body corporate. The remainder contains the Tontine hotel, which was enlarged by ſubſcription upon lives. The coffee-room is, perhaps, the largeſt and fineſt in Europe. It is ſupported by annual ſubſcription, the ſubſcribers amounting to upwards of 1000, who pay one pound five ſhillings each.

Bridges.—Three of theſe are of ſtone, and a fourth was actually built in the year 1795, when the river riſing rapidly, in conſequence of exceſſive rains, it was ſwept away in one night when very nearly finiſhed. The arches being very flat, and the extremities not ſufficiently ſecured, the accident was attributed, by profeſſional perſons, to the lateral preſſure. Its place has ſince been ſupplied by a very handſome wooden bridge for foot paſſengers. The two bridges higheſt upon the river are plain, but very well built and paved. The loweſt, or new bridge, is very finely executed, and is eſteemed one of the moſt compleat ſpecimens of this ſpecies of architecture in Britain.

Water-works.—The city of Glaſgow, until lately, was ſupplied with water by pit-wells, and the water of theſe, although abundant in quantity, was of inferior quality both for waſhing and culinary purpoſes; as, beſides other impurities, it holds in ſolution a conſiderable portion of marine acid, by which it is rendered hard and brackiſh. To remedy this inconvenience a public company was formed, who, at the expence of upwards of 60,000*l*., brought water filtered from the river into every part of the city and ſuburbs by caſt iron pipes, and from theſe pipes into every houſe, upon receiving a moderate annual payment from the proprietor or leſſee. The capital neceſſary was raiſed by transferable ſhares of 50*l*. each. The rapidity with which thoſe ſhares were bought induced others to form a ſeparate eſtabliſhment, and to raiſe water alſo from the river for the ſupply of the city. The firſt ſupply is drawn from the Clyde by two large ſteam engines, into a reſervoir about two miles to the eaſtward of the town. From this reſervoir it is filtered into another, and from thence conveyed by the pipes to a third immediately contiguous to the town. The whole lower part may be ſupplied from this without further forcing, but to ſupply the higher parts, a portion is again forced by another ſmaller engine to a ciſtern on a higher elevation, which commands every part above the former level.

The weſtern water-work company draw their ſupply from the river, to ciſterns ſituated on an eminence about one mile weſt of the town, where it is filtered, and conveyed by pipes, without requiring to be forced a ſecond time. The inhabitants are left to their own free choice from which company to take their ſupply.

River Clyde.—The Clyde takes its riſe about 60 miles to the ſouth-eaſt of Glaſgow, in the ſame mountain which forms the ſources of the Tweed and the Annan. Near the county town of Lanark, about 28 miles above Glaſgow, it has three remarkable falls or cataracts, much viſited by ſtrangers. From Lanark to Glaſgow it paſſes through a fine valley, richly wooded in many places, fertile and highly cultivated. From the new bridge of Glaſgow, where it becomes navigable, until it terminates in St. George's, or the Iriſh channel, about 80 miles diſtant. About thirty years ago, Mr. Goldburn, an eminent engineer, was employed by the city of Glaſgow to deepen the river, from the Broomilau or harbour, to the ſea-port towns of Port Glaſgow and Greenock, the former ſituated 21, and the latter 24 miles below the city. This he effected in a very judicious, although gradual and economical manner. The beneficial effects of his plan became ſoon apparent, have been, every ſucceſſive year, improving, and muſt continue ſo for many years to come. He began by conſtructing, on either bank, projecting dykes, or jetties, into the river, at right angles, to the banks on either ſide, and placed at ſmall diſtances from each other along the whole courſe of the navigation. Theſe jetties intercept much of the earth and gravel waſhed down by ſucceſſive floods, and thus ſupply the materials for ultimate contraction, without the expence of carriage. Beſides this, a number of labourers are employed every ſummer ſeaſon to drag the bottom of the river, and lodge the ſtuff which is withdrawn from the bottom between the projecting jetties. By the conſtant repetition of this ſimple proceſs, a great part of the river is now contracted to leſs than one half of its original breadth, and has gained above four feet of additional depth. As the tonnage dues, the greater part of which is appropriated for this purpoſe, now exceed 6000l. *per annum*, theſe operations promiſe to be continued on a more extended ſcale than ever; and it is probable that in a few years veſſels of large burthen may be brought up to the city. The largeſt hitherto brought up are about 130 tons, the depth of the channel being about nine feet at high water. The gentleman who now directs theſe improvements thinks, that in a few years this depth may be increaſed to 14 feet by the preſent plan.

It was lately propoſed to improve the harbour by the conſtruction of wet docks; but a difference of opinion having ariſen reſpecting the controul under which theſe improvements were to be placed, the ſcheme has been ſuſpended, but it is hoped not finally relinquiſhed. The tonnage dues are one ſhilling *per* ton on merchandiſe, eight-pence on foreign produce, and four-pence on coals, brick, and other building materials. Manure, carried upon the river for the improvement of the adjacent country, is exempted from any tax

The country ſtretching along the banks of the Clyde, for a number of miles, both above and below the city, is generally fertile, and, in moſt places, highly cultivated, and well encloſed. The pariſh of Govan, ſituated on the ſouth bank of the river, is, perhaps, as highly improved as any diſtrict in Britain. Beſides the natural fertility of the ſoil, this may be accounted for by the plentiful ſupply of coal, lime, and manure, which are ſupplied at cheap rates by water-carriage. It muſt alſo be greatly promoted by the circumſtance of there being many landed proprietors, whoſe eſtates, although abundantly ſufficient to maintain themſelves and families in comfort and affluence under their perſonal ſuperintendence, are not ſo large as to induce them to relinquiſh the profits and emoluments of cultivating their own property, which, of courſe, derives the united benefit of their perſonal ſkill, induſtry, and capital, beſides that emulation which a laudable ſpirit of rivalry excites among them to ſurpaſs each other. The higher lands, both to the north and ſouth, are conſiderably inferior, both in ſoil and cultivation, to thoſe in the valley. In every direction round Glaſgow, coal, lime, and iron-ſtone are found in great plenty, and give great advantages to the agricultural and manufacturing claſſes of the community.

The ſuburbs of Glaſgow, which form the chief reſidences of the operative tradeſmen, are the following:

Calton—a very populous village, immediately adjoining to the city on the ſouth-eaſt, and bordering on the *Green* of Glaſgow. This village contains upwards of 20,000 inhabitants, with many manufactories, diſtilleries, &c. The green ſerves both for paſture and for the purpoſes of waſhing and bleaching There are a commodious waſhing-houſe, and fine walks for the recreation of the inhabitants. The dues of waſhing and paſture form part of the city revenue. The green contains upwards of 100 acres of ground.

Bridgetown—another ſuburb adjoining to the former, and ſimilar in every reſpect.

Gorbals—a village on the oppoſite bank of the Clyde, governed by a chief magiſtrate, appointed by the council of Glaſgow, and two reſident baillies.

Anderſton, Brownfield, Finnuſton, and *Partick.*—Theſe four villages lye to the weſt of Glaſgow, on the north bank of the Clyde; they alſo are reſidences for operative tradeſmen, and contain ſeveral extenſive manufactories, *viz.* three large cotton mills, an extenſive puntfield, and porter brewery, at Anderſton; a large and flouriſhing glaſs-work at Finnuſton, and the very large flour-mills belonging to the incorporation of bakers at Glaſgow, at Partick, where are alſo the ruins of an ancient caſtle, formerly belonging to the archbiſhop.

Municipal Government of Glaſgow.

This, as formerly remarked, in ancient times, was almoſt excluſively veſted in the archbiſhop and chapter. Since the reformation, it underwent various changes during the ſucceſſive alterations of government in Scotland at large. The laſt arrangement made by royal and parliamentary authority, was early in the 18th century, under William and Mary. It has ſince been modified by the authority of the Scottiſh convention of royal boroughs, who exerciſe this power without diſpute. As at preſent conſtituted, the government of the city is veſted in the lord provoſt, three merchants, and two trades baillies, the dean of guild, or preſident of the merchants, the convenor, or preſident of the trades, the city treaſurer, and maſter of the public works, twelve counſellors from the merchants, and eleven from the incorporated trades, in all 33 counſellors. To this body the regulation of all the public buſineſs belongs; the lord provoſt being preſident, with the caſting or deciding vote in caſes of parity. The courts of juſtice within the city are the following:

1. The circuit court of juſticiary, for the cognizance of criminal actions, which is held twice a year at Glaſgow, for the counties of Lanark, Renfrew, and Dumbarton, generally before two of the lords commiſſioners, although any one of their number is competent. This court alſo decides appeals in civil cauſes from any of the inferior courts within the diſtrict.

2. The magiſtrates or town court. This court is held under the authority of the magiſtrates, aſſiſted by the town clerks as legal aſſeſſors. The juriſdiction of this court extends to any amount ſubject to an appeal to the court of ſeſſion.

3. The conſcience court, for the deciſion of petty cauſes under twenty ſhillings, where the formality of an oath is diſpenſed with, or any written pleading.

4. The ſitting magiſtrate alſo decides daily trifling claims under five ſhillings. The magiſtrates alſo exerciſe a criminal juriſdiction in petty crimes, and puniſh by impriſonment, pillory, and ſometimes public whipping and baniſhment from the city.

5. The ſheriff court, for the under-ward of Lanarkſhire, is alſo held at Glaſgow, before the ſheriff ſubſtitute. His juriſdiction is equal to that of the magiſtrates, not only within the city, but the diſtrict. The deciſions of this court are ſubject by appeal to the ſheriff depute and to the court of ſeſſion.

6. The juſtice of peace court alſo decides civil cauſes to a limited amount, and regulates diſputes between maſters and ſervants. The appeal from this court is to the quarter ſeſſions, and finally to the court of ſeſſions.

7. The ſmall debt court is held by two or more juſtices, for the deciſion of cauſes under 10*l.* No profeſſional lawyer is heard here, and the pleadings are verbal. They review their own deciſions upon appeal, provided the ſum decerned for be lodged with the clerk of court.

8. The commiſſary court is the remnant of the biſhop's court. It decides for ſums under 3*l.* 6*s.* 8*d.*, and alſo in caſes of defamation. Its juriſdiction extends over all the ancient biſhopric.

Police Eſtabliſhment.—This eſtabliſhment was conſtituted a few years ago under the authority of a ſpecial act of parliament. The commiſſioners named in the act are, the lord provoſt and baillies, and twenty-four commiſſioners elected by twenty-four wards, into which number the city is divided. The qualification of a commiſſioner, is the occupation of a *dwelling* houſe valued at 15*l.* or upwards of yearly rent; and of a voter, that of any houſe at 10*l.* or upwards. The buſineſs of this eſtabliſhment is the lighting, cleaning, and guarding of the ſtreets, and ſuppreſſion of quarrels, riots, and other breaches of the public peace. For this purpoſe a maſter, or intendant of police officers, and watchmen are employed. A magiſtrate ſits every morning at the police office to decide upon thoſe who have been apprehended during the night. Where the charge is ſerious, he generally remits the cognizance of it to the town court, and puniſhes petty delinquencies by a ſmall fine. The expence is defrayed by a tax on the valued rents of ſhops, warehouſes, and dwelling houſes, by fines levied in the courſe of the year by the ſale of manure, from cleaning the ſtreets, &c. The maximum of the tax is from 6*d.* to 1*s.* 3*d.* per pound of valued rent, but much leſs has been generally found ſufficient. This inſtitution has been always hitherto conducted with the moſt vigilant attention to economy, and is very popular even among thoſe of the citizens, who ſtrenuouſly oppoſed its original adoption.

Commerce and Manufactures.—The commercial importance of Glaſgow only began to riſe ſubſequently to the Union, and had attained no very important extent until the colonization of North America opened a wide field for the exportation of Britiſh commodities and the importation of American produce in return. Previous to the commencement of the American war in 1775, it had, however, engaged very extenſively in the tobacco trade, for it appears that of 90,000 hhds. of tobacco imported into Britain in 1772, 49,000 hhds. were brought into the Clyde alone, and, in 1775, the importation was 57,143 hhds.

The operations of the war neceſſarily put a ſtop to this intercourſe, to the great loſs of the merchants engaged in it; many of whom have never been able to recover their debts. Upon the reſtoration of peace in 1783, the trade with America revived, and continued again in a flouriſhing ſtate, until again recently ſuſpended by the American non-intercourſe act. In 1783, the regiſtered veſſels of the Clyde, were 386, and their tonnage 22,896, and in 1803, the number cleared outwards and inwards was as follows.

At Greenock inwards,			
Foreign trade	406 ſhips,	53,546 tons,	5183 men.
Coaſt and fiſhing	730 veſſels,	35,532	3147
Outwards,			
Foreign trade	352 ſhips,	50,366 tons,	3673 men.
Coaſt and fiſhing	1016 veſſels,	43,009	3326
At port Glaſgow inwards,			
Foreign trade	113 ſhips,	18,722 tons,	1081 men.
Coaſt and fiſhing	182 veſſels,	7,226	551
Outwards;			
Foreign trade	177 ſhips,	25,157 tons,	1692 men.
Coaſt and fiſhing	119 veſſels,	7,202	424
Total	3095	238,790	17:077

From this note ſome idea may be formed of the extent of the trade; but many of theſe veſſels having probably made ſeveral voyages in the courſe of the year, it is not to be inferred that this number of veſſels actually belongs or trades to the Clyde. The articles of exportation are chiefly Britiſh manufactured goods, coals, fiſh, &c. and the imports European, American, and colonial produce.

The city of Glaſgow had alſo a very conſiderable commercial intercourſe with the eaſtern parts of the iſland, and with the northern ſtates of Europe, until this was ſuſpended by the events of the war. This intercourſe is carried on by means of the Forth and Clyde canal, which interſects Scotland, and forms a junction between the eaſtern and weſtern ſeas, ſome account of which has already been given under the article CANAL.

The manufactures of Glaſgow had obtained no very great extent previous to the commencement of the American war, although they had been progreſſively advancing during the whole courſe of the eighteenth century. So far back as the reign of Charles II. indeed, ſome attempts had been made to introduce the manufacture of ſoap, refining of ſugar, and ſome other branches, all of which proved abortive, and were diſcontinued. The linen manufacture was the moſt extenſive of the various attempts made, and the moſt ſucceſsful during the time that it laſted. It commenced about the year 1725, and continued progreſſively advancing until it was almoſt entirely ſuperſeded by the cotton towards the cloſe of the century. The cotton manufacture, which is now unqueſtionably the ſtaple trade of Glaſgow, was proſecuted to very ſmall extent until after the year 1784, but when once introduced it advanced with unprecedented rapidity. It is impoſſible to aſcertain with any preciſion its actual amount either in quantity or value at any given period for want of proper data. A computation in 1791 makes the number of looms employed 15,000, and the perſons who earned their ſubſiſtence by various parts of the proceſſes of ſpinning, weaving, bleaching, &c. 135,000. It alſo eſtimates the total value of the goods made yearly at 1,500,000*l*. The grounds of this calculation are not ſtated, and little reliance can be placed on it, for the value of cotton goods has fluctuated as remarkably as the quantity has extended.

Two manufactories of earthen ware are carried on in Glaſgow, but neither of them extenſively. Indeed a much greater quantity of Staffordſhire ware is uſed in the city itſelf than of the produce of either. Two or three rope works are alſo carried on, but to no great extent.

The printing of calicoes and other goods is, however, a very extenſive branch of the manufacture of Glaſgow and its vicinity. The moſt extenſive of theſe works, are thoſe ſituated upon the water of Leven, in Dumbartonſhire, about 18 miles diſtant. The extenſion of the cotton trade has alſo greatly improved and enlarged the number of dye-works, and the manufactures of chemical preparations for the various proceſſes of bleaching, dyeing, and printing. Theſe works are ſituated in the vicinity of the city, chiefly on the banks of the river.

Of the chemical works carried on in Glaſgow, ſome are peculiar to it.

The manufacture of Cudbear was introduced by Mr. Mackintoſh ſo long ago as the year 1777. It is prepared from *rock-moſs*, and above 2000 gallons of human urine are daily conſumed in the proceſs. The cudbear gives a dark reddiſh colour, and is uſed in the dyeing of leather, woollen ſtuffs, &c. The proceſs is kept profoundly ſecret.

The diſcharging of the Turkey red dye is alſo peculiar to Glaſgow. This proceſs is particularly deſcribed under the article *Diſcharging of* COLOUR.

The manufacture of the oxy-muriate of lime, in a dry form, for the purpoſes of bleaching, &c. is alſo almoſt peculiar to Glaſgow. Its object is to decreaſe the expence of bleaching by the ſubſtitution of lime for potaſh. This article is made to great extent by Mr. Tennent the inventor.

Iron liquor, for the uſe of printers, is made here by various perſons, and large alum works are eſtabliſhed in the neighbourhood. Manufactures of red and white lead are alſo carried on.

Miſcellaneous Remarks.

It will appear that the city of Glaſgow has undergone three remarkable changes. Its firſt ſtate was the reſidence of a great archiepiſcopal ſee, and conſequently it was for many ages entirely under clerical influence and controul. Its firſt eminence as a commercial place aroſe from its favourable ſituation for commerce with the American and Weſt Indian colonies, and through this traffick it made rapid advances in commercial importance during the whole courſe of the eighteenth century. One branch of this traffick being at leaſt for the preſent ſuſpended, it now depends chiefly on the other, and upon its manufactures for ſupport. From the facilities of acquiring a good education, the inhabitants of Glaſgow have generally added a conſiderable taſte for literary attainment even to their commercial habits, and this ſtyle prevails, perhaps, in a degree ſuperior to any other commercial place in Britain. The ſyſtem of education is, however, rapidly adapting itſelf to the modern purſuits of the inhabitants, and more pains are now taken to qualify the riſing generation for eminence in the counting-houſe than the cloſet. However deſirable a thorough knowledge of the principles of commercial economy, and the details of buſineſs may be in a commercial community, it is ſtill to be hoped, that all the benefits ariſing from intellectual attainment will not be deemed altogether nugatory, and conſequently neglected. In every ſituation of life, they are ſources of rational and innocent amuſement, and, in the viciſſitudes to which commercial enterpriſe is peculiarly expoſed, may often prove of real benefit and utility to the poſſeſſor.

The city of Glaſgow returns a member to the Britiſh parliament, conjunctly with the neighbouring burghs of Ruthuglen, Renfrew, and Dumbarton.

GLASGOW, *Port*, ſituated on the river Clyde, about 22 miles below the city, is a handſome ſmall town, and was projected by the magiſtrates of Glaſgow at the requeſt of the merchants as a harbour for their ſhips and veſſels. It is ſaid that the firſt plan was to improve the harbour of Dumbarton for this purpoſe, but Dumbarton being a royal borough, the conſent of its magiſtrates became neceſſary, and that when made, it was rejected by that body, who preferred the full enjoyment of their chartered privileges to the idea of ſinking into the mere ſea-port of Glaſgow, however much their wealth, revenue, population, and general proſperity might be benefitted by ſuch an union. If this were the caſe, it is one among the numberleſs inſtances where comfort and proſperity have been ſacrificed to a mere empty title. The harbour of port Glaſgow is good but ſhallow. The diſadvantage of the bank, noticed in the article GREENOCK, is alſo much againſt it as a haven. At port Glaſgow there is a cuſtom-houſe, where the general cuſtoms of the Clyde are collected. There is here alſo a fine graving, or dry dock, built by the merchants of Glaſgow long before that of Greenock was executed, and this circumſtance alone brought many ſhips up to this port which now come no further than Greenock. The ſituation of port Glaſgow is more pleaſant than that of Greenock, the country more level, and better adapted for cultivation. In other reſpects it is certainly

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eſs calculated for the general purpoſes of maritime traffick than its rival, and therefore there is little probability of its extenſion. Indeed the ſhipping belonging to Glaſgow is certainly on the decreaſe, the foreign merchants finding it more for their advantage to freight or charter veſſels for any purpoſe than to build or buy veſſels of their own, which both conſume or ſink a conſiderable portion of their capital, and may, from the many caſualties and fluctuations to which commerce in this eventful age is expoſed, prove rather burthens than advantages, while the mere ſhip-owner, if deprived of a freight or charter-party at one port, may with greater facility ſeek it at another, than the perſon with whom freight is only a ſecondary and inferior conſideration.

Port-Glaſgow is governed by magiſtrates, appointed by the council of Glaſgow, and ſome reſident magiſtrates. Its exports and imports have been already given and compared with thoſe of Greenock under the article Glasgow, which indeed furniſhes by far the greater part of the freight to and from both ports.

There are no manufactures here of any extent, excepting thoſe which are to be found at almoſt all ſea-port towns, *viz.* ſhip building and rope ſpinning. Both of theſe are carried on to a very conſiderable extent. A work was erected ſome years ago for refining of ſugar, and alſo a ſmall cotton-mill, but neither have ever been proſecuted to any great extent.

A plan has been formed, and its execution is now begun, which in time may produce a great effect, both on this town and Greenock. This plan has for its object the formation of a more direct communication between Glaſgow and the weſt ſea, than the preſent circuitous navigation of the Clyde, by means of a navigable canal to be carried from Glaſgow to Ardroſſan, near Irvine, which is about thirty miles farther down the river than the preſent ſeaports. This canal was projected under the ſanction and patronage of the preſent earl of Eglintoun, (lord Ardraſſan of Great Britain,) a part of whoſe eſtates lie in that neighbourhood. Its objects are two-fold. Firſt, to facilitate the maritime intercourſe of Glaſgow and Paiſley with the New World, by a more direct channel and better harbour. Second, to improve the agricultural and internal ſtate of Renfrewſhire, and the northern diſtrict of Ayrſhire, by affording means for the cheap conveyance of coal, lime, manure, and other heavy articles by means of the canal. Ardroſſan is ſituated not more than thirty miles from Glaſgow, by the line of the projected canal, and therefore the carriage of goods will not be more expenſive or tedious than by the Clyde, for the canal being free from the conſtant interruptions ariſing from the operation of wind and tide upon the river, the time of arrival and departure may be depended upon at all ſeaſons and in all weathers. A conſiderable ſum has already been ſubſcribed for the canal, and alſo for the harbour, and from the well-known energy and activity of his lordſhip's general character, there is no reaſon to doubt that every exertion for its ſpeedy completion will be uſed.

It is natural to expect that every oppoſition will be given by thoſe whoſe local intereſts will ſuffer by the ſucceſs of this undertaking, and theſe comprehend many wealthy and powerful claſſes; but whilſt ſome oppoſe, others will find it their intereſt to promote it, and the competition muſt be ultimately advantageous to the general body, however it may terminate as to thoſe more immediately intereſted.

The other part of the plan is the formation of an excellent and ſecure harbour at Ardroſſan, capable of receiving ſhips of large burthen, and this alſo is begun. The ſubſcriptions for the two undertakings are conducted ſeparately. The coaſt here is in ſome places reckoned dangerous during the prevalence of ſtrong gales from the north-weſt, when veſſels are making the land; but it is ſaid that the bay of Lamlaſh, in Arran, will afford a ſafe and eaſy ſhelter within a few hours ſail, when this may prove to be the caſe. The ſurveys, plans, and eſtimates for the canal and harbour of Ardroſſan were made under the ſuperintendance of Mr. Telford. It muſt be perfectly evident that this canal will in all events produce much benefit as it paſſes through the moſt populous and flouriſhing manufacturing diſtrict in Renfrewſhire.

Glasgow, a new county of America, in Newbern diſtrict, North Carolina, taken from Dobbs's county: bounded N. by Edgcomb, S. by Lenoir, E. by Pitt, and W. by Wayne.—Alſo, a town of New York, on the E. coaſt of lake Cayuga; eight miles S. of Cayuga.

GLASS, in the general acceptation of this term among *Chemiſts*, denotes any ſubſtance or mixture, earthy, ſaline, or metallic, which is reduced by igneous fuſion to the ſhape of a hard, brittle, uniform maſs, which breaks with a conchoidal fracture, paſſing into ſplintery, and with a high degree of luſtre. Moſt glaſſes of this kind are alſo tranſparent. See Vitrification.

Glass, *Vitrum*, in a more reſtricted ſenſe, and as the term is commonly uſed in the *arts* and *manufactures*, ſignifies that tranſparent, ſolid, brittle, factitious ſubſtance, produced by the vitrification of ſiliceous earth with various ſalts and metallic oxyds, which is applicable to innumerable purpoſes of ornament and comfort, as well as of ſcientific inveſtigation and reſearch.

As to the antiquity of the term *glaſs*, Tacitus (Germ. c. 45.) and Pliny (l. xxxvii. c. 3.) inform us, that amber was called among the ancient Gauls or Germans by the name of *gleſum* or *gleſſum*; and from the ſimilarity which glaſs bore to amber with reſpect to tranſparency and brightneſs, it acquired a name, which was, in all probability, originally the ſame. The word *gleſum* denoted, without doubt, a ſhining or tranſparent ſubſtance, as *gleiſſen* expreſſes at preſent in the German language to ſhine; and our Engliſh word to *gliſten* is derived from it, and has nearly the ſame ſignification. Ducange ſays that ſome critics were of opinion, that the word *gleſum* itſelf implied glaſs rather than amber. The ancient Greeks, as it has been obſerved, applied the ſame term (ηλεκτρον) both to glaſs and amber. The herb with which the Britons painted their bodies had alſo the name of *glaſtum*, perhaps from the ſhining appearance it might give to their ſkins, or poſſibly becauſe its aſhes might be uſed in the making of glaſs. The Latins called the ſame plant by the name of *vitrum*, the word they uſed to ſignify glaſs. (Cæſar. Bell. Gall. l. v.)

We find frequent mention of this plant in ancient writers, particularly Cæſar, Vitruvius, Pliny, &c. who relate, that the ancient Britons painted or dyed their bodies with glaſtum, guadum, vitrum, &c. *i. e.* with the blue colour procured from this plant. And hence, as ſome have ſuppoſed, the factitious matter we are ſpeaking of, came to be called glaſs, as having always ſomewhat of this bluiſhneſs in it.

Merret (Not. in Ant. Neri de Art. Vitrar.) gives us the following characters or properties of glaſs, by which it is diſtinguiſhed from all other bodies, *viz.* 1. That it is an artificial concrete of ſalt and ſand, or ſtones. 2. Fuſible by a ſtrong fire. 3. When fuſed, tenacious and coherent. 4. It does not waſte or conſume in the fire. 5. When melted, it cleaves to iron. 6. Ductile, when red-hot, and faſhionable into any form, but not malleable; and capable of being blown into a hollowneſs, which no mineral is. (See Ductility *of Glaſs*.) 7. Frangible when thin, without annealing. 8. Friable when cold. 9. Always diaphanous, whether hot or cold. 10. Flexible and elaſtic. 11. Diſſoluble by cold and moiſture. 12. Only capable of being graven, or cut with a diamond or other hard ſtones, and emery. 13. Receives any colour or dye, both externally and internally. 14. Not diſſolvable by aquafortis, aqua-regia, or mercury. 15. Neither acid juices, nor any other matter, extract either colour, taſte, or any other quality, from it. 16. It admits of poliſhing. 17. Neither loſes of weight nor ſubſtance, by the longeſt and moſt frequent uſe. 18. Gives fuſion to other metals, and ſoftens them. 19. The moſt pliable thing in the world, and that which beſt retains the faſhion given it. 20. Not capable of being calcined. 21. An open glaſs, filled with water in the ſummer-time, will gather drops of water on the outſide; juſt ſo far as the water on the inſide reaches; and a man's breath blown upon it will manifeſtly moiſten it. 22. Little glaſs balls, filled with water, mercury, and other liquor, and thrown into the fire, as alſo drops of green glaſs broken, fly aſunder, with a loud noiſe. 23. Neither wine, beer, nor any other liquor, will make it muſty, nor change its colour, nor ruſt it. 24. It may be cemented as ſtones and metals. 25. A drinking-glaſs, partly filled with water, and rubbed on the brim with a wet finger, yields muſical notes, higher or lower, as the glaſs is more or leſs full; and this makes the liquor friſk and leap. See ARMONICA. For the electrical properties of glaſs, ſee ELECTRIC, &c.

GLASS, *origin and hiſtory of*. De Neri will have glaſs as ancient as Job; for that writer, chap. xxviii. ver. 17. ſpeaking of wiſdom, ſays, "gold and glaſs cannot equal it."

This, we are to obſerve, is the reading of the Septuagint, Vulgate Latin, St. Jerom, Pineda, &c. for in the Engliſh verſion, inſtead of glaſs, we read *cryſtal;* and the ſame is done in the Chaldee, Arias Montanus, and the king of Spain's edition. In other verſions, &c. it is read *ſtone;* in others *beryl:* in the Italian, Spaniſh, French, High and Low Dutch, &c. *diamond;* in others, *carbuncle;* and in the Targum, *looking-glaſs*.

In effect, the original word is *zechuchith*, (זכוכית) which is derived from the root *zacac, to purify, cleanſe, ſhine, be white, tranſparent:* and the ſame word (Exod. xxx. 34.) is applied to frankincenſe; and rendered in the Septuagint *pellucid*. Hence the reaſon of ſo many different renderings; for the word ſignifying *beautiful* and *tranſparent*, in the general, the tranſlators were at liberty to apply it to whatever was valuable and tranſparent.

Herodotus (l. iii.) is, according to Dr. Falconer (Mancheſter Memoirs, vol. ii.), the moſt ancient writer (B. C. 440) who uſed the word 'υαλος, which is generally underſtood to ſignify glaſs. But he evidently does not mean artificial glaſs, nor cryſtal, but, moſt probably, ſomewhat of the talcky kind, or lapis ſpecularis, which might readily be framed in ſuch a manner, as to form a convenient tranſparent caſe, ſuch as the ancient hiſtorian has deſcribed. Ariſtophanes (B. C. 400) ſeems to be the next writer who mentions glaſs: that poet, in his comedy called the Clouds, ſcene I. act. 2. uſes the word *hyalus*, υαλος, which is now ordinarily rendered glaſs. He there introduces Strepſiades teaching Socrates a new way to pay old debts, *viz.* "by placing a fair tranſparent ſtone, ſold by the druggiſts, from which the fire is ſtruck, between the ſun and the writing, and ſo melting away the letters thereof." This ſtone Socrates calls υαλος, which the Scholiaſt on Ariſtophanes derives from ὕειν, *to rain*, from the likeneſs it bears to ice, which is rain, or water congealed; though, it muſt be owned, the word υαλος is ambiguous, and ſignifies *cryſtal* as well as *glaſs:* and Gorræus obſerves, that the ancients had a kind of yellow amber, tranſparent as glaſs, called by ſome υαλος.

Ariſtotle (B. C. 340) has two problems upon glaſs: the firſt, Why we ſee through it? The ſecond, Why it is not malleable? If theſe problems be Ariſtotle's, which the learned doubt very much, this would properly be the earlieſt teſtimony in favour of the antiquity of glaſs. Theophraſtus (B. C. 303) ſeems to have been well acquainted with glaſs; for he deſcribes it as having been made of the ſand of the river Belus, which was called υαλι-, to which he adds, that the commoneſt kinds are made with copper. The celebrated ſphere of Archimedes (B. C. 209), if it be truly deſcribed, is a remarkable inſtance of the perfection to which the art of making glaſs had been brought at that early period.

Lucian mentions large drinking glaſſes; and Plutarch, in his Sympoſiacon, ſays, that the fire of tamariſk wood is the fitteſt for making of glaſs.

Among the Latin writers, Lucretius is the firſt that takes notice of glaſs; "Niſi recta foramina tranant, qualia ſunt vitri;" lib. vi. v. 3. Dr. Merret, however, adds, that glaſs could not be unknown to the ancients, but that it muſt needs be as ancient as pottery itſelf, or the art of making bricks; for ſcarcely can a kiln of bricks be burnt, or a batch of pottery-ware be made, but ſome of the bricks and ware will be at leaſt ſuperficially turned to glaſs.

Hence, Ferrant. Imperatus, lib. xxv. cap. 7. "Glaſs, like the common kind, is found under ground, in places where great fires have been. Other glaſſes are found in round clods, like fire-ſtone, ſome brittle, others firm, &c. This foſſil glaſs is wrought by the Americans, and uſed inſtead of iron. And no doubt but vitrifications were more common in the ancient bricks than they are in ours; as they tempered their earth two years together, and burnt them better.

Virgil (B. C. 39) compares the clearneſs of the water of the Fucine lake to glaſs. Æneid, v. 759. Horace (B. C. 36) is more expreſs, and mentions glaſs in terms that ſhew its clearneſs and brightneſs to have been brought to great perfection. Carm. iii. Od. 2. Od. 13. In the time of Strabo, (A. D. 27) the manufacture of glaſs was undoubtedly well underſtood, and had become a conſiderable article. Seneca (A. D. 65) was not only well acquainted with glaſs as a ſubſtance, but alſo underſtood its magnifying powers when formed into a convex ſhape. Quæſt. Natur. lib. iii. vi.

Pliny (A. D. 77) relates the manner of the diſcovery of glaſs. It was firſt made of ſand, according to that author, (Nat. Hiſt. l. xxxvi. c. 66, &c.) found in the river Belus, a ſmall river of Galilee, running from the foot of mount Carmel, out of the lake Cendevia. The part of the ſhore where the ſand was dug did not exceed 500 paces in extent, and had been uſed many ages before for the ſame purpoſe. The report of its diſcovery was, that a merchant ſhip, laden with nitre, or foſſil alkali, being driven upon the coaſt, and the crew going aſhore for proviſions, and dreſſing their victuals upon the ſhore, made uſe of ſome pieces of foſſil alkali to ſupport their kettles. By theſe means a vitrification of the ſand beneath the fire was produced, which afforded a hint for the manufacture. In proceſs of time the calx of iron, in form of the magnetical ſtone, came to be uſed along with the foſſil alkali, from an idea of its not only containing iron, but glaſs, in a liquid form. Clear pebbles, ſhells, and foſſil ſand, were alſo in many places employed for the ſame purpoſe. It is ſaid, that in India pieces of native cryſtal were uſed for that purpoſe; and on that account the Indian glaſs was preferred to any other. Pliny adds, that light and dry woods were uſed for the melting of glaſs; to which they added copper from the iſland of Cyprus, and the foſſil alkali, eſpecially that which is brought from the Eaſt Indies. The furnaces are kept burning without intermiſſion, that the copper may be melted with the glaſs, and out of this compound are made maſſes of a coarſe blackiſh colour. Theſe lumps or maſſes are again melted, and tinged of the colour required. Some of theſe pieces are brought to the ſhape required by blowing with the breath; ſome are ground on a lathe, and others are emboſſed in the ſame manner as ſilver. Sidon was formerly famous for theſe manufactures, as ſpecula or looking-glaſſes were firſt invented there; "ſiquidem etiam ſpecula excogitaverat." Such is the ancient method of making glaſs, deſcribed by Pliny. In his time, it was made with ſand found at the mouth of the river Vulturnus, upon the ſhore, for ſix miles between Cumæ and the Lucrine bay. This ſand was very fine, and was ground to powder with a ball or ſphere and a mill. It was then mixed with three parts of the foſſil alkali, either by weight or meaſure; and being fuſed, was conveyed in a liquid ſtate into other furnaces, where it was formed into a maſs, called "ammonitrum," (or ſand combined with the foſſil alkali,) which maſs was melted, and became then pure glaſs, and a maſs of white vitrified matter. The ſame method of making it prevailed in Spain and Gaul. Glaſs was likewiſe made to imitate the lapis Obſidianus, a ſubſtance found by a perſon of the name of Obſidius, in Egypt and Ethiopia. This ſubſtance was of a very black colour, yet obſcurely tranſparent, and often placed among ſpecula in the walls of rooms, to reflect the ſhadow of objects. It was alſo uſed for the ſame purpoſe as gems (probably for engraving upon) and even for ſtatues. Pliny mentions, that he ſaw ſolid ſtatues of the emperor Auguſtus made of this material; and the ſame emperor dedicated four elephants made of the ſame ſubſtance in the temple of Concord. It ſeems to have been uſed from great antiquity; but in the time of Pliny the artificial imitation of it by glaſs was uſed inſtead of the native material; and he intimates that the black colour was produced by ſome colouring ingredient. The Romans had likewiſe an opaque red kind of glaſs, uſed for plates and diſhes for the table, called "hæmatinon," one of various colours, called "myrrhinum," a white, a clear red, a blue, and indeed moſt other colours. Pliny obſerves, that no ſubſtance was more manageable in receiving colours, or being formed into ſhape, than glaſs. The perfectly clear glaſs, which bore the greateſt reſemblance to cryſtal, was, however, moſt valued. Nero gave for two cups, with two handles to each, and of no extraordinary ſize, 6000 ſeſtertia, or nearly 50,000*l.* ſterling. The inferior kinds were not uncommon, as Pliny informs us, that the uſe of glaſs cups had nearly ſuperſeded thoſe of gold and ſilver. We ſhall here add, that Pliny knew the power of a hollow glaſs globe, filled with water, in concentrating the rays of light, ſo as to produce flame in any combuſtible ſubſtance upon which the focus fell; and he alſo mentions, that ſome ſurgeons in his time made uſe of it as a cauſtic for ulcers (l. xxxvii. c. 2.). He was likewiſe acquainted with the comparative hardneſs of gems and glaſs, as he obſerves, that the lapis Obſidianus would not ſcratch the true gems; and he alſo mentions (l. xxxvii. c. 13.), the counterfeiting of the latter, in his time, as a very lucrative art, and brought to great perfection. He alſo ſays, that glaſs might be cut or engraven upon by means of diamonds, which art is evidenced by the antique gems ſo frequently found. (See Gem.) Joſephus, (l. ii. c. 10.) mentions the ſand of the river Belus, in Galilee, as fit for making glaſs.

The firſt time we hear of glaſs made among the Romans was in the reign of Tiberius, when Pliny relates that an artiſt had his houſe demoliſhed for making glaſs malleable, or rather flexible; though Petronius Arbiter, and ſome others, aſſure us, that the emperor ordered the artiſt to be beheaded for his invention. In the time of Martial, (A.D. 84) glaſs was not only brought to great perfection, and in common uſe for drinking veſſels, but was employed (as it ſeems) for bottles in which wine was kept, and likewiſe for pots to hold flowers. (Epig. 1. l. ii. 22. 40. l. iv. 86.) Galen (A.D. 143) frequently mentions glaſs in ſeveral parts of his works, and ſeems to have been well acquainted with the method of making it. Apuleius (A.D. 161) mentions the manufacture of glaſs cups, in his time, as highly wrought and carved in various ways, and of great value. Alexander Aphrodiſienſis (A.D. 214) a Greek writer, and a commentator on Ariſtotle, has ſeveral remarks on glaſs reſpecting both its brittleneſs, eſpecially on change of temperature, and its tranſparency.

The manufacturers of glaſs formed a company at Rome, and had a ſtreet aſſigned them, in the firſt region of the city, near the Porta Capena. A tax was laid upon them by Alexander Severus (A.D. 220) which ſubſiſted in the time of Aurelian, and probably long after.

Mr. Nixon, in his obſervations on a plate of glaſs found at Herculaneum, which was deſtroyed A. D. 80, on which occaſion Pliny loſt his life, offers ſeveral probable conjectures as to the uſes to which ſuch plates might be applied.

Such plates, he ſuppoſes, might ſerve for *ſpecula*, or looking-glaſſes; for Pliny, in ſpeaking of Sidon, adds, "ſiquidem etiam ſpecula excogitaverat;" the reflection of images from theſe ancient ſpecula being effected by beſmearing them behind, or tinging them through with ſome dark colour. (See Mirror.) Another uſe in which they might be employed, was for adorning the walls of their apartments by way of wainſcot, to which Pliny is ſuppoſed to refer by his *vitreæ cameræ* (lib. xxxvii. cap. 25. § 64.). Mr. Nixon farther conjectures, that theſe glaſs plates might be uſed for windows, as well as the laminæ of lapis ſpecularis and phengites, which were improvements in luxury mentioned by Seneca, and introduced in his time, Ep. xc. However, there is no poſitive authority relating to the uſage of glaſs windows earlier than the cloſe of the third century: "Manifeſtius eſt," ſays Lactantius, "mentem eſſe, per oculos ea quæ ſunt oppoſita, tranſpiciat, quaſi per feneſtras lucente vitro aut ſpeculari lapide obductas." De Opificio Dei, cap. 5. See Phil. Tranſ. vol. l. art. 80. p. 601. vol. lii. art. 23. p. 123.

St. Jerome (A. D. 422) ſpeaks of windows formed of glaſs, melted and caſt into thin plates, as being uſed in his time. Paulus Silentiarius, a poet and hiſtorian of the 6th century (about A.D. 534), ſpeaks of the brightneſs of the ſun's rays, paſſing through the eaſtern windows of the church of St. Sophia, at Conſtantinople, which windows were covered with glaſs. Gregory of Tours (A. D. 571) laments the devaſtations frequently committed on the windows of the churches by the ravages of war. Johannes Philoponus, who lived about the year 630, or, as ſome ſay, a century earlier, not only ſpeaks of glaſs, but of the panes being faſtened in with plaſter, much in the ſame way as at preſent.

If the opinion of Pennant, ſuggeſted under the article Anguinum *ovum*, be well founded, we have reaſon to believe, that, long before the conqueſt of Britain by the Romans, the art of manufacturing glaſs into ſuch ornaments as beads and amulets was known among the Druids; and if the art was thus applied, it is not improbable to ſuppoſe, that it was employed for more important and uſeful purpoſes, as in the manufacture of glaſs veſſels. Nor is it likely that the Britons derived this art from the Romans, who preferred ſilver and gold to glaſs for the compoſition of their drinking veſſels. Beſides, the glaſs that was commonly uſed by the Romans was of an inferior quality, and appears from ſome remains of it diſcovered at their ſtations and houſes to have conſiſted of a thick, ſometimes white, but moſtly blue-green, metal.

According to venerable Bede, artificers ſkilled in making glaſs were brought over into England, in the year 674, by abbot Benedict, who were employed in glazing the church and monaſtery of Weremouth. According to others, they were firſt brought over by Wilfrid, or Wigfrid, biſhop of Worceſter, about the ſame time, or, as others think, at a later period, A. D 726. Till this time the art of making glaſs, or at leaſt of applying it to this purpoſe, was unknown in Britain: though glaſs windows did not begin to be uſed before the year 1180: till this period they were very ſcarce in private houſes, and conſidered as a kind of luxury, and as marks of great magnificence. Italy had them firſt, next France, from whence they came into England.

Leo Oſtienſis (A. D. 760) ſpeaks of the windows in his time being made with glaſs-plates fixed in lead, and faſtened together with iron. Anaſtaſius, an hiſtorian of Rome, who was librarian to the pope, mentions, that in the pontificate of Leo III. who became pope about the year 800, painted glaſs in windows was in uſe. The ſtatutes of the church of Traguier, in Lower Britany, about the year 1156, ſpeak of the windows of churches and chapels being ornamented with arms and military enſigns, painted upon the glaſs in them. A charter of Richard II. of England, quoted by Rymer, (A. D. 1386), contains a paragraph in which is mentioned glaſs, together with the manufacture of it for windows.

Venice, for many years, excelled all Europe in the fineneſs of its glaſſes; and in the thirteenth century, the Venetians were the only people who had the ſecret of making cryſtal looking-glaſſes, and which they performed by blowing, much in the ſame manner as a conſiderable quantity of the common mirror-glaſs is now manufactured. The great glaſs-works were at Muran, or Murano, a village near the city, which furniſhed all Europe with the fineſt and largeſt glaſſes.

The glaſs manufacture was firſt begun in England in 1557: the finer ſort was made in the place called Crutched Friars, in London; the fine flint glaſs, little inferior to that of Venice, was firſt made in the Savoy-houſe, in the Strand, London. This manufacture appears to have been much improved in 1635, when it was carried on with ſea-coal or pit-coal, inſtead of wood, and a monopoly was granted to ſir Robert Manſell, who was allowed to import the fine Venetian flint glaſſes for drinking, the art of making which was not brought to perfection before the reign of William III. But the firſt glaſs plates, for looking-glaſſes and coach windows, were made in 1673, at Lambeth, by the encouragement of the duke of Buckingham; who, in 1670, introduced the manufacture of fine glaſs into England, by means of Venetian artiſts, with amazing ſucceſs. So that within a century paſt, the French and Engliſh have not only come up to, but even ſurpaſſed, the Venetians, and we are now no longer ſupplied from abroad.

The French made a conſiderable improvement in the art of glaſs, by the invention of a method to caſt very large plates, till then unknown, and ſcarce practiſed yet by any but themſelves and the Engliſh. That court applied itſelf with a laudable induſtry to cultivate and improve the glaſs manufacture. A company of glaſs-men was eſtabliſhed by letters patent; and it was provided by an arret, not only that the working in glaſs ſhould not derogate any thing from nobility, but even that none but nobles ſhould be allowed to work therein.

It was in the year 1665, under the miniſtry of the great Colbert, that a company for "blown-mirror-glaſs" was firſt eſtabliſhed near Cherbourg, in Normandy, on the plan of the Venetian manufacture; but the beautiful art of caſting glaſs was invented in France about the year 1688, by a perſon of the name of Abraham Thevart; and a company was ſoon eſtabliſhed for this branch of manufacture, which was firſt carried on at Paris, and ſoon after removed to St. Gobin, where it ſtill exiſts in full activity, and undiminiſhed reputation. An extenſive manufactory of this kind was firſt eſtabliſhed among us near Preſcot in Lancaſhire, about the year 1773, by a reſpectable body of proprietors, who were incorporated by an act of parliament. They ſtruggled for a conſiderable time with difficulties; but being nobly relieved and encouraged by government, they have ſucceeded in producing plates rivalling, if not ſurpaſſing in ſize, quality, or brilliancy, the moſt celebrated continental manufactures. This company furniſhes, at Albion Place, London, plates of various dimenſions, from 12 to 144 inches in length, and from 10 to 72 inches in breadth; and alſo convex and concave mirrors, from 12 to 36 inches in diameter.

GLASS, *Ingredients of.* The materials uſed in the compoſition are ſome ſaline ſubſtance and ſome ſort of ſiliceous earth.

1. The firſt ingredient we ſhall ſpecify is ſilex or flint. The beſt is that which will melt, and which is white and tranſparent. It is this that gives conſiſtence and firmneſs to the glaſs. This is found principally in Italy, being a ſort of ſtony ſubſtance called *tarſo*: the next is *puocoli*, or *cuogola*, a ſort of pebbles found at the bottoms of rivers, and gathered for the Venetian manufacture out of the river Po, which are ſaid not to be inferior in whiteneſs to alabaſter.

Indeed, nothing makes finer and clearer glaſs than common flint, diſtinguiſhed for this uſe by its clear tranſparent, black colour; this, before it is uſed, muſt be heated red-hot, and then immediately quenched in cold water. The heat whitens it, and the water cauſes it to ſplit in every direction, and facilitates the grinding of it. The charge of preparing this deters the glaſs-men from uſing it. The rounded fragments of quartz, found in the beds of rivers among mountains, are ſometimes uſed in foreign countries, being firſt heated and ground to powder. Indeed, the preparation neceſſary for ſtone, in general, is to calcine, powder, and ſearce it.

Ant. Neri obſerves, that all white tranſparent ſtones, which will not burn to lime, are fit to make glaſs; and that all ſtones which will ſtrike fire with ſteel, are capable of being employed in making of glaſs. But this latter rule, Dr. Merret obſerves, does not hold univerſally. Where proper ſtone cannot be had, ſand is uſed; and it is now almoſt the only kind of ſubſtance employed in the Britiſh manufactures of glaſs. The beſt for this purpoſe is that which is white, ſmall, and ſhining: examined by the microſcope, it appears to be ſmall fragments of rock cryſtal. For green glaſs, that which is of a ſoft texture, and more gritty; it is to be well waſhed, which is all the preparation it needs. Our glaſs-houſes are furniſhed with white ſand for their cryſtal glaſſes from Lynn in Norfolk, and Maidſtone in Kent, and from the weſtern extremity of the Iſle of Wight; and with the coarſer, for green glaſs, from Woolwich.

2. The ſecond ingredient in the manufacture of glaſs is an alkali, which is either ſoda, or pot-aſh. It is always uſed at firſt in the ſtate of carbonat, though the carbonic acid flies off in the proceſs. For the method of preparing each, ſee CARBONAT. Theſe alkalies are uſed in different degrees of purity according to the required quality of the glaſs. The fineſt ſort of glaſs requires the beſt pearl-aſhes, purified by ſolution and evaporation, to dryneſs; but for inferior glaſſes coarſer alkalies, ſuch as barilla,

wood-aſhes, and kelp, are employed. The aſhes of fern will alſo yield a ſalt, which will make excellent glaſs; and, moreover, the aſhes of the cods and ſtalks of beans, as alſo thoſe of coleworts, bramble buſh, millet-ſtalks, ruſhes, cyperuſes, and many other plants, may be uſed for the like purpoſe, and after the ſame manner.

There are other fluxes uſed for different kinds of glaſs, and for various purpoſes. Lime, in the form of chalk, is employed in the manufacture of glaſs; but this muſt be uſed only in ſmall proportions; for an exceſs would act powerfully on the ſides of the glaſs-pots, in conſequence of the eſcape of the carbonic acid from the chalk during the fuſion, and, beſides, it would render the glaſs opaque and milky in cooling, however clear it might be when hot. It is known by experience, that to 100 parts of ſilex and the requiſite quantity of alkali, no more than about ſix or ſeven parts of quick-lime, or chalk, can be added, without affecting the clearneſs of the glaſs. Borax is another very valuable flux; but its high price reſtricts the uſe of it to the fineſt kinds of glaſs, and to thoſe which are required to be free from ſpecks and bubbles. A very ſmall quantity of borax will correct any deficiency of ſtrength in the alkali.

Of the oxyds of lead, litharge and minium are found to be of ſingular uſe in the manufacture of glaſs. Litharge is a powerful flux, and imparts to glaſs the valuable qualities of greater denſity and greater power of refracting the rays of light, and of bearing ſudden changes from heat to cold, without being ſo liable to crack, and alſo greater tenacity when red-hot, ſo that it is more eaſily wrought. A conſiderable quantity of this oxyd is contained in the finer glaſſes; ſuch as the London flint glaſs, and that which is uſed for the table, for luſtres, for artificial gems, and for moſt optical purpoſes. Glaſs, however, that contains much lead, is extremely ſoft; and liable to be injured by hard bodies that come into contact with it; and it is alſo very fuſible. It is alſo liable to be corroded by very acrid liquors. Beſides, the uſe of lead renders it difficult ſo to unite the ſilex and alkali, that a piece of glaſs ſhall be throughout of uniform denſity. Another ingredient occaſionally uſed in glaſs is the black oxyd of manganeſe, called "glaſs-ſoap," from its uſe in clearing the glaſs from any accidental foulneſs of colour, and more eſpecially from the green tinge, owing to the preſence of iron. Scheele and Bergman in their reſpective "Eſſays," have illuſtrated many curious circumſtances that attend the uſe of manganeſe in glaſſes, which are particularly detailed in Aikin's Dictionary. The manganeſe ſhould be choſen of a deep colour, and free from ſpecks, of a metalline appearance, or a lighter caſt: and it requires to be well calcined in a hot furnace, and then to undergo a thorough levigation. The effect of manganeſe in deſtroying the colours of glaſs is accounted for by M. Montamy, in his "Traité des Couleurs pour la Peinture en Email," in the following manner; the manganeſe deſtroys the green, olive, and blue colours of glaſs, by adding to them a purple tinge, and by the mixture producing a blackiſh brown colour; and as blackneſs is cauſed merely by an abſorption of the rays of light, the blackiſh tinge given to the glaſs by the mixture of colours, prevents the reflection of ſo many rays, and thus renders the glaſs leſs coloured than before. But the black produced by this ſubſtance ſuggeſts an obvious reaſon for uſing it very ſparingly in thoſe compoſitions of glaſs, which are required to be very tranſparent.

This purple colour may be corrected by charcoal, or in the glaſs-houſe, by thruſting a billet of wood down into the melted glaſs, which becomes charred by the intenſe heat, and cauſes the purple hue to vaniſh, with a ſlight efferveſcence of the glaſs, and eſcape of numerous ſmall air-bubbles. On the other hand, if a ſmall quantity of nitre is added to glaſs containing manganeſe, the purple colour is reſtored, or, if preſent, the diſcolouring effect of the charcoal is prevented, till the nitre becomes alkalized by the heat, and mixes with the other ingredients of the crucible. For the explanation of theſe phenomena, it is obſerved, that the oxyd of manganeſe gives the purple colour only ſo long as it remains in its higher ſtate of oxygenation; but when in contact with charcoal, the latter partially deoxygenates it, carbonic acid gas is formed, the cauſe of the bubbles obſerved on this occaſion, and the colour is now loſt. Nitre, on the other hand, is known to give out oxygen largely as ſoon as red-hot; and hence the manganeſe immediately retakes from this ſource the oxygen of which the charcoal had deprived it, and reſumes its colouring power. The other ſubſtances which take away the colour from glaſs, tinged red with manganeſe, are all the ſalts with the baſis of ſulphuric acid, ſuch as gypſum, ſulphat of ſoda, &c. and alſo ſulphur itſelf; likewiſe the oxyds of tin and iron, and of ſome other metals. Nevertheleſs theſe ſubſtances have this power only when in contact with charcoal. The tinging power of manganeſe is perfectly deſtroyed by the addition of arſenic in any form. Thus, a mixture of oxyd of cobalt and oxyd of manganeſe, in the colouring ſtate, is of a dark purple; but on the addition of any arſeniat, or of white arſenic, the manganeſe is made inactive, and the proper cobalt-blue alone appears. Hence we perceive the neceſſity, when the red colour of manganeſe is wanted, to avoid any thing arſenical; and nitre is alſo generally added to keep the manganeſe always at the proper ſtate for imparting its colour. The oxyd of manganeſe is a very powerful flux for all earthy matters; and this, as well as lead, gives a great denſity to glaſs. The white oxyd of arſenic is another powerful and cheap flux in the making of glaſs; but it ſhould be very moderately uſed; for it takes a longer time to mix intimately with glaſs, and to allow it to be perfectly clear, than any other of the additions commonly employed. For want of this the glaſs has a milky hue, which increaſes with age; and when the arſenic is in exceſs, the glaſs becomes gradually ſoft, and is decompoſed. Beſides, glaſs of this kind is unſafe to be uſed in the form of drinking veſſels.

Nitre is alſo uſed, in ſmall quantities, in the manufacture of glaſs, and is deſigned to anſwer particular purpoſes, ſome of which we have already ſpecified. It not only ſerves to deſtroy the ſtrong tinge of yellow which is found in glaſs, prepared with lead as a flux; but in ſaline glaſs, it is requiſite, in a ſmaller proportion, to render it ſufficiently tranſparent, as in the caſe of looking-glaſſes, and other kinds of plates. For an account of Mr. Dollond's excellent contrivance for deſtroying the colours in the object-glaſſes of teleſcopes, &c. ſee ABERRATION.

With regard to the ſeveral fluxes above enumerated, we may obſerve, in general, that the more calx of lead, or other metallic earth, enters into the compoſition of any glaſs, ſo much the more fuſible, ſoft, coloured, and denſe this glaſs is, and reciprocally.

The colours given to glaſs by calces of lead are ſhades of yellow: on the other hand, glaſſes that contain only ſaline fluxes partake of the properties of ſalts; they are leſs heavy, leſs denſe, harder, whiter, more brilliant, and more brittle than the former; and glaſſes, containing both ſaline and metallic fluxes, do alſo partake of the properties of both theſe ſubſtances. Glaſſes too ſaline are eaſily ſuſceptible of alteration by the action of air and water; eſpecially thoſe in which alkalies prevail; and theſe are alſo liable to be injured by acids. Thoſe that contain too much borax and arſenic, though at firſt they appear very beautiful, quickly tarniſh, and become opaque when expoſed to air. By attending to theſe properties of different fluxes, phlogiſtic or ſaline, the artiſt may know how to adjuſt the proportions of theſe to ſand, or powdered flints, for the various kinds of glaſs.

Glass, *proportion of ingredients in.* Different kinds of glaſs require different proportions; nor have theſe been preciſely aſcertained. We ſhall here, and in ſubſequent articles, ſtate ſeveral of the moſt uſual and approved mixtures that have been propoſed. When ſilex is melted with twice its weight, or more, of dry carbonated alkali, either potaſh or ſoda, the reſult is a very ſoft deliqueſcent vitreous maſs, always more or leſs opaque, ſtrongly alkaline to the taſte, and which, on expoſure to moiſt air, or more ſpeedily in water, totally diſſolves into a clear liquor, which is a ſolution of ſilex in alkali. When the ſame alkali is equal to the ſilex in weight, or does not much exceed it, the glaſs is now tranſparent, but it is ſtill ſoluble in water. It is not till the alkali is diminiſhed to about one-half of the weight of the ſilex, that the glaſs becomes perfectly hard and inſoluble in any corroſive liquors, (the fluoric acid excepted,) and, in ſhort, acquires the character of a perfect glaſs. This proportion, therefore, of two parts of ſand to one of alkali, is uſually the datum on which the doſes of the alkalies actually uſed are regulated. Thus, if common wood aſhes (of which the alkaline part is reckoned at no more than 10 per cent.) are employed, 100lbs. of theſe would require no more than about 20lbs. of ſand. If the beſt Spaniſh barilla, containing from 45 to 50 per cent. of carbonate of ſoda, be uſed, an equal weight of ſand may be added; but if purified pearlaſh be taken, it will melt down perfectly twice its own weight of ſand. But glaſſes compoſed merely of pure alkali and ſand, require a very ſtrong fire for their fuſion, and are hard, harſh, and difficult to break: they are therefore never uſed alone. As one half the weight of the ſand is reckoned an abundant allowance of alkali, it follows of courſe that when litharge, arſenic, borax, or any other fluxes are employed, the quantity of alkali will be proportionally diminiſhed. The following proportions are extracted from Macquer's Chemical Dictionary. If a glaſs be required that is denſe, fuſible, and not ſaline, one part and a half of red lead or litharge may be mixed with one part of ſand, and fuſed together: if equal parts of ſand and of calx of lead be employed, a glaſs ſomewhat leſs denſe and harder will be produced: if a glaſs be required of very little denſity, only ſaline fluxes muſt be employed. A glaſs of this kind may be compoſed of ſix parts of ſalt of tartar, or of potaſh, or of purified ſoda, mixed with eight parts of ſand or of flints; or of four parts of any of the above-mentioned alkalies, mixed with two parts of nitre or of borax, and eight parts of vitrifiable earth. When a cryſtal glaſs is required, which ſhall be of an intermediate quality betwixt the metallic and ſaline glaſſes, it may be made from a mixture of one part of the above mentioned ſalts, one part of calx of lead, and two parts of ſand or other vitrifiable earth. By varying the proportion of theſe ingredients, many different kinds of glaſſes may be produced, each of which may be good, if the quantity of each of the fluxes employed be proportionable to its vitrifying power.

Glass, *inſtruments for manufacturing.* Theſe are ſubſervient to two different purpoſes; *viz.* the levigation and mixture of the ingredients, and the fuſion or vitrification of them. To the former claſs belong horſe or hand-mills, mortars and peſtles, flat ſtones and mullars, and ſearces or ſieves. The other ſort of utenſils are furnaces, with the proper iron work, pots for containing the compoſition when put into the fire, and iron inſtruments for ſhifting the matter out of one into the other, in caſe of accidents; and for taking out ſmall portions, in order to judge of the progreſs of the vitrification, and the qualities of the glaſs, &c. See the following articles. See alſo Glass-*houſe*, Furnace, and Glass-*pots*.

Glass, *fuſion of.* When the ingredients are ſelected and duly proportioned, they are firſt calcined for a longer or ſhorter time, before they are put into the glaſs-pots. This operation is called "fritting," and is performed either in ſmall furnaces adjoining to the proper glaſs-furnace, and heated by the ſame fuel after its chief force has been ſpent upon the glaſs-pots, or elſe in ſmall furnaces or ovens conſtructed for this purpoſe. The uſes of fritting are, to expel all moiſture from the ingredients, by which the glaſs-pots would be endangered; to diſcharge part of the carbonic acid from the alkalies and chalk. and thus to moderate the ſwelling in the glaſs-pots, and eſpecially to cauſe an adheſion, or commencement of chemical union, between the alkali and ſilex, and metallic oxyds. This operation ſhould be performed gradually, and carried to the point of ſemi-vitrification, in which the materials ſtrongly adhere, and begin to become paſty, but are ſtill opaque and not homogeneous. This operation ſerves alſo to deſtroy any carbonaceous matter. When the ingredients are ſufficiently fritted, they are thrown with clean iron ſhovels through the ſide-opening of the furnace into the glaſs-pots, the fire having been previouſly raiſed to its greateſt intenſity, to prevent the furnace from being chilled and to ſave time. The pots are charged by two or three ſucceſſive portions, the preceding one being thoroughly melted down before another portion is thrown in. When filled, the ſide-opening is cloſed up with wet clay, excepting a ſmall hole for examining the work, which cloſure is pulled down when the glaſs is well refined and about to be worked off. As ſoon as the frit begins to feel the action of the fire in the glaſs-pots, which is immediately raiſed to its greateſt pitch, it ſinks down into a ſoft paſty ſtate, increaſing in tenacity till the fuſion is complete. However, it is ſtill opaque, from the riſing of a white porous ſcum, known by the name of "ſandiver," or "glaſs-gall." This ſubſtance appears to be a confuſed maſs, conſiſting of all thoſe ſalts contained in common alkalies, which readily melt at ſomewhat leſs than a glaſs-melting heat, and are either naturally ſoluble in a conſiderable degree, or have little, if any, affinity for ſilex, and not uniting in the compoſition of glaſs, but being lighter, riſe to the top. Another heterogeneous ſubſtance, called "ſandiver," is ſometimes found at the bottom of the pots. This is quite different from the other, and ſeems to conſiſt of a vitrified maſs of arſenic and other impurities. But the ſcum, or proper "glaſs-gall," is almoſt entirely ſaline. When laded out and cooled, it forms a crumbly maſs, ſometimes white, at other times brown and fouled, and ſtrongly ſaline, but not uniform in its compoſition, being ſometimes merely ſalt, often very bitter, probably as common ſalt or ſulphat of potaſh predominates. It is ſo volatile in a ſtrong fire, that it is conſtantly diſperſing from the ſurface of the glaſs in a denſe vapour, which is firſt thick and black, afterwards whiter, and which corrodes the top of the crucible in its paſſage. With long continued fuſion it would entirely eſcape in this ſtate, if it were not ſcummed off with long ladles, and ſold to metal refiners as a powerful flux. Abundance of this glaſs-gall is attended with one of the greateſt inconveniences to the maker of glaſs, as it requires a conſiderable continuance of ſtrong heat to diſſipate the whole of it, or otherwiſe the glaſs would be full of bubbles, unſound, and having a cloudy gelatinous appearance. It is obſerved, that glaſs from potaſh is more likely to ſuffer from glaſs-gall than the ſoda-glaſs is, becauſe the potaſh glaſſes are harder, and do not run ſo thin as the other, and the glaſs-gall from them does not ſo eaſily diſſipate in the fire.

During this proceſs ſamples for examination are drawn out of the pots with an iron rod; and the glaſs gradually becomes more and more flexible, denſe, and leſs brittle, and at laſt the glaſs-gall is entirely diſſipated. Whilſt the heat is continued, the glaſs which was full of ſpecks and bubbles is refined, and becomes beautifully clear, tranſparent, and colourleſs; and this proceſs, which goes on from the ceſſation of the vapour of the glaſs-gall and its entire removal to the time when the glaſs is altogether clear and free from bubbles, is called the "refining." After this the glaſs is complete; but being too thin for working, it is cooled, by ſtopping the draught of fire round the pot which contains it, and in cooling it thickens to a fit ſtate for being wrought. For glaſs that is caſt into plates, leſs cooling is neceſſary, as it is required to flow very thin and hot. On an average it takes about 48 hours for the fine flint glaſſes, from the time when the pots are firſt filled till the glaſs is ready for working, in which ſtate it is of a very full red colour, and poſſeſſes a ſingular kind of conſiſtence and tenacity. It is juſt ſoft enough to yield with eaſe to any external impreſſion, even to the force of the breath urged pretty ſtrongly in the centre of the glowing maſs, and may be bent and ſhaped in every poſſible way; and ſuch is its tenacity, that it extends uniformly without any cracks or fiſſures; but when ſtretched out to the utmoſt, it forms a ſolid ſtring, the diameter of which is conſtantly decreaſing till it ſeparates from the maſs in a thin capillary thread. It ſtiffens as it cools, and becomes perfectly brittle and alſo tranſparent. As melted glaſs adheres very feebly to poliſhed metal, it is very eaſily wrought with bright iron tools.

GLASS, *working or blowing round.*—Every kind of glaſs, plate-glaſs excepted, is formed from a hollow globe that has been produced by blowing. For this purpoſe the operator takes his blowing-iron, which is a hollow tube, about four or five feet long, and dipping it in the melting-pot, turns it about there till the metal adheres to the iron like ſome glutinous or clammy juice; he then holds it near the ground, ſo that the maſs is extended by its own weight, and blows ſtrongly into the tube. With his breath thus penetrating into the centre of the red-hot maſs, he enlarges it into an uniform hollow globe of the requiſite thickneſs and bulk, keeping the force of his breath upon it for a few ſeconds till it ſtiffens by cooling, and thus preventing its ſinking by the compreſſion of the denſer external air. This globe, adhering by a neck to the iron rod, is formed by the dexterity of the workman, and by a variety of ingenious manœuvres into all the common utenſils. As a ſpecimen of his art, we may inſtance a common tumbler. The hollow globe already mentioned is taken off the iron rod by the following ſimple proceſs: An aſſiſtant dips the end of a ſhort ſolid iron rod into the glaſs-pot, and, bringing out at its extremity ſome of the melted glaſs, thruſts it immediately againſt the hollow of the globe at the part directly oppoſite to the neck, to which it firmly unites, and thus the globe is cemented by the melted glaſs to the ſecond rod. The workman then wets a ſmall piece of iron with his mouth, and lays it on the neck of the globe, which is extremely hot, and this, in a ſecond or two, cracks it round; ſo that with a ſlight pull it comes off and detaches the hollow rod, leaving the globe open at the neck, and transferred to the ſecond rod at the oppoſite ſide. The open globe is again ſoftened by holding it a few ſeconds over the mouth of the glaſs-pot, and is cut away from the open end to the form of a cup by iron ſhears. The operator, when employed in faſhioning the globe, uſually ſits upon a kind of arm-chair, with its arms ſloping forwards and covered with a flat ſmooth iron-plate; and by laying the iron rod ſtraight before him, reſting on both the arms of his ſeat, and twirling it backwards and forwards, the hot glaſs at the end is made to revolve like clay on a potter's lathe, and thus is opened, widened, or compreſſed at pleaſure by any ſimple iron inſtrument that is preſſed againſt it. The globular cup is thus extended eaſily into a cylinder, or made into the ſhape of a barrel, if this form be required, and is ſmoothed up at the edges. In order to ſeparate it from the iron-rod, it is wetted as before at the point of attachment, and the tumbler drops off complete. This laſt operation leaves that burr or roughneſs, with ſharp fragments, which is ſeen at the bottom of all glaſs-veſſels, unleſs it be taken off by poliſhing. The next operation is that of cooling the veſſel very gradually, called "annealing." See *Annealing of* GLASS.

GLASS, *different kinds of.* The manufactured glaſs now in uſe may be divided into three general kinds; white tranſparent glaſs, coloured glaſs, and common green or bottle-glaſs. Of the firſt kind, there is a great variety; as the flint glaſs, as it is called with us, and the German cryſtal glaſs, which are applied to the ſame uſes; the glaſs for plates for mirrors or looking-glaſſes; the glaſs for windows and other lights; and the glaſs for phials and ſmall veſſels. And theſe again differ in the ſubſtances employed as fluxes in forming them, as well as in the coarſeneſs or fineneſs of ſuch as are uſed for their body. The flint and cryſtal, mirror, and beſt window glaſs, not only require ſuch purity in their fluxes, as may render it practicable to free the glaſs perfectly from all colour: but for the ſame reaſon likewiſe, either the white Lynn ſand, calcined flints, or white pebbles, ſhould be uſed. The others do not demand the ſame nicety in the choice of the materials; though the ſecond kind of window glaſs, and the beſt kind of phial, will not be ſo clear as they ought, if either too brown ſand, or impure ſalts, be ſuffered to enter into their compoſition.

Of coloured glaſs there is a great variety of ſorts, differing in their colour, or other properties, according to the occaſions for which they are wanted. The differences in the latter kind depend on the accidental preparation and management of the artiſts by whom they are manufactured.

GLASS, *Cryſtal.* Foreigners uſe this term for our flint glaſs, and for making it they give the following directions: Take of the whiteſt tarſo, pounded ſmall, and ſearced as fine as flour, two hundred pounds; of the ſalt of polverine, a hundred and thirty pounds: mix them together, and put them into the furnace, called the *calcar*, firſt heating it. For an hour keep a moderate fire, and keep ſtirring the materials with a proper rake, that they may incorporate and calcine together; then increaſe the fire for five hours; after which take out the matter; which, being now ſufficiently calcined, is called frit. From the calcar put the frit in a dry place, and cover it up from the duſt for three or four months.

Now, to make the glaſs, or cryſtal: Take of this cryſtal frit, called alſo *bollito;* ſet it in pots in the furnace, adding to it a due quantity of manganeſe: when the two are fuſed, caſt the fluor into fair water, to clear it of the ſalt, called *ſandiver;* which would otherwiſe make the cryſtal obſcure and cloudy. This lotion muſt be repeated again and again, as often as needful, till the cryſtal be fully purged; or, this ſcum may be taken off by means of proper ladles. Then ſet it to boil four, five, or ſix days; which done, ſee whether it have manganeſe enough; and if it be yet greeniſh, add more manganeſe, at diſcretion, by little and little at a time, taking care not to overdoſe it, becauſe the manganeſe inclines it to a blackiſh hue. Then let the metal clarify, till it becomes of a clear and ſhining colour; which done, it is fit to be blown, or formed into veſſels at pleaſure.

Glass, *Flint*, as it is called in our country, is of the ſame general kind with that which in other places is called cryſtal glaſs. It has this name from being originally made with calcined flints, before the uſe of the white ſand was underſtood; and retains the name though no flints are now uſed in the compoſition of it. This flint glaſs differs from the other, in having lead for its flux, and white ſand for its body; whereas the fluxes uſed for the cryſtal glaſs are ſalts or arſenic, and the body conſiſts of calcined flints, or white river pebbles, tarſo, or ſuch ſtones. This glaſs, on account of the quantity of litharge, which enters into its compoſition, is the heavieſt, the moſt brilliant, the ſofteſt and moſt eaſy to work, and alſo the moſt expenſive. It is that fine glaſs, of which the common and moſt valuable articles of white glaſs in domeſtic or ornamental uſe are manufactured; and beſides, many optical inſtruments are made of this ſubſtance. To the white ſand and lead a proper proportion of nitre is added, for the purpoſes ſpecified in a former part of this general article, and alſo a ſmall quantity of manganeſe, and in ſome works they uſe a proportionable quantity of arſenic to aid the fluxing ingredients. The moſt perfect kind of flint glaſs may be made by fuſing with a very ſtrong fire a hundred and twenty pounds of the white ſand, fifty pounds of red lead, forty pounds of the beſt pearl-aſhes, twenty pounds of nitre, and five ounces of manganeſe.

From others we have the following compoſition for glaſs of this kind, ſaid to be of the beſt quality, *viz.* 120 parts of fine clear white ſand, 40 of pearl-aſhes well purified, 35 of litharge or minium, 13 of nitre, and a ſmall quantity of black oxyd of manganeſe.

The following compoſition for a fine cryſtal glaſs is given by Loyſel; 100 pounds of white ſand, 80 to 85 of red oxyd of lead, 35 to 40 of pearl-aſh, 2 to 3 of nitre, and one ounce of manganeſe. The ſpecific gravity of this glaſs, and of the common London flint-glaſs, is about 3.2.

Another compoſition of flint glaſs, which is ſaid to come nearer to the kind now made, is the following: a hundred and twenty pounds of ſand, fifty-four pounds of the beſt pearl-aſhes, thirty-ſix pounds of red lead, twelve pounds of nitre, and ſix ounces of manganeſe. To either of theſe a pound or two of arſenic may be added, to increaſe the flux of the compoſition. A cheaper compoſition of flint glaſs may be made with a hundred and twenty pounds of white ſand, thirty-five pounds of the beſt pearl-aſhes, forty-pounds of red-lead, thirteen pounds of nitre, ſix pounds of arſenic, and four ounces of manganeſe; or, inſtead of the arſenic, may be ſubſtituted fifteen pounds of common ſalt; but this will be more brittle than the other. The cheapeſt compoſition for the worſt kind of flint-glaſs, conſiſts of a hundred and twenty pounds of white ſand, thirty pounds of red-lead, twenty pounds of the beſt pearl-aſhes, ten pounds of nitre, fifteen pounds of common ſalt, and ſix pounds of arſenic. The beſt German cryſtal glaſs is made of a hundred and twenty pounds of calcined flints, or white ſand, ſeventy pounds of the beſt pearl-aſhes, ten pounds of ſalt-petre, half a pound of arſenic, and five ounces of manganeſe. And a cheaper compoſition is formed of a hundred and twenty pounds of calcined flints, or white ſand, forty-ſix pounds of pearl-aſhes, ſeven pounds of nitre, ſix pounds of arſenic, and five ounces of manganeſe.

A glaſs, much harder than any prepared in the common way, may be made by means of borax in the following method: take four ounces of borax, and an ounce of fine ſand; reduce both to a ſubtile powder, and melt them together in a large cloſe crucible ſet in a wind-furnace, keeping up a ſtrong fire for half an hour; then take out the crucible, and when cold break it, and there will be found at the bottom a pure hard glaſs, capable of cutting common glaſs like a diamond. This experiment, duly varied, may lead to ſeveral uſeful improvements in the arts of glaſs, enamels, and factitious gems, and ſhews an expeditious method of making glaſs, without any fixed alkali, which has been generally thought an eſſential ingredient in glaſs; and it is not yet known whether calcined cryſtal, or other ſubſtances, being added to this ſalt inſtead of ſand, it might not make a glaſs approaching to the nature of a diamond. Shaw's Lectures, p. 426.

Glass, *Crown*, is the beſt ſort of window-glaſs, and differs from the flint-glaſs in containing no lead, nor any metallic oxyd, except manganeſe, and ſometimes oxyd of cobalt, in minute doſes, not as a flux, but for correcting the natural colour. This glaſs is much harder and harſher to the touch than the flint-glaſs; but when well made it is a very beautiful article. It is compounded of ſand, alkali, either potaſh or ſoda, the vegetable aſhes that contain the alkali, and generally a ſmall portion of lime. A ſmall doſe of arſenic is often added to facilitate the fuſion. Zaffre, or the oxyd of cobalt, with ground flint, is often uſed to correct the dingy yellow of the inferior ſort of crown-glaſs, and by adding the blue, natural to glaſs coloured with this oxyd, to convert the whole into a ſoft light green. One ounce of zaffre is ſufficient for 1000lbs. But when the ſand, alkali, and lime are very fine, and no other ingredients are uſed, no zaffre nor corrective of bad colour is required. A very fine glaſs of this kind may be made by 200 parts of pretty good ſoda, 300 of fine ſand, 33 of lime, and from 250 to 300 of the ground fragments of glaſs. We had formerly in London two kinds of crown glaſs, diſtinguiſhed by the places where they were wrought; *viz.* 1. *Ratcliff crown glaſs*, which is the beſt and cleareſt, and was firſt made at the Bear-garden, on the Bank-ſide Southwark, but ſince at Ratcliff: of this there are twenty-four tables to the caſe, the tables being of a circular form, about three feet ſix inches in diameter.

2. *Lambeth crown glaſs*, which is of a darker colour than the former, and more inclining to green. The following compoſition has been recommended for the beſt window or crown glaſs, *viz.* white ſand, ſixty pounds; of purified pearl-aſhes, thirty pounds; of ſalt-petre, fifteen pounds; of borax, one pound; and of arſenic, half a pound. If the glaſs ſhould prove yellow, manganeſe muſt be added. A cheaper compoſition for window glaſs conſiſts of ſixty pounds of white ſand, twenty-five pounds of unpurified pearl-aſhes, ten pounds of common ſalt, five pounds of nitre, two pounds of arſenic, and one ounce and a half of manganeſe. The common, or green window glaſs, is compoſed of ſixty pounds of white ſand, thirty pounds of unpurified pearl-aſhes, ten pounds of common ſalt, two pounds of arſenic, and two ounces of manganeſe. But a cheaper compoſition for this purpoſe, conſiſts of a hundred and twenty pounds of the cheapeſt white ſand, thirty pounds of unpurified pearl-aſhes, ſixty pounds of wood-aſhes well burnt and ſifted, twenty pounds of common ſalt, and five pounds of arſenic.

The manufacture of the common window glaſs, though made by blowing, is conducted differently from that of the flint glaſs articles; as it is the object to produce a large, flat, very thin plate of glaſs, which is afterwards cut by the glazier's diamond into the requiſite ſhape. Without minutely detailing the ſeveral gradations of the proceſs, it may be here mentioned, that the workman takes a very large maſs of melted glaſs on his hollow iron rod, and by rolling it on an iron plate and ſwinging it backwards and forwards, cauſes it to lengthen, by its own weight, into a cylinder, which is made hollow and brought to the required thinneſs, by blowing with a fan of breath, which perſons accuſtomed to the buſineſs know how to command. The hollow cylinder is then opened by holding it to the fire, which, by expanding the air confined within it, (the hole of the iron rod being ſtopped,) burſts it at the weakeſt part, and when ſtill ſoft, it is ripped up through its whole length by iron ſhears, opened out into a flat plate, and finiſhed by annealing as uſual.

The large crown glaſs of Meſſrs. Hammond and Smith is ſuperior in quality as well as in ſize to that of any other manufacture. The uſual diameter of the tables in other manufactures may be taken at 47 or 48 inches, with an occaſional variation in a table of one or two inches: and the largeſt ſquare which can be cut from theſe meaſures about 24 inches by 20, and in ſome circumſtances one inch wider or longer. Whereas the glaſs of Meſſrs. Hammond and Smith is 60 inches in diameter, and will admit of being cut into ſquares of about 33 inches by 23 inches; and a little more or leſs. This glaſs is almoſt free from thoſe ſpecks, wreaths, &c. which diſcolour other glaſs, and diſtort the objects ſeen through it. It now ſupplies the place of German ſheet glaſs for prints, large ſaſhes, and exportation to thoſe foreign markets where that glaſs was formerly in uſe.

Glass, *French*, as alſo called *Normandy glaſs*, and formerly *Lorraine glaſs*, becauſe it was made in thoſe provinces: though it has ſince been made wholly in the nine glaſs works; five of which were in the foreſt of Lyons, four in the country of Eu; the laſt at Beaumont, near Rouen. It is of a thinner kind than our crown claſs; and, when laid on a piece of white paper, appears of a dirtyiſh-green colour. There are but twenty-five tables of this to the caſe.

Glass, *German*, is of two kinds, the *white* and the *green*: the firſt is of a whitiſh colour, but is ſubject to thoſe ſmall curved ſtreaks, obſerved in our Newcaſtle glaſs, though free from the ſpots and blemiſhes thereof. The green, beſides its colour, is liable to the ſame ſtreaks as the white; but both of them are ſtraighter, and leſs warped, than our Newcaſtle glaſs.

Glass, *Dutch*, is not much unlike our Newcaſtle glaſs, either in colour or price. It is frequently much warped, like that, and the tables are but ſmall.

Glass, *Newcaſtle*, is that moſt uſed in England. It is of an aſh-colour, and much ſubject to ſpecks, ſtreaks, and other blemiſhes; and, beſides, is frequently warped. Leybourn ſays, there are forty-five tables to the caſe, each containing five ſuperficial feet: ſome ſay there are but thirty-five tables, and ſix feet in each table.

Glass, *Phial*, is a kind of glaſs betwixt the flint glaſs and the common bottle, or green glaſs. The beſt kind may be prepared with a hundred and twenty pounds of white ſand, fifty pounds of unpurified pearl-aſhes, ten pounds of common ſalt, five pounds of arſenic, and five ounces of mangeneſe. The compoſition for green or common phial glaſs, conſiſts of a hundred and twenty pounds of the cheapeſt white ſand, eighty pounds of wood aſhes, well burnt and ſifted, twenty pounds of pearl-aſhes, fifteen pounds of common ſalt, and one pound of arſenic.

Glass, *common green bottle*, is made almoſt entirely of ſand, lime, and ſometimes clay, alkaline aſhes of any kind, as cheapneſs or convenience direct, and more eſpecially of kelp in this country, of barilla, varec, and the other varieties of ſoda in France, and of wood aſhes in many parts of Germany, and the like. To theſe ingredients is ſometimes added the earth remaining from ſaline aſhes, after the alkali and ſalts have been extracted by lixiviation, and in England flags from the iron furnaces. Bottle-glaſs is a very hard well-vitrified glaſs, which reſiſts the corroſive action of all liquids much better than flint glaſs. It is uſed, not only for wine-bottles, but for very large retorts, ſubliming veſſels, and other articles of the chemical apparatus; and it has for this purpoſe the advantage of bearing as much as a pretty full red heat without melting or ſinking down into a ſhapeleſs lump, as the lead-glaſſes would do. The following compoſition is given by Loyſel as a good and cheap material for bottle-glaſs; *viz.* 100 parts of common ſand, 30 of varec (a kind of coarſe kelp made on the weſtern coaſts of France), 160 of the lixiviated earth of aſhes, 30 of freſh wood-aſh, or any other kind of aſh, 80 of brick-clay, and any quantity, generally about 100, of broken glaſs. This compoſition yields no glaſs-gall. This kind of glaſs is formed of ſand of any kind, fluxed by the aſhes of burnt wood, or of any parts of vegetables; to which may be added the ſcoriæ or clinkers of forges. When the ſofteſt ſand is uſed, two hundred pounds of wood-aſhes will ſuffice for a hundred pounds of ſand, which are to be ground and mixed together. The compoſition with the clinkers conſiſts of a hundred and ſeventy pounds of wood-aſhes, a hundred pounds of ſand, and fifty pounds of clinkers, or ſcoriæ, which are to be ground and mixed together. If the clinkers cannot be ground, they muſt be broke into ſmall pieces, and mixed with the other matter without any grinding.

A good bottle-glaſs, but nearly black and opaque, has been made in France of the decompoſed pulverulent baſaltic earth found in the vallies of all baſaltic countries. In France it abounds in the Vivarais, in Languedoc, and Auvergne. The firſt glaſs of this kind appears to have been made in 1780 by a M. Ducros at the ſuggeſtion of Chaptal, who ſimply melted ſome of this baſalt without addition in a glaſs-pot, and formed of it two very light, black, or rather deep yellow, ſhining, perfect bottles. In ſubſequent trials by another artiſt, a mixture of equal parts of baſalt and ſand was employed, as preferable to the baſalt alone; but notwithſtanding a conſiderable demand for bottles of this material, the manufacture was abandoned for want of uniformity in the ingredients, which made them often fail. The colour of this glaſs was of a green-olive.

The green colour, tranſmitted by bottle-glaſs, when in its perfect ſtate, is owing to the iron contained both in the vegetable aſhes and in the ſea-ſand, which enter into its compoſition. This glaſs affords an inſtance of a ſemi-pellucid ſubſtance, which exhibits a blue colour by incident light, and a yellow or orange colour by that which is tranſmitted. See Delaval on the cauſe of the permanent colour of opaque bodies.

Glass, *Plate*, is the moſt perfect and beautiful glaſs, of which all the kinds of mirrors and looking-glaſſes are compoſed. The materials of which this kind of glaſs is made are much the ſame as thoſe of other works of glaſs, *viz.* an alkali ſalt, and ſand.

To prepare the ſalt, they clean it well of all foreign matters; pound or grind it with a kind of mill, and finally ſift it pretty fine.

Pearl-aſhes, properly purified, will furniſh the alkali ſalt requiſite for this purpoſe; but it will be neceſſary to add borax, or common ſalt, in order to facilitate the fuſion, and prevent the glaſs from ſtiffening in that degree of heat, in which it is to be wrought into plates. For purifying the pearl-aſhes, diſſolve them in four times their weight of boiling water, in a pot of caſt iron, always kept clean from ruſt. Let the ſolution be removed into a clean tub, and remain there twenty-four hours, or longer. Having decanted the clear part of the fluid from the dregs or ſediment, put it again in the iron pot, and evaporate the water till the ſalts are left perfectly dry. Preſerve them in ſtone jars, well ſecured from air and moiſture.

Pearl-aſhes may alſo be purified in the higheſt degree, ſo as to be proper for the manufacture of the moſt tranſparent glaſs, by pulverizing three pounds of the beſt pearl-aſhes, with ſix ounces of ſalt-petre, in a glaſs or marble mortar, till they are well mixed; and then putting part of the mixture into a large crucible, and expoſing it in a furnace to a ſtrong heat. When this is red-hot, throw in the reſt gradually; and when the whole is red-hot, pour it out on a moiſtened ſtone or marble, and put it into an earthen or clean iron pot, with ten pints of water; heat it over the fire till the ſalts be entirely melted; let it then ſtand to cool, and filter it through paper in a pewter cullender. When it is filtered, put the fluid again into the pot, and evaporate the ſalt to dryneſs, which will then be as white as ſnow; the nitre having burnt all the phlogiſtic matter that remained in the pearl-aſhes, after their former calcination.

As to the ſand, it is to be ſifted and waſhed, till ſuch time as the water come off very clear; and when it is well dried again, they mix it with the ſalt, paſſing the mixture through another ſieve. This done, they lay them in the annealing furnace for about two hours; in w[illegible] the matter becomes very light and white: in this ſtat[illegible]re called *frit*, or *fritta*; and are to be laid [illegible] a dry clean place, to give them time to incorporate. They lie here for at leaſt a year.

When they would employ this frit, they lay it for ſome hours in the furnace, adding to ſome the fragments or ſhards of old and ill made glaſſes; taking care firſt to calcine the ſhards by heating them red-hot in the furnace, and thus caſting them into cold water. To the mixture muſt likewiſe be added manganeſe, to promote the fuſion and purification.

The beſt compoſition for looking-glaſs plates is ſaid to conſiſt of ſixty pounds of white ſand cleanſed, twenty-five pounds of purified pearl-aſhes, fifteen pounds of ſalt-petre, and ſeven pounds of borax. If a yellow tinge ſhould affect the glaſs, a ſmall proportion of manganeſe, mixed with an equal quantity of arſenic, ſhould be added. An ounce of the manganeſe may be firſt tried; and if this proves inſufficient, the quantity ſhould be increaſed.

A cheaper compoſition for looking-glaſs plate conſiſts of ſixty pounds of the white ſand, twenty pounds of pearl-aſhes, ten pounds of common ſalt, ſeven pounds of nitre, two pounds of arſenic, and one pound of borax.

The materials of the fineſt plate glaſs, ſuch as that of French manufacture, are white ſand, ſoda, and lime, to which are added manganeſe and zaffre, or any other oxyd of cobalt for particular colouring purpoſes. The ſand is of the fineſt and whiteſt kind, which ſhould be previouſly paſſed through a wire ſieve, moderately cloſe, into water, in which it ſhould be well ſtirred about and waſhed. The ſharpeſt grained ſand is preferred, and it is found that grains of moderate ſize melt with the alkali ſooner, than the very fine duſt or the larger fragments. The alkali is always ſoda, which is preferable to potaſh, as glaſſes made with ſoda are found to be ſofter and to flow thinner when hot, and yet to be equally durable when cold. Beſides, the neutral ſalts with the baſis of ſoda which conſtitute the glaſs-gall in this inſtance, ſuch as the muriat and ſulphat of ſoda, appear to be diſſipated more readily by the fire than the correſponding ſalts of potaſh. The ſoda that is uſed is conſiderably pure, or ſuch as is ſeparated from the rough aſhes of barilla, and other ſoda plants by lixiviation. Lime adds to the fuſibility of the other materials, ſupplying the uſe of litharge in the flint-glaſs; but exceſs of it would impair the colour and ſolidity of the glaſs. About 1-15th of the whole is as much as can properly be uſed; but ſome reduce the quantity to 1-24th. The decolouring ſubſtances are azure, or cobalt blue, and manganeſe. Beſides theſe, there is always a great quantity of the fragments of glaſs, collected from the waſte of the manufacture, which are made friable by quenching in water when hot, and uſed in this ſtate together with the freſh materials. As to the quantities and proportions of the ingredients, much latitude is allowed. The following are ſaid to produce a very fine glaſs; *viz.* 300lbs. of ſand; 200lbs. of ſoda; 30lbs. of lime; 32 ounces of manganeſe; three ounces of azure; and 300lbs. of fragments of glaſs. In the manufactory at St. Gobin ſecrecy is obſerved with regard to the materials; but it is affirmed, and with much probability, that borax is uſed in ſmall quantity.

Of the materials now enumerated the ſand, ſoda, lime, and manganeſe are firſt mixed together with more care than for ordinary glaſs, and they are fritted in ſmall furnaces built for this purpoſe, the heat being gradually raiſed to a full red-white, and then kept with frequent ſtirring till the materials undergo no farther change, nor yield any kind of vapour. The azure and glaſs fragments being already in a ſtate of perfect vitrification are not added till juſt at the end of the proceſs, which laſts about ſix hours. When the materials are thus prepared, they are fit for plate-glaſs, to be formed either by blowing or caſting. The largeſt glaſſes at St. Gobin are run; the middle-ſized and ſmall ones are blown.

Blowing looking-glaſs plates. The work-houſes, furnaces, &c. uſed in the making of this kind of plate-glaſs, are the ſame, except that they are ſmaller, and that the carquaiſſes are diſpoſed in a large covered gallery, over-againſt the furnace, as thoſe in the following article, to which the reader is referred.

After the materials are vitrified by the heat of the fire, and the glaſs is ſufficiently refined, the workman dips in his blowing iron, ſix feet long, and two inches in diameter, ſharpened at the end, which is put in the mouth, and widened at the other, that the matter may adhere to it. By this means he takes up a ſmall ball of matter, which ſticks to the end of the tube by conſtantly turning it. He then blows into the tube, that the air may ſwell the annexed ball: and carrying it over a bucket of water, which is placed on a ſupport at the height of about four feet, he ſprinkles the end of the tube to which the matter adheres, with water, ſtill turning it, that by this cooling, the matter may coaleſce with the tube, and be fit for ſuſtaining a greater weight. He dips the tube again into the ſame pot, and proceeds as before; and, dipping it in the pot a third time, he takes it out, loaded with matter, in the ſhape of a pear, about ten inches in diameter, and a foot long, and cools it at the bucket; at the ſame time blowing into the tube, and, with the aſſiſtance of a labourer, giving it a balancing motion, he cauſes the matter to lengthen; which, by repeating this operation ſeveral times, aſſumes the form of a cylinder, terminating like a ball at the bottom, and in a point at the top. The aſſiſtant is then placed on a ſtool three feet and a half high; and on this ſtool there are two upright pieces of timber, with a croſs beam of the ſame, for ſupporting the glaſs and tube, which are kept in an oblique poſition by the aſſiſtant, that the maſter workman may with a puncheon ſet in a wooden handle, and with a mallet make a hole in the maſs: this hole is drilled at the centre of the ball that terminates the cylinder, and is about an inch in diameter. When the glaſs is pierced, the defects of it are perceived; if it is tolerably perfect, the workman lays the tube horizontally on a little iron treſſel, placed on the ſupport of the aperture of the furnace. Having expoſed it to the heat for about half a quarter of an hour, he takes it away, and with a pair of long and broad ſhears, extremely ſharp at the end, widens the glaſs, by inſinuating the ſhears into the hole made with the puncheon, whilſt the aſſiſtant, mounted on the ſtool, turns it round, till, at laſt, the opening is ſo large as to make a perfect cylinder at bottom. When this is done, the workman lays his glaſs upon the treſſel, at the mouth of the furnace, to heat it: he then gives it to his aſſiſtant on the ſtool, and with large ſhears cuts the maſs of matter up to half its height. There is at the mouth of the furnace an iron tool, called *pontil*, which is now heating, that it may unite and coaleſce with the glaſs juſt cut, and perform the office which the tube did before it was ſeparated from the glaſs. This pontil is a piece of iron, ſix feet long, and in the form of a cane or tube, having at the end of it a ſmall iron bar, a foot long, laid equally upon the long one, and making with it a T. This little bar is full of the matter of the glaſs, about four inches thick. This red-hot pontil is preſented to the diameter of the glaſs, which coaleſces immediately with the matter round the pontil, ſo as to ſupport the glaſs for the following operation. When this is done, they ſeparate the tube from the glaſs, by ſtriking a few blows with a chiſſel upon the end of the tube, which has been cooled; ſo that the glaſs breaks directly, and makes this ſeparation, the tube being diſcharged of the glaſs now adhering to the pontil. They next preſent to the furnace the pontil of the glaſs, laying it on the treſſel to heat, and redden the end of that glaſs, that the workman may open it with his ſhears, as he has already opened one end of it, to complete the cylinder; the aſſiſtant holding it on his ſtool as before. For the laſt time, they put the pontil on the treſſel, that the glaſs may become red-hot, and the workman cuts it quite open with his ſhears, right overagainſt the fore-mentioned cut; this he does as before, taking care that both cuts are in the ſame line. In the mean time, the man who looks after the carquaiſſes, comes to receive the glaſs upon an iron ſhovel, two feet and a half long without the handle, and two feet wide, with a ſmall border of an inch and a half to the right and left, and towards the handle of the ſhovel. Upon this the glaſs is laid, flattening it a little with a ſmall ſtick a foot and a half long, ſo that the cut of the glaſs is turned upwards. They ſeparate the glaſs from the pontil, by ſtriking a few gentle blows between the two with a chiſſel. The glaſs is then removed to the mouth of the hot carquaiſſe, where it becomes red-hot gradually; the workman, with an iron tool, ſix feet long, and widened at the end in form of a club at cards, four inches long, and two inches wide on each ſide, very flat, and not half an inch thick, gradually lifts up the cut part of the glaſs, to unfold it out of its form of a flattened cylinder, and render it ſmooth, by turning it down upon the hearth of the carquaiſſe. The tool, already deſcribed, being inſinuated within the cylinder, performs this operation, by being puſhed hard againſt all the parts of the glaſs. When the glaſs is thus made quite ſmooth, it is puſhed to the bottom of the carquaiſſe, or annealing furnace, with a ſmall iron raker, and ranged there with a little iron hook. When the carquaiſſe is full, it is ſtopped and cemented as in the caſe of run glaſſes, and the glaſs remains there for a fortnight to be annealed; after which time, they are taken out to be poliſhed. A workman can make but one glaſs in an hour, and he works and reſts for ſix hours alternately.

It may be obſerved, that looking-glaſſes, thus blown, ſhould never be above forty-five, or at moſt fifty inches long, and of a breadth proportionable. Thoſe exceeding theſe dimenſions, as we frequently find among the Venice glaſſes, cannot have the thickneſs ſufficient to bear the grinding; and, beſides, are ſubject to warp, which prevents them from regularly reflecting objects. Whereas plates as large as nine feet in length and proportionally wide, have been manufactured by caſting.

Caſting or running large Looking-glaſs plates. This art, as we have obſerved in the *Hiſtory of* GLASS, is of French invention. It is owing to the Sieur Abraham Thevart, who firſt propoſed it to the court of France, in 1688

It is performed much like the caſting of ſheet-lead among the plumbers; and by means hereof we are not only enabled to make glaſſes of more than double the dimenſions of any made by the Venetian way of blowing; but alſo to caſt all kinds of borders, mouldings, &c.

The furnaces for melting the materials of this manufacture are of large ſize, being about 18 feet long and 15 wide; and thoſe for annealing the glaſſes, when formed, are much more ſo. Round a melting-furnace, there are at leaſt twenty-four annealing furnaces or ovens; each from twenty to twenty-five feet long; they are called carquaiſſes: each carquaiſſe has two tiſſarts, or apertures, to put in wood, and two chimnies. Add, that beſide the annealing furnaces, &c. there are others for making of frit, and calcining old pieces of glaſs.

All theſe furnaces are covered over with a large ſhed; under which are likewiſe forges, and work-houſes for ſmiths, carpenters, &c. continually employed in repairing and keeping up the machines, furnaces, &c. as alſo lodges, and apartments for theſe, and the other workmen, employed about the glaſs, and keeping up a perpetual fire in the great furnace; ſo that the glaſs-houſe, as that in the caſtle of St. Gobin, in the foreſt of Fere, in the Soiſſonois, appears more like a little city, than a manufactory.

The inſide of furnaces is formed of a ſort of baked earth, or refractory clay, proper to ſuſtain the action of fire; and the ſame earth ſerves alſo for melting-pots, ciſterns, &c. The furnaces ſeldom laſt above three years; after which they are to be rebuilt, from bottom to top; and to keep them good, even for that time, the inſide muſt be refitted every ſix months, at which time the fire is extinguiſhed. The ſmelting-pots are as big as wine hogſheads, about three feet in height, and in diameter; and contain above two thouſand weight of metal. They are in the form of an inverted and truncated cone. The ciſterns, or pans, called "cuvettes," are much ſmaller, being about thirty-ſix inches long, eighteen inches wide, and as many deep; and ſerve for the conveyance of liquid glaſs, which is drawn out of the pots to the caſting tables. They do not contain much more than a ſixth, or when large plates are caſt, a third of the pots.

When the furnace is in condition to receive the pots and ciſterns, they heat it red-hot, which requires fifty cords, or a hundred cart-loads of wood. That kind of wood which emits the largeſt and brighteſt flame, without much reſinous ſmoke, is preferred. This done, they fill the pots with the materials, or ſoda and ſand, which is done at ſeveral times, to facilitate the fuſion. When the matter is ſufficiently vitrified, refined, and ſettled, which uſually happens in thirty-ſix hours, they fill the ciſterns, which are in the ſame furnace, and which are left there about ſix hours longer, till ſuch time as they appear all white through the exceſſive heat.

To get the ciſterns with the metal out of the furnace, they make uſe of a large iron chain which opens and ſhuts with hooks and eyes. From the middle of this, on each ſide, ariſe two maſſive iron pins, by which, with the aſſiſtance of pullies, the ciſterns are raiſed upon a kind of carriage of a proper height; and thus conducted to the table where the glaſs is to be run. The ciſtern is then raiſed above the tables with an engine, in form of a crane, by means of two iron bars, ſo contrived as to throw the ciſtern into an inclined poſition, which diſcharges a torrent of matter, all on fire, with which the table prepared for this purpoſe is preſently covered.

The table on which the glaſs is to be run, is of ſmooth thick copper-plate, about ten feet long, and ſix feet broad. It is ſupported on a wooden frame, with truckles, for the convenience of removing from one carquaiſſe, or annealing furnace, to another, in proportion as they are filled.

Or, when each pot has a caſting table, it is ſtrongly ſupported by maſonry, and contiguous to each table on the ſame level are the annealing ovens, upon which, being flat, the glaſs, when caſt and ſufficiently cooled, may be ſlid from off the copper-table without much difficulty. The tops of the flat ovens and the tables are on a level with the correſponding opening of the furnace, whence the cuvettes or ciſterns are withdrawn. When the glaſs is melted and fined in the manner already ſtated under the article *Flint* Glass, the cuvette or ciſtern, previouſly made hot in the furnace, is filled out of the pot with a copper ladle, about ten inches in diameter, fixed to an iron handle ſeven feet long, properly ſupported on an iron ſtay by two workmen; and after remaining in the furnace for ſome hours, till the ſamples taken out for trial appear to be quite clear and limpid, the door of the furnace is opened, and the cuvette is pulled out and removed to the ſide of the copper table. It is then ſcummed with an inſtrument conſiſting of a copper blade ſet in iron, and hoiſted for the diſcharge of its contents on the table, in the manner already mentioned.

To form the thickneſs of a glaſs, and to make the ſurface ſmooth and even, there are two iron rulers or rims, placed round the edge of the table; and on theſe reſt the two extremes of a kind of roller, or hollow heavy cylinder of copper, turned after being caſt, and about 500 pounds in weight, which ſerves to drive the liquid matter before it to the end of the table, or mould. The iron rulers being moveable, and capable of being ſet cloſer, or farther apart, at pleaſure, determine the width of the glaſſes, and retain the matter, that it does not run off at the edges. The waſte glaſs, if any, falls into a veſſel of water, and is reſerved for the next melting.

As ſoon as the matter is arrived at the end of the table, and the glaſs is come to a conſiſtence, examined by the directors of the manufacture, and approved, they ſhove it off into the annealing furnace, with an iron raker, as wide as the table, that has a handle two fathoms long; being aſſiſted by workmen on the other ſide of the carquaiſſe, who, with iron hooks, pull the glaſs to them, and range it in the carquaiſſe, which holds ſix large glaſſes.

What is moſt ſurpriſing throughout the whole of this operation, is the quickneſs and addreſs wherewith ſuch maſſy ciſterns, filled with a flaming matter, are taken out of the furnace, conveyed to the table, and poured on it, the glaſs ſpread, &c. The whole is inconceivable to ſuch as have not been eye-witneſſes of that ſurpriſing manufacture.

As faſt as the ciſterns are emptied, they carry them back to the furnace and take freſh ones, which they empty as before. This they continue to do, ſo long as there are any full ciſterns; laying as many plates in each carquaiſſe as it will hold, and ſtopping them up with doors of baked earth, or clay, and every chink with cement, as ſoon as they are full, to let them anneal, and cool again, which requires about fourteen days.

The firſt running being diſpatched, they prepare another, by filling the ciſterns anew, from the matter in the pots; and after the ſecond, a third, and even a fourth time, till the melting pots are quite empty.

The ciſterns at each running ſhould remain at leaſt ſix hours in the furnace to whiten; and when the firſt annealing furnace is full, the caſting table is to be carried to another. It need not here be obſerved, that the carquaiſſes, or annealing furnaces, muſt firſt have been heated to the degree proper for them. It may be obſerved, that the oven full, or the quantity of matter commonly prepared, ſupplies the running of eighteen glaſſes, which is performed in eighteen hours, being an hour for each glaſs. The workmen work ſix hours, and are then relieved by others.

When the pots are emptied, they take them out, as well as the ciſterns, to ſcrape off what glaſs remains, which otherwiſe would grow green by continuance of fire, and ſpoil the glaſſes. They are not filled again in leſs than thirty-ſix hours, ſo that they put the matter into the furnace, and begin to run it every fifty-four hours.

The manner of heating the large furnaces is ſingular enough; the two tiſors, or perſons employed for that purpoſe, in their ſhirts, run round the furnace without making the leaſt ſtop, with a ſpeed ſcarce inferior to that of the lighteſt courier: as they go along, they take two billets, or pieces of wood, which are cut for the purpoſe; theſe they throw into the firſt tiſſart; and continuing their courſe do the ſame for the ſecond. This they hold without interruption for ſix hours ſucceſſively; after which they are relieved by others, &c. It is ſurpriſing that two ſuch ſmall pieces of wood, and which are conſumed in an inſtant, ſhould keep the furnace to the proper degree of heat; which is ſuch, that a large bar of iron, laid at one of the mouths of the furnace, becomes red-hot in leſs than half a minute.

It is computed, that a furnace, before it be fit to run glaſs, coſts above three thouſand five hundred pounds; that at leaſt ſix months are required for the building it anew, and three months for the refitting it; and that when a pot of matter burſts in the furnace, the loſs of matter and time amounts to above two hundred and fifty pounds.

The glaſs, when taken out of the melting-furnace, needs nothing farther but to be ground, poliſhed, and foliated. But before theſe operations are performed, they cut and ſquare the edges of the plates; which is performed with a rough diamond, paſſed along the ſurface of the glaſs, upon a ſquare ruler, like that of the glaziers, and made to cut into the ſubſtance of the glaſs to a certain depth. This cut is then opened by gently knocking with a ſmall hammer on the under ſide of the glaſs, juſt under it; by which means the piece comes off, and the roughneſſes of the edges are removed by pincers. The plates are then laid by for *grinding*, *poliſhing*, and *ſilvering;* which ſee reſpectively. See alſo Looking-Glass.

Glass, *Annealing* or *Nealing of.* The operation of annealing of glaſs is performed in a peculiar furnace called the *leer*, which conſiſts of two parts, the *tower* and *leer.* The veſſels, as ſoon as made, are placed by the workmen on the floor of the former to anneal: which done, they are drawn ſlowly in a ſort of pan, called *fraches*, by an operator called the *ſarole-man*, all along the latter, the ſpace of five or ſix yards, to give them time to cool gradually; ſo that when they reach the mouth of it, they are found quite cold. Merret, Not. to Neri, p. 243, ſeq.

This annealing is generally performed in a hot chamber, built for the purpoſe, at the top of the glaſs-houſe, above the crucibles, and a little below the chimney. Without this precaution, the glaſs would be liable to fly and break, by the leaſt change of heat and cold, by the ſmalleſt ſcratch, and ſometimes without any apparent external cauſe. The hard glaſſes, and thoſe eſpecially that are made with alkali and earths, require much more annealing than the ſofter and more fuſible glaſſes, containing in their compoſition much litharge.

The particles of glaſs by annealing are ſuppoſed to loſe part of their ſpringineſs, and their brittleneſs at the ſame time. A gradual heating or cooling of glaſs, according to Dr. Hook, anneals or reduces its parts to a texture more looſe, and eaſy to be broke; but withal more flexible than before. And hence in ſome meaſure the phenomena of glaſs-drops.

Some of the phenomena depending on the fragility of unannealed glaſs deſerve the attention of the curious. Thoſe of the lachrymæ, or glaſs-drops, were among the firſt taken notice of; and it has alſo been obſerved, that hollow bells made of unannealed glaſs, with a ſmall hole in them, will fly to pieces by the heat of the hand only, if the hole by which the internal and external air communicate be ſtopped with a finger. Phil. Tranſ. N° 477. § 3. See Rupert's *Drops*.

But lately ſome veſſels made of ſuch unannealed glaſs have been diſcovered, which have the remarkable property of reſiſting very hard ſtrokes given from without, though they ſhiver to pieces by the ſhocks received from the fall of very light and minute bodies dropped into their cavities. Of this kind is the "Bologna phial." Theſe glaſſes may be made of any ſhape; all that needs be obſerved in making them, is to take care that their bottoms may be thicker than their ſides. The thicker the bottom is, the eaſier do the glaſſes break. One whoſe bottom is three fingers breadth in thickneſs, flies with as much eaſe at leaſt as the thinneſt glaſs. Some of theſe veſſels have been tried with ſtrokes of a mallet ſufficient to drive a nail into wood tolerably hard, and have reſiſted fracture. They alſo reſiſt the ſhock of ſeveral heavy bodies let fall into their cavities, from the height of two or three feet. For inſtance, muſket-balls, pieces of iron, or other metal; pyrites, jaſper, wood, bone, &c. but this is not ſurpriſing, as other glaſſes of the ſame ſize do the ſame. But the wonder is, that taking a ſhiver of flint of the ſize of a ſmall pea, and letting it fall into the glaſs only from the height of three inches, in about two ſeconds the glaſs flies, and ſometimes in the very moment of the ſhock; nay a bit of flint, no larger than a grain, dropt into ſeveral glaſſes ſucceſſively, though it did not immediately break them, yet they all flew, being ſet by, in leſs than three quarters of an hour. Phil. Tranſ. ibid. p. 509.

Some other bodies produce a like effect with flint: for inſtance, ſapphire, porcelain, diamonds, hard tempered ſteel, as alſo marbles, ſuch as boys play with; to which add pearls from the animal kingdom.

The experiment ſucceeded alſo when the glaſſes were held in the hand, reſted on a pillow, put in water, or filled with water. It is alſo remarkable, that the glaſſes broke upon their bottoms being ſlightly rubbed with the finger, though ſome of them did not fly till half an hour after the rubbing.

If the glaſſes be every where extremely thin, they do not break in theſe circumſtances.

Some have pretended to account for theſe phenomena, by ſaying, that the bodies dropped into theſe veſſels cauſe a concuſſion, that is ſtronger than the coheſion of the parts of the glaſs, and that conſequently a rupture of the ſame muſt enſue. But why does not a ball of gold, ſilver, iron, copper, or ſeveral other bodies, even a thouſand times heavier than a ſhiver of flint, equally cauſe this concuſſion, and break the glaſſes?

Mr. Euler has endeavoured to account for theſe appearances from his Principles of Percuſſion. He thinks this experiment entirely overthrows the opinion of thoſe who meaſure the force of percuſſion by the *vis viva;* and he thinks the principles he has eſtabliſhed give a clear ſolution of this phenomenon. According to theſe principles, the extreme hardneſs of the flint, and alſo its angular figure, which makes the ſpace of contact with the glaſs veſſel extremely ſmall, ought to cauſe an impreſſion on the glaſs vaſtly greater than lead or any other metal; and this may account for the flint's breaking the veſſel, though the bullet, even falling from a conſiderable height, does no damage. Mem. Acad. Berlin, 1745, p. 47.

Hollow cups, made of the green bottle-glaſs, ſome of them three inches thick at bottom, were inſtantly broken, by a ſhiver of flint weighing about two grains, though they had reſiſted the ſhock of a muſket ball from the height of three feet. Phil. Tranſ. ibid. p. 515.

"The preciſe mechanical cauſe of this diſpoſition to crack in unannealed glaſs, is very difficult to explain," ſays Aikin (Dict.), "but generally ſpeaking, it is ſuppoſed to be the forcible contraction of the outer part by ſudden cooling, whilſt the inner portion is ſtill ſoft and half-fluid, ſo that the whole fixes with a permanent ſtrain or inequality of preſſure of one part upon the other; and as glaſs is extremely elaſtic, though brittle, any force which tears aſunder a portion, however ſmall, of the tenſe part, communicates a ſtrong and ſudden impulſe over the whole maſs." "This moſt ſingular phenomenon," (of the Rupert's drop) ſays the ſame ingenious chemiſt, in conſequence of his own experiments, "is obviouſly owing to ſome permanent and very ſtrong inequality of preſſure; for when they are heated ſo red, as to be ſoft and merely let to cool of themſelves, this property of burſting is entirely loſt, and, at the ſame time, the ſpecific gravity of the drop is increaſed. The peculiar brittleneſs of the Bologna phial is alſo removed by again heating and cooling ſlowly." The common window-glaſs, when badly annealed, is cut by the diamond with difficulty, and the cut often flies in a direction different from what was intended, or the glaſs entirely breaks.

Among other more common defects of glaſs, we may mention its liability to be acted upon by corroſive liquors, as is the caſe when too much ſaline flux has been uſed. As impenetrable as glaſs is to the common menſtruums, we find it eaten by the air in length of time, when expoſed in old windows; but the effects of its being kept in a ſubterraneous place are much more ſtrange. Borrichius tells us, that at the time when he was at Rome, there was dug up a whole houſe from under the kitchen garden of a citizen. The houſe had been buried there ten ages, and there were found in it ſeveral glaſs urns, or lacrymatories. The glaſs of theſe had no holes made in it, as our old glaſs in chamber-windows has, but ſtill retained its ſmooth ſurface and tranſparence; but it was ſplit into a vaſt number of thin laminæ, which were as pellucid and fine as Muſcovy glaſs; and in ſome places were tinged with all the beautiful colours that art could have given. We are not acquainted perfectly with the ancient way of working their glaſs; but it is not probable there could be any thing particular in the formation of the veſſel, to determine it to ſplit thus into flakes; but that glaſs of the ſame kind, in any form, would have done the ſame. Borrich. de Ortu Chemiæ.

There are other viſible imperfections in glaſs, materially injuring its ſoundneſs and beauty, and enumerated by Aikin (Dict. art. *Glaſs*) under the denominations of *ſtriæ, threads, tears,* and *knots.* The former are undulating waves in the glaſs, ariſing from the imperfect mixture of the materials, and their different ſpecific gravities. Accordingly, we may obſerve, that the moſt tranſparent glaſs is ſubject to bubbles and veins, the methods of preventing which are yet little known; and this is an inconvenience by which Mr. Dollond's excellent diſcovery is affected; for the flint-glaſs which he uſes is peculiarly ſubject to ſmall veins, that diſturb the rays in their paſſage, and render the viſion confuſed. This effect is owing to the denſity of theſe veins being greater than that of the reſt of the glaſs, as appears from their image received on white paper, when the glaſs is held between the paper and a candle, or other luminous object: for this image of a vein, thus received, is a line brighter than the reſt of the image of the glaſs, and this bright line is defined by a dark edge on each ſide. But the bright line evidently ſhews a convergency of rays, which can only be effected by the veins being denſer than the medium in which they are placed. The reaſon why flint glaſs is more ſubject to veins than other glaſs is, ſays the tranſlator of Macquer's Chemical Dictionary, becauſe it is compoſed of materials of more different denſities.

Mr. Macquer, with a view of improving the manufacture of this glaſs, propoſes to facilitate the union of the calx of lead and ſand, of which it is compoſed, by depriving the calx of lead, as much as poſſible, of its phlogiſton, which may be done by combining the vitriolic acid with minium, or red-lead, and expoſing this compoſition to the operation of fire, to diſengage it from the acid; and alſo by giving theſe two ſubſtances the greateſt poſſible degrees of fluidity and mobility, which may be done by mixing with the compoſition of them a conſiderable quantity of ſolvents. Hiſt. Acad. Scienc. for 1773.

Threads in glaſs, are thoſe ſtreaky filaments which ariſe from the vitrification of the clay; being generally green, and rendering the glaſs more liable to crack at theſe parts. But one of the worſt defects (ſays Aikin, *ubi ſupra*), is "*tears,* or drops of vitrified clay falling down from the furnace into the pots, and entangled with the glaſs. Articles made of glaſs with this defect, are always very brittle, and generally break of themſelves by ſlight changes of heat and cold." Small bubbles appear in glaſs not ſufficiently refined by a continuance of the melting heat; and theſe may be owing to a deficiency of flux, ſo that the glaſs is leſs fuſible, and the bubbles cannot eaſily be diſengaged. "Hence," ſays the author now cited, "the ſoft fuſible glaſſes with much lead are much leſs liable to this fault than the hard, green bottle-glaſs, which is made only of alkali and earth." The *knots* in glaſs "ariſe either from a portion of ſand that has eſcaped vitrification, and remains entangled in the glaſs, or from a remaining quantity of glaſs-gall; or from bits of the crucible which may be accidentally knocked off by the iron inſtruments uſed in the working."

GLASS *of Antimony.* See *Oxyds of* ANTIMONY and VITRUM *Antimonii ceratum.*

GLASS, *Axungia of.* See AXUNGIA, SANDIVER, and GLASS, *ſupra.*

GLASS *of Borax.* See BORAX.

GLASS, *Colouring of, to imitate gems.* See GEMS.

GLASS, *Gold-coloured.* This kind of glaſs may be made by taking ten pounds of either of the compoſitions for hard glaſs, omitting the ſalt-petre; and for every pound adding an ounce of calcined borax; or, if this quantity doth not render the glaſs ſufficiently fuſible, two ounces; ten ounces of red tartar, of the deepeſt colour, two ounces of manganeſe, and two drams of charcoal of ſallow, or any other ſoft kind. Precipitate of ſilver baked on glaſs will ſtain it yellow, and likewiſe give a yellow colour on being mixed with and melted with forty or fifty times their weight of vitreous compoſitions; the precipitate from aqua-fortis by fixed alkali ſeems to anſwer beſt. Yellow glaſſes may alſo be obtained with certain preparations of iron, particularly with Pruſſian blue. But Dr. Lewis obſerves, that the colour does not conſtantly ſucceed, nor approach to the high yellow of gold, with ſilver or with iron. The neareſt imitations of gold which he has been able to produce, have been effected with antimony and lead. Equal parts of the glaſs of antimony, of flint calcined and powdered, and of minium, formed a glaſs of a high yellow; and with two parts of glaſs of antimony, two of minium, and three of powdered flint, the colour approached ſtill more to that of gold. The laſt compoſition exhibited a multitude of ſmall ſparkles interſperſed through its whole ſubſtance, which gave it a beautiful appearance in the maſs, but were really imperfections, owing to air-bubbles.

Neri directs, for a gold-yellow colour, one part of red tartar, and the ſame quantity of manganeſe, to be mixed with a hundred parts of frit. But Kunckel obſerves, that theſe portions are faulty; that one part, or one and a quarter of manganeſe, is ſufficient for a hundred of frit; but that ſix parts of tartar are hardly enough, unleſs the tartar is of a dark red colour, almoſt blackiſh; and that he found it expedient to add to the tartar about a fourth of its weight of powdered charcoal. He adds, that the glaſs ſwells up very much in melting, and that it muſt be left unſtirred and worked as it ſtands in fuſion. Mr. Samuel More, in repeating and varying this proceſs, in order to render the colour more perfect, found that the manganeſe is entirely eſſential to the gold colour, and that the tartar is no otherwiſe of uſe, than in virtue of the coaly matter, to which it is in part reduced by the fire; the phlogiſton or inflammable part of the coal appearing in ſeveral experiments to be the direct tinging ſubſtance. Mr. Pott alſo, in his Neue Wichtige Phyſicaliſhch-Chymiſche Materien, &c. printed in 1762, obſerves, that common coals give a yellow colour to glaſs; that different coaly matters differ in their tinging power; that caput mortuum of ſoot and lamp-black anſwer better than common charcoal; and that the ſparkling coal which remains in the retort after the rectification of the thick empyreumatic animal oils, is one of the moſt active of theſe preparations. This preparation, he ſays, powdered, and then burnt again a little in a cloſe veſſel, is excellent for tinging glaſs, and gives yellow, brown, reddiſh, or blackiſh colour, according to its quantity: but the frit muſt not be very hard of fuſion; for, in this caſe, the ſtrong fire will deſtroy the colouring ſubſtance before the glaſs melts, and he has found the following compoſitions to be nearly the beſt; *viz.* ſand two parts, alkali three parts; or ſand two, alkali three, calcined borax one; or ſand two, alkali two, calcined borax one: and though ſalt-petre is hardly uſed at all, or very ſparingly, for yellow glaſſes, as it too much volatilizes the colouring ſubſtance; yet here for the moſt part a certain proportion of it, eaſily determined by trial, is very neceſſary; for without it, the concentrated colouring matter is apt to make the glaſs too dark, and even of an opaque pitchy blackneſs. It does not certainly appear that there is any material diverſity in the effects of different coals; the difference being probably owing to the different quantities of the inflammable matter which they contain; ſo that a little more ſhall be required of one kind than of another, for producing the ſame degree of colour in the glaſs. Nor does the ſoftneſs or fuſibility of the frit appear to be in any reſpect neceſſary.

Gold-coloured ſpangles may be diffuſed through the ſubſtance of glaſs, by mixing the yellow talcs with powdered glaſs, and bringing the mixture into fuſion. See Lewis's Com. Phil. Techn. p. 223. 626, &c.

Glass *for counterfeiting lapis lazuli.* See *Lapis* Lazuli.

Glass *reſembling opal.* See Opal and Gems.

Glass, *Ruby.* The way to give the true fine red of the ruby, with a fair tranſparence, to glaſs, is as follows. Calcine in earthen veſſels gold diſſolved in aqua regia, the menſtruum being evaporated by diſtillation, more aqua regia added, and the abſtraction repeated five or ſix times, till it becomes a red powder. This operation will require many days in a hot furnace; when the powder is of a proper colour, take it out; and when it is to be uſed, melt the fineſt cryſtal glaſs, and purify it, by often caſting it into water; and then add, by ſmall quantities, enough of this red powder to give it the true colour of a ruby, with an elegant and perfect tranſparence. Neri. See Gems.

The proceſs of tinging glaſs and enamels by preparations of gold, were firſt attempted about the beginning of the 17th century. Libavius, in one of his tracts, entitled Alchymia, printed in 1606, conjectures that the colour of the ruby proceeds from gold, and that gold diſſolved, and brought to redneſs, might be made to communicate a like colour to factitious gems and glaſs. On this principal Neri, in his "Art of Glaſs," dated 1611, gives the proceſs above recited. Glauber, in 1648, publiſhed a method of producing a red colour by gold, in a matter which is of the vitreous kind, though not perfect glaſs. For this purpoſe he ground powdered flint or ſand with four times its weight of fixed alkaline ſalt; this mixture melts in a moderately ſtrong fire, and when cold looks like glaſs, but expoſed to the air runs into a liquid ſtate. On adding this liquor to ſolution of gold in aqua regia, the gold and flint precipitate together in form of a yellow powder, which by calcination becomes purple; by mixing this powder with three or four times its weight of the alkaline ſolution of flint, drying the mixture, and melting it in a ſtrong fire for an hour, a maſs is obtained, of a tranſparent ruby colour, and of a vitreous appearance, which nevertheleſs is ſoluble in water, or by the moiſture of the air, on account of the redundance of the ſalt. The honourable Mr. Boyle, in a work publiſhed in 1680, mentions an experiment, in which a like colour was introduced into glaſs without fuſion; for, having kept a mixture of gold and mercury in digeſtion for ſome months, the fire was at laſt immoderately increaſed, ſo that the glaſs burſt with a violent exploſion; and the lower part of the glaſs was found tinged throughout of a tranſparent red colour, hardly to be equalled by that of rubies. See Poroſity of Bodies, in Shaw's Abridgment of Boyle's Works, vol. i. p. 459; and Appendix to the Sceptical Chemiſt.

About the ſame time Caſſius is ſaid to have diſcovered the precipitation of gold by tin, and that glaſs might be tinged of a ruby colour by melting it with this precipitate: though he does not appear, ſays Dr. Lewis, from his treatiſe De Auro, to have been the diſcoverer of either. He deſcribes the preparation of the precipitate and its uſe, but gives no account of the manner of employing it; only that he ſays, one dram of gold, duly prepared, will tinge ten pounds of glaſs. See Gold *precipitate with tin.*

This proceſs was ſoon after brought to perfection by Kunckel; who ſays, that one part of the precipitate is ſufficient to give a ruby colour to 1280 parts of glaſs, and a ſenſible redneſs to upwards of 1900 parts; but that the ſucceſs is by no means conſtant. Kunckel alſo mentions a purple-gold powder, reſembling that of Neri, which he obtained by inſpiſſating ſolution of gold to dryneſs, abſtracting from it freſh aqua regia three or four times, till the matter appears like oil; then precipitating with ſtrong alkaline ley, and waſhing the precipitate with water. By diſſolving this powder in ſpirit of ſalt, and precipitating it again, it becomes, he ſays, extremely fair; and in this ſtate he directs it to be mixed with a due proportion of Venice glaſs.

Orſchal in his treatiſe entitled Sol ſine Veſte, gives the following proceſs for producing a very fine ruby. He directs the purple precipitate, made by tin, to be ground with ſix times its quantity of Venice-glaſs into a very fine powder, and this compound to be very carefully mingled with the frit or vitreous compoſition to be tinged. His frit conſiſts of equal parts of borax, nitre, and fixed alkaline ſalt, and four times as much calcined flint as of each of the ſalts; but he gives no directions as to the proportion of the gold precipitate, or mode of fuſion. Hellot deſcribes a preparation, which mixed with Venice glaſs, was found to give a beautiful purple enamel. This preparation conſiſts of equal parts of ſolution of gold, and of ſolution of zinc in aqua regia, mixed together with the addition of a volatile ſalt prepared from ſal ammoniac, in quicklime, in ſufficient quantity to precipitate the two metals. The precipitate is then gradually heated, till it acquires a violet colour. However, though a purple or red colour, approaching to that of ruby, may, by the methods above recited, be baked on glaſs or enamels, and introduced into the maſs by fuſion, the way of equally diffuſing ſuch a colour through a quantity of fluid glaſs is ſtill, ſays Dr. Lewis, a ſecret. The following proceſs for making the ruby glaſs was communicated to Dr. Lewis by an artiſt, who aſcribed it to Kunckel. The gold is directed to be diſſolved in a mixture of one part of ſpirit of ſalt, and three of aqua-fortis, and the tin in a mixture of one part of the former of theſe acids with two of the latter. The ſolution of gold being properly diluted with water (ſee Gold *precipitate,* &c.) the ſolution of tin is added, and the mixture left to ſtand till the purple matter has ſettled to the bottom. The colourleſs liquor is then poured off, and the purple ſediment, while moiſt and not very thick, is thoroughly mixed with powdered flint or ſand. This mixture is well ground with powdered nitre, tartar, borax, and arſenic, and the compound melted with a ſuitable fire. The proportions of the ingredients are 2560 parts of ſand, 384 of nitre, 240 of tartar, 240 of borax, 28 of arſenic, 5 of tin, and 5 of gold. Lewis's Com. Phil. Techn. p. 171. 621, &c.

Glass, *white-opaque,* and *ſemi-tranſparent,* may be made of ten pounds of either of the compoſitions for hard glaſs, and one pound of well calcined horn, ivory, or bone; or an opaque whiteneſs may be given to glaſs, by adding one pound of very white arſenic to ten pounds of flint glaſs. Let them be well powdered and mixed, by grinding them together; and then fuſed with a moderate heat, till they are thoroughly incorporated. A glaſs of this kind is made in large quantities at a manufacture near London, and uſed not only for different kinds of veſſels, but as a white ground for enamel in dial-plates and ſnuff-boxes, which do not require finiſhing with much fire, becauſe it becomes very white and fuſible with a moderate heat.

Glass, *Yellow*. See *Golden-coloured* Glass.

Glass-*balls*, which are circular or otherwiſe ſhaped hollow veſſels of glaſs, may be coloured within, ſo as to imitate the ſemi-pellucid gems. The method of doing it is this: make a ſtrong ſolution of ichthyocolla, or iſinglaſs, in common water, by boiling; pour a quantity of this while warm into the hollow of a white glaſs veſſel; ſhake it thoroughly about, that all the ſides may be wetted, and then pour off the reſt of the moiſture. Immediately after this, throw in red lead, ſhake it and turn it about, throw it into many places with a tube, and the moiſture will make it ſtick and run in waves and pretty figures. Then throw in ſome of the painter's blue ſmalt, and make it run in waves in the ball as the red-lead; then do the ſame with verdigris, next with orpiment, then with red lake, all well ground; always caſting in the colours in different places, and turning the glaſs, that the moiſture within may run them into the waves. Then take fine plaſter of Paris, and put a quantity of it into the ball; ſhake it alſo nimbly about; this will every where ſtick firmly to the glaſs, and give it a ſtrong inner coat, keeping all the colours on very fairly and ſtrongly.

Theſe are ſet on frames of carved wood, and much eſteemed as ornaments in many places. Neri.

Glass-*drops*. See Rupert's *drops*.

Glass, *Foliating of*. See Foliating and Looking-glass.

Glass-*gall*, or *ſandiver*, is the ſcum of the glaſs pots, which ariſes during the vitrification of the frit. See Glass, *ſupra*.

Glass, *gilding of*. See Gilding *of enamel* and *glaſs*.

Glass, *grinding of*. See Grinding.

Glass-*houſe Furnace*, is the place in which the ingredients or materials of glaſs are fuſed and vitrified. There are three kinds of furnaces uſed in the glaſs-works. The *firſt*, called the "calcar," ſerves for preparing or calcining the frit. It is made like an oven, 10 feet long, ſeven broad, and two deep. The fuel, which is ſea-coal, is put in a trench, on one ſide of the furnace; and the flame reverberates from the roof back upon the frit. The coals burn in an iron grate, and the aſhes fall thence into holes underneath.

The *ſecond* is the "working furnace," in which the ingredients are melted, and the glaſs is made. Its figure is round, reſembling a dome, three yards in diameter, and two high, ſupported on arches, beneath which is a large ſpace for a briſk and copious draught of cold air from without: round the inſide there are arranged eight or more pots, and on theſe piling-pots, every where cloſed except at one ſide opening, which communicates with a ſmall receſs formed by the alternate projections of the maſonry and flues of the oven or kiln, in which receſs the workmen ſtand. The furnace has two partitions; the lower, ſeparating the pots from the fire-place, has a circular hole in the centre covered with a grate, through which the flame paſſes from the fire-place into the furnace, being afterwards reverberated from the arched ſides and roof to the melting-pots, and paſſing out with the ſmoke through the top of the dome, which is lengthened into a chimney for the ſpace of a few feet. The ſecond partition divides this from the leer or annealing furnace; through the boccas, or working holes, when there are more than one, the metal is taken out of the pots, and the pots put into the furnace: theſe boccas are ſtopped with moveable covers, made of lute and brick to ſcreen the eyes of the workmen from the fire; and ſometimes on each ſide of the bocca is a boccarella, out of which coloured glaſs, or finer metal is taken from the piling-pot. To the furnace likewiſe occaſionally belong ovens, or holes near the leer, for the calcining of tartar, iron, &c.

The leer, which ſerves to anneal and cool the veſſels, and which Agricola makes a particular furnace, conſiſts of a tower, beſides the leer; the tower lies directly over the melting furnace, with a partition betwixt them about a foot thick, having an aperture called *occhio*, or *lumella*, through which the flame or heat aſcends out of the furnace into the tower: on the floor or bottom of this tower, the veſſels, faſhioned by the artiſt, are ſet to be annealed; and as the flame has here a leſs degree of intenſity than that which is ſuſtained by the pots, the veſſels, after they have been formed, cool ſlowly and gradually. This has uſually two boccas, or mouths, by which the glaſſes are put in with a fork, and placed on the floor. The *leer* is an avenue, five or ſix yards long, continued to the tower; through this the glaſſes, when annealed, are drawn in iron pans, called *fraches*, by which they come to cool by degrees, being quite cold by the time they reach the mouth of the leer, which enters the "ſaroſel," or room where the glaſſes are to be ſet.

The *third* is the "green-glaſs furnace," which is a kind of compound of all the former. It is made ſquare, (the two former being circular,) having an arch at each angle for annealing and cooling the glaſſes. The metal is wrought on two oppoſite ſides, and on the other two they have their calcars, into which are made linnet-holes for the fire to come from the furnace, to bake the frit, and alſo to diſcharge the ſmoke. Fires are made in the arches to anneal the veſſels, ſo that the whole proceſs is done in one furnace. The materials with which the inſides of theſe furnaces are conſtructed are not ordinary brick (which would ſoon melt down into glaſs, as would alſo all the ſofter ſtones,) but hard and ſandy kinds, called by Imperatus "pyramachia." But when bricks are uſed, they ſhould be formed of an earth which poſſeſſes in the higheſt degree the qualities of denſity and infuſibility, for reſiſting the fire, which continues to act upon them, without ceſſation for a long time; as the fires in a glaſs-houſe are ſeldom ſuffered to go out, from the time when the furnace is firſt employed till it needs repair, and the interval may be two or three years; the walls of the furnace, for this reaſon, as well as the pots, are conſtructed chiefly of clay, mixed with ſand, and other materials of a refractory kind, in due proportion. See Glass-*pots*.

Glass *of lead*, a glaſs made with the addition of a large quantity of lead, of great uſe in the art of making counterfeit gems. The method of making it is this: put a large quantity of lead into a potter's kiln, and keep it in a ſtate of fuſion with a moderate fire, till it is calcined to a grey looſe powder: then ſpread it in the kiln, and give it a greater heat, continually ſtirring it to keep it from running into lumps; continue this ſeveral hours, till the powder become of a fair yellow; then take it out and ſift it fine: this is called calcined lead.

Take of this calcined lead fifteen pounds, and cryſtalline, or other frit, twelve pounds; mix theſe as well as poſſible together; put them into a pot, and ſet them in the furnace for ten hours; then caſt the whole, which will be now perfectly melted, into water; ſeparate the looſe lead from it, and return the metal into the pot; and after ſtanding in fuſion twelve hours more, it will be fit to work. It is very tender and brittle, and muſt be worked with great care, taking it ſlowly out of the pot, and continually wetting the marble it is wrought upon. Neri.

It is well known, that ceruſs, or white lead, minium, litharge, and all the other preparations and calces of lead, are eaſily fuſed by a moderate fire, and formed into a tranſparent glaſs of a deep yellow colour. But this glaſs is ſo penetrating and powerful a flux, that it is neceſſary to give it a greater conſiſtence, in order to render it fit for uſe. With this view, two parts of calx of lead, *e. g.* minium, and other parts of ſand, or powdered flints, may be put into a crucible of refractory clay, and baked into a compact body. Let this crucible, well cloſed with a luted lid, be placed in a melting furnace, and gradually heated, for an hour, or an hour and a half; and afterwards let the heat be increaſed, ſo as to obtain a complete fuſion, and continued in that ſtate for the ſame time: let this crucible remain to cool in the furnace, and when it is broken, a very tranſparent yellow-coloured glaſs will be found in it. Some add nitre and common ſalt to the above mixture, becauſe theſe ſalts promote the fuſion and the more equal diſtribution of the ſand. This glaſs of lead has a conſiderable ſpecific gravity, and its loweſt part is always the heavieſt. It is an important flux in the aſſays of ores to facilitate their ſcorifications.

Glaſs of lead is capable of all the colours of the gems in very great perfection. The methods of giving them are theſe: for green, take polverine frit twenty pounds, lead calcined ſixteen pounds; ſift both the powders very fine; then melt them into a glaſs, ſeparating the unmixed lead, by plunging the maſs in water; after this return it into the pot, and add braſs thrice calcined ſix ounces, and one pennyweight of crocus martis made with vinegar; put this in at ſix different times, always carefully mixing it together; let it finally ſettle an hour, then mix it together, and take a proof of it; when the colour is right, let it ſtand eight hours, and then work it. If inſtead of the calcined braſs the ſame quantity of the caput mortuum of the vitriolum veneris be uſed, the green is yet much finer.

For topaze-colour take cryſtal frit fifteen pounds, calcined lead twelve pounds; mix them well together, by ſifting the powders through a fine ſieve; then ſet them in a furnace not too hot, and ſeparate the ſuperfluous unmixed lead, by caſting the whole into water: repeat this twice; then add half gold yellow glaſs, and let them incorporate and purify, and they will be of the true and exact colour of the original topazes.

For ſea-green, take cryſtal frit ſixteen pounds, calcined lead ten pounds; mix and ſift them together, and ſet them in a pot in a furnace: in twelve hours the whole will be melted; then caſt it into water and ſeparate it from the looſe lead; put them into the furnace again for eight hours; then ſeparate the looſe lead by waſhing a ſecond time, and return it to the pot for eight hours more. Neri. See GEMS.

GLASS, *Painting in.* The primitive manner of painting in glaſs was very ſimple, and of conſequence very eaſy: it conſiſted in the mere arrangement of pieces of glaſs of different colours, in ſome ſort of ſymmetry; and conſtituted a kind of what we call *Moſaic work.*

Afterwards, when they came to attempt more regular deſigns, and even to repreſent figures raiſed with all their ſhades, their whole addreſs went no farther than to the drawing the contours of the figures in black, with water colours, and hatching the draperies, after the ſame manner, on glaſſes of the colour of the object intended to be painted. For the carnations, they choſe glaſs of a bright red; upon which they deſigned the principal lineaments of the face, &c. with black.

At laſt the taſte for this ſort of painting being conſiderably improved, and the art being found applicable to the adorning of churches, baſilicas, &c. they found means of incorporating the colours with the glaſs itſelf, by expoſing them to a proper degree of fire, after the colours had been laid on.

A French painter at Marſeilles is ſaid to have given the firſt notion hereof, upon going to Rome, under the pontificate of Julius II. But Albert Durer, and Lucas of Leyden, were the firſt that carried it to any height.

The colours uſed in painting on glaſs are very different from thoſe uſed either in painting in oil, or water.

The *black* is made of two-thirds of flakes, or ſcales of iron, beaten up, and mixed with another third of rocaille, or little glaſs beads. *White,* with ſand, or little white pebbles, calcined, pounded in a mortar, and afterwards ground on marble; with one fourth-part of ſalt-petre, added thereto, and the mixture calcined and pulverized over again: to which, when they are ready to uſe it, is added a little gypſum, or plaſter of Paris well ground, &c. For *yellow,* they uſe leaf-ſilver ground, mixed up in a crucible, with ſulphur or ſalt-petre; then well beaten and ground on a porphyry ſtone; and, at length, ground over again with nine times as much red ochre. *Red* is made of litharge of ſilver, and ſcales of iron, gum Arabic, ferretta, glaſs-beads, and blood-ſtone, nearly in equal quantities. This is one of the moſt difficult colours, and the preparation only to be learned by experience. *Green* is made of æs uſtum, one ounce; as much black lead, and four ounces of white ſand, incorporated by the fire. After calcination, they add a fourth part of ſalt-petre: after a ſecond calcination, a ſixth part more: after which they make a third coction before it is uſed. *Azure, purple,* and *violets,* are prepared like green, only leaving out the æs uſtum, and in the lieu thereof uſing ſulphur for azure; perigueux for purple; and both theſe drugs for violet. *Carnations* are made of ferretta and rocaille. And laſtly, colours for the hair, trunks of trees, &c. are made of ferretta, rocaille, &c.

This account of colours we have from M. Felibien's excellent work Des Principes d'Architecture, &c. though it muſt be owned, that all the painters on glaſs do not uſe them; there being few artiſts of that kind but have invented their own particular ones, whereof they uſually make great ſecrets. But this is certain, that theſe above deſcribed are ſufficient for the beſt paintings of all ſorts; provided the perſon has but the ſkill to manage them.

In the windows of divers ancient churches, chapels, colleges, &c. we meet with the moſt beautiful and lively colours imaginable; ſuch as far exceed any uſed among us: but it is not that the ſecret of making thoſe colours is loſt; but that the moderns would not go to the expence of them; nor take all the neceſſary pains; becauſe this ſort of painting is not now ſo much eſteemed as formerly.

Mr. Walpole, in his Anecdotes of painting in England, has traced the hiſtory of this art from the reformation, when miſguided zeal deſtroyed moſt of the monuments of it in our churches, through a ſeries of profeſſors to the preſent time. Among the later proficients in this art were Iſaac Oliver, who painted the windows at Chriſtchurch, Oxford, in 1700; William Price, who in the ſame year painted the windows in Merton chapel; William Price, the ſon, to whoſe art we owe the windows at Queen's, New-college, and Maudlin, of whom Mr. Walpole ſays, that his colours are fine, his drawing good, and his taſte in ornaments and Moſaic far ſuperior to any of his predeceſſors, and equal to the antique. In 1761, Mr. Paterſon, an auctioneer late of Eſſex-houſe in London, exhibited the two firſt auctions of painted glaſs imported from Flanders; and undertook alſo to eſtabliſh a manufacture of painted glaſs: ſeveral of the pieces of this ingenious artiſt exhibited colours vying in perfection with the old paintings.

Thoſe beautiful works, among the painters in glaſs, which were made in the glaſs-houſe, were of two kinds: in ſome, the colour was diffuſed through the whole body of glaſs; in others, which were the more common, the colour was only on one ſide, ſcarce penetrating within the ſubſtance above one-third of a line; though this was, more or leſs, according to the nature of the colour; the yellow being always found to enter the deepeſt.

Theſe laſt, though not ſo ſtrong and beautiful as the former, were of more advantage to the workmen; becauſe, on the ſame glaſs, though already coloured, they could ſhew other kinds of colours, where there was occaſion to embroider draperies, enrich them with foliages, or repreſent other ornaments of gold, ſilver, &c.

In order to this, they made uſe of emery; grinding, or wearing down the ſurface of the glaſs, till ſuch time as they were got through the colour, to the clear glaſs: this done, they applied the proper colours on the other ſide of the glaſs. By this means the new colours were prevented from running and mixing among the former, when the glaſſes came to be expoſed to the fire, as will hereafter be ſhewn.

When the intended ornaments were to appear white, or ſilvered, they contented themſelves to bare the gloſs of its colour with emery, without applying any new colour at all; and it was in this manner that they wrought the lights and heightenings on all kinds of colours.

The painting with vitreous colours on glaſs depends entirely on the ſame principles as painting in enamel; and the manner of executing it is likewiſe the ſame; except that in this the tranſparency of the colours being indiſpenſibly requiſite, no ſubſtances can be uſed to form them but ſuch as vitrify perfectly: and, therefore, the great object is to find a ſet of colours, which are compoſed of ſuch ſubſtances, as, by the admixture of other bodies, may promote their vitrification and fuſion; are capable of being converted into glaſs; and melting, in that ſtate, with leſs heat than is ſufficient to melt ſuch other kinds of glaſs as may be choſen for the ground or body to be painted; to temper theſe colours, ſo as to make them proper to be worked with a pencil; and to burn or reduce them by heat, to a due ſtate of fuſion, without injuring or melting the glaſs which conſtitutes the body painted. The firſt thing to be done, in order to paint on glaſs, in the modern way, is to deſign, and even colour, the whole ſubject on paper. Then they make choice of pieces of glaſs proper to receive the ſeveral parts, and proceed to divide or diſtribute the deſign itſelf, or the paper it is drawn on, into pieces ſuitable to thoſe of glaſs; having always a view that the glaſſes may join in the contours of the figures, and the folds of the draperies; that the carnations and other finer parts may not be damaged by the lead wherewith the pieces are to be joined together.

The diſtribution being made, they mark all the glaſſes, as well as papers, with letters, or numbers, that they may be known again; which done, applying each part of the deſign on the glaſs intended for it, they copy or transfer the deſign upon this glaſs, with the black colour, diluted in gum-water; by tracing and following all the lines and ſtrokes, as they appear through the glaſs, with the point of a pencil.

When theſe firſt ſtrokes are well dried, which happens in about two days, the work being only in black and white, they give it a ſlight waſh over, with urine, gum Arabic, and a little black; and this ſeveral times repeated, according as the ſhades are deſired to be heightened; with this precaution, never to apply a new waſh, till the former is ſufficiently dried. This done, the lights and riſings are given, by rubbing off the colour in the reſpective places, with a wooden point or the handle of the pencil.

As to the other colours above-mentioned, they are uſed with gum-water, much as in painting in miniature; taking care to apply them lightly, for fear of effacing the outlines of the deſign; or even, for the greater ſecurity, to apply them on the other ſide, eſpecially yellow, which is very pernicious to other colours, by blending therewith.

And here too, as in pieces of black and white, particular regard muſt be always had, not to lay colour on colour, or lay on a new lay, till ſuch time as the former are well dried. It may be added, that the yellow is the only colour that penetrates through the glaſs, and incorporates therewith by the fire; the reſt, and particularly the blue, which is very difficult to uſe, remaining on the ſurface, or at leaſt entering very little. When the painting of all the pieces is finiſhed, they are carried to the furnace or oven, to anneal or bake the colonrs. The furnace here uſed is ſmall, built of brick, from eighteen to thirty inches ſquare: at ſix inches from the bottom is an aperture, to put in the fuel, and maintain the fire. Over this aperture is a grate, made of three ſquare bars of iron, which traverſe the furnace, and divide it into two parts. Two inches above this partition is another little aperture, through which they take out pieces, to examine how the coction goes forward.

On the grate is placed a ſquare earthen pan, ſix or ſeven inches deep; and five or ſix inches leſs, every way, than the perimeter of the furnace. On one ſide hereof is a little aperture, through which to make the trials, placed directly oppoſite to that of the furnaces deſtined for the ſame end.

In this pan are the pieces of glaſs to be placed in the following manner; firſt, the bottom of the pan is covered with three ſtrata, or layers of quicklime, pulverized; thoſe ſtrata being ſeparated by two others, of old broken glaſs: the deſign whereof is to ſecure the painted glaſs from the too intenſe heat of the fire. This done, the glaſſes are laid horizontally on the laſt, or uppermoſt, layer of lime.

The firſt row of glaſs, they cover over with a layer of the ſame powder an inch deep; and over this they lay another range of glaſſes: and thus alternately, till the pan is quite full; taking care that the whole heap always ends with a layer of the lime-powder.

The pan thus prepared, they cover up the furnace with tiles, on a ſquare table of earthen-ware, cloſely luted all round; only having five little apertures, one at each corner, and another in the middle, to ſerve as chimnies.

Things thus diſpoſed, there remains nothing but to give the fire to the work. The fire for the two firſt hours muſt be very moderate; and muſt be increaſed in proportion as the coction advances, for the ſpace of ten or twelve hours; in which time it is uſually completed. At laſt, the

the fire, which at firſt was only of charcoal, is to be of dry wood: ſo that the flame covers the whole pan, and even iſſues out at the chimnies.

During the laſt hours, they make aſſays from time to time, by taking out pieces laid for that purpoſe, through the little aperture of the furnace, and pan, to ſee whether the yellow be perfect, and the other colours in good order. When the annealing is thought ſufficient, they proceed with great haſte to extinguiſh the fire, which otherwiſe would ſoon burn the colours, and break the glaſſes. See PAINTING.

GLASS, *painting on, by means of prints.* See BACK-*painting.*

GLASS, *poliſhing of.* See POLISHING and GRINDING.

GLASS-*porcelain*, the name given by many to a modern invention of imitating the china-ware with glaſs. The method given by M. Reaumur, who was the firſt that carried the attempt to any degree of perfection, is delivered by that gentleman in the Memoirs of the Academy of Sciences of Paris, to this effect. This change of glaſs was firſt taken notice of by Neumann, who, in diſtilling milk in a glaſs retort, obſerved, that the bottom of the veſſel acquired the appearance of porcelain, which he attributes to the fine white earthy matter of the milk forced into the glaſs by heat. Neum. Chem. Works by Dr. Lewis, p. 571.

The mixing of glaſs reduced to powder, with other leſs eaſily vitrifiable ſubſtances for forming a paſte, to be afterwards made into a ſort of a porcelain, has been a contrivance long practiſed, but it is very troubleſome, and the reſult ſubject to many faults; but this new ware is made of glaſs alone, and that with much leſs trouble, and without the reducing it to powder. By this art, veſſels of glaſs are changed into veſſels of a ſort of porcelain, without altering their form, and the meaneſt glaſs made only of ſand, lime, and ſaline aſhes, ſerves as well as the beſt for that purpoſe: our common coarſe green quart-bottles, or the great bell glaſſes with which gardeners cover their melons, &c. being by this means changeable into a beautiful white ſort of porcelain ware; and this is to be done in ſo eaſy a manner, and with ſo ſmall expence, that it requires no more trouble or charge, than that of baking a common veſſel of our coarſe earthen-ware; and for this reaſon the veſſels of this ſort of ware may be afforded extremely cheap.

It is very certain, that all porcelain ware is a ſubſtance in the ſtate of ſemi-vitrification: and in order to bring glaſs, which is a wholly vitrified ſubſtance, into the condition of porcelain, there requires no more than to reduce it to a leſs perfectly vitrified ſtate.

The queſtion which would naturally be ſtarted on this occaſion, is, whether it be poſſible to reduce glaſs to a leſs vitrified ſtate, it having already undergone what is eſteemed the laſt change by fire. But when we conſider, that the maſs of antimony, the vitrifications of many of the metals, as the glaſs of lead, and the counterfeit gems coloured by the metals, are more or leſs eaſily reduced again by chemiſtry to metals, &c. the reducing of ſand, flints, &c. after they are vitrified, at leaſt a little way back toward their native or priſtine ſtate, may appear not wholly impracticable, and the attempts which M. Reaumur made on this occaſion, were what gave him the firſt hints of the glaſs-porcelain; called from his name "Reaumur's porcelain."

The method of making it is this. The glaſs veſſels to be converted into procelain are to be put into a large earthen veſſel, ſuch as the common fine earthen diſhes are baked in, or into ſufficiently large crucibles; the veſſels are to be filled with a mixture of fine white ſand, and of fine gypſum or plaſter-ſtone burnt into what is called plaſter of Paris, and all the interſtices are to be filled up with the ſame powder; ſo that the glaſs veſſels may no where touch either one another, or the ſides of the veſſel they are baked in. The veſſel is to be then covered down and luted, and the fire does the reſt of the work; for this is only to be put into a common potter's furnace, and when it has ſtood there the uſual time for the baking of the other veſſels, it is to be taken out, and the whole contents will be found no longer glaſs, but converted into a white opaque ſubſtance, which is a very elegant porcelain, and has almoſt the properties of that of China. Memoirs Acad. Sciences Par. 1739.

The powder which has ſerved once, will do again as well as freſh, and that for a great many times: nay, it ſeems, ever ſo often. The cauſe of this transformation, ſays Macquer, is probably that the vitriolic acid of the gypſum quits its baſis of calcareous earth, and unites with the alkaline ſalt and ſaline earth of the glaſs, with which it forms a kind of ſalt or ſelenites, differing from the calcareous ſelenites, by the interpoſition of which matter the glaſs acquires the qualities of porcelain. Dr. Lewis, from a variety of experiments on the nature and qualities, and method of producing this porcelain, has deduced the following concluſions: 1. Green glaſs cemented with white ſand received no change in a heat below ignition: in a low red-heat, the change proceeded very ſlowly; but in a ſtrong red-heat, approaching to whiteneſs, the thickeſt pieces of glaſs bottles were thoroughly changed in three hours. 2. The glaſs ſuſtained the following progreſſion of changes. Its ſurface firſt became blue; its tranſparence was diminiſhed, and when held between the light and the eye, it appeared of a yellowiſh hue: afterwards it was changed a little way on both ſides into a white ſubſtance, externally ſtill blueiſh: and as this change advanced ſtill farther and farther within the glaſs, the colour of the vitreous part in the middle approached nearer to yellow: the white coat was of a fine fibrous texture, and the fibres were diſpoſed nearly parallel to one another, and tranſverſe to the thickneſs of the piece: by degrees the glaſs became throughout white and fibrous, the external blueiſhneſs at the ſame time going off, and being ſucceeded by a dull whitiſh or dun colour: by a ſtill longer continuance in the fire, the fibres were changed gradually from the external to the internal part, and converted into grains; and the texture then was not unlike that of common porcelain. The grains, at firſt fine and ſomewhat gloſſy, appeared afterwards larger and duller, and at length the ſubſtance of the glaſs became porous and friable, like a maſs of white ſand ſlightly cohering. 3. Concerning the qualities of the converted glaſs Dr. Lewis obſerves, that the whiteneſs of the internal part was not inferior to that of porcelain, but that its ſurface was the leaſt beautiful; that the thick pieces were quite opaque, and that ſeveral thin pieces were ſemi-tranſparent: that while it remained in a fibrous ſtate, its hardneſs became greater than that of glaſs, or of the common kinds of porcelain; it was capable of ſuſtaining ſudden changes of heat and cold better than any porcelain; and in a moderate white heat, it was fuſible into a ſubſtance not fibrous, but vitreous and ſmooth, like white enamel: that when its texture had been coarſely granulated, it was now much ſofter and unfuſible; and, laſtly, that when ſome coarſely granulated unfuſible pieces which, with the continuance of a moderate heat, would have become porous and friable, were ſuddenly expoſed to an intenſe fire, they were rendered remarkably more compact than before; the ſolidity of ſome of them being ſuperior to that of any other ware. 4. No differences appeared in the internal colour, hardneſs, texture, or the regular ſucceſſion of changes, from the uſe of different cementing ſubſtances;

though in external appearances the differences were conſiderable. All the pieces which had been ſurrounded with charcoal or with ſoot were externally of a deep black colour, which did not diſappear by expoſure to a ſtrong fire during an hour, with free acceſs of air. Coloured clays and ſands communicated different ſhades of a brown colour; and white earths gave whitiſh, greyiſh, or browniſh tinges. White ſand, calcined flints, and gypſum, gave in general the greateſt whiteneſs, and tobacco-pipe clay the greateſt gloſſineſs and brightneſs. Glaſſes compoſed of earths without alkaline ſalt, glaſs of lead, flint-glaſs, crown-glaſs, looking-glaſs plates, a glaſs prepared with calcined flints and a fixed alkaline ſalt, and even green glaſs which had been fuſed together with a ninth part of alkaline ſalt, ſuffered none of the above alterations by cementation. Green bottle-glaſs and common window-glaſs were moſt ſuſceptible of theſe alterations. 6. The changes produced by cementation could not proceed from any abſorption of matter from the cementing ſubſtance; becauſe no increaſe of weight was given, and becauſe the ſame changes were produced upon a piece of glaſs merely by heat, without any cementing ſubſtance. See Com. Phil. Techn. p. 230—255.

Mr. Gregory Watt, in his valuable paper on baſalt (Phil. Tranſ. for 1804, cited by Aikin,) alleges this porcellanous change of glaſs as an illuſtration of his important principle, *viz.* "that bodies whoſe fibres have a natural tendency to a cryſtalline arrangement, or a polarity, when vitrified by a ſufficient heat and cooled haſtily in the vitreous ſtate, are able ſubſequently to return to their natural cryſtalline arrangement of fibre, when expoſed to a heat merely ſufficient to ſoften the texture, though not enough for fuſion. This, in the inſtance of baſalt, he ſhews by the ſingular cryſtallizations formed in the cells of fuſed baſalt, long after it had loſt the liquidity of fuſion. The circumſtance of no material change occurring in the weight of glaſs by this converſion into the fibrous ſtate, ſhews inconteſtably that it cannot be owing either to any thing gained during the proceſs, nor to any material loſs of the alkali; and this is alſo rendered manifeſt by its return to the vitreous ſtate and vitreous qualities when again melted. This too may again be porcellanized in the ſame way, and again be melted into glaſs, and ſo on alternately." See Porcelain.

Glass-*pots*, the veſſels in the glaſs manufacture uſed for melting the glaſs. Thoſe for the white glaſs works are made of a tobacco-pipe clay, brought from the Iſle of Wight, which is firſt well waſhed, then calcined, and afterwards ground to a fine powder in a mill; which being mixt with water, is then trod with the bare feet till it is of a proper conſiſtence, to mould with the hands into the proper ſhape of the veſſels. When theſe are thus made, they are afterwards annealed over the furnace. Thoſe for the green-glaſs work are made of the nonſuch, and another ſort of clay from Staffordſhire; they make theſe ſo large as to hold three or four hundred weight of metal. And beſides theſe, they have a ſmall ſort called piling pots, which they ſet upon the larger, and which contain a finer and more nice metal fit for the niceſt works. Neri.

The clay that is uſed for this purpoſe ſhould be of the pureſt and moſt refractory kind, and well cleanſed from all ſandy, ferruginous, and pyritous matters; and to this it will be proper to add ground crucibles, white ſand, calcined flints duly levigated, or a certain proportion of the ſame clay baked, and pounded not very finely. The quantity of baked clay that ought to be mixed with the crude clay, to prevent the pots from cracking when dried, or expoſed to a great heat, is not abſolutely determined, but depends on the quality of the crude clay, which is more or leſs fat. M. D'Antic, in a memoir on this ſubject, propoſes the following method of aſcertaining it: the burnt and crude clay, being mixed in different proportions, ſhould be formed into cakes, one inch thick, and four inches long and wide. Let theſe cakes be ſlowly dried, and expoſed to a violent heat, till they become as hard and as much contracted as poſſible, and in this ſtate be examined; and the cake, he ſays, which has ſuffered a diminution of its bulk equal only to an eighteenth part, is made of the beſt proportions. He obſerves, in general, that moſt clays require that the proportion of the burnt ſhould be to the freſh as four to five.

It is of great importance that the material of which the pots are made ſhould be carefully ſelected, as they are expoſed to the action of a very fierce fire, and alſo to the ſolvent activity of the glaſs with its powerful fluxes. They ſhould alſo be made very thick and ſtrong, as they are intended to laſt for many months. When finiſhed, they are placed in a warm room in order to diſcharge their moiſture, and any ſmall fiſſures ariſing from the unequal ſhrinking of the clay are cloſed by gently beating with a mallet. They are afterwards gradually heated in a ſmall oven, conſtructed for this purpoſe, and ſlowly brought to a red heat; and after remaining for ſome time in this ſtate, they are removed to the furnace, and fixed down in their places by fire-clay. Here, on account of a further ſhrinking, they remain for a day or two before they are fit for receiving the glaſs materials. Pots of this kind are ſaid to laſt, at an average, about a year.

Glass *Tubes* are of various lengths, diameters, and forms, according to the purpoſes to which they are applied. Theſe are often formed with the lamp and blow-pipe, in the manner deſcribed under the article Lamp-*blowers*. In this way tubes are ſealed hermetically (ſee Hermetical *Seal*), tubes are bent, others are joined, bulbs are annexed to tubes for thermometers, &c., and glaſs is drawn out into threads.

It has been obſerved, that glaſs tubes laid before the fire in an horizontal poſition, and with their extremities ſupported, have had a rotatory motion about their axes; and alſo a progreſſive motion towards the fire, even when their ſupports are inclined from the fire, ſo that the tubes will move a little upwards. See Phil. Tranſ. N° 476. § 1.

When the progreſſive motion of the tube is ſtopped by any obſtacle, its motion about its axis will ſtill continue. When the tubes are placed in a nearly upright poſture leaning to the right hand, the motion will be from eaſt to weſt; but if they lean to the left, the motion will be from weſt to eaſt; when the nearer they are placed to the perfectly upright poſture, the leſs the motion will be either way.

If the tube be placed horizontally on a glaſs plane, the fragment, for inſtance, of coach window-glaſs, inſtead of moving towards the fire, will move from it, and about its axis, in a contrary direction to what it had done before. Nay, it will recede from the fire and move a little upwards, when the plane inclines towards the fire.

Neither the draught of air up the chimney, not attraction or repulſion, are the cauſe of theſe phenomena. It ſeems rather owing to the ſwelling of the tube towards the fire; for allowing ſuch ſwelling, gravity muſt pull the tube down, when ſupported near its extremities horizontally; and a freſh part being expoſed to the fire and ſwelling out again, muſt fall down again, and ſo on ſucceſſively; which will produce a rotatory motion towards the fire.

If the tube be ſupported by two other tubes, and theſe be brought near to each other, and to the centre of the ſupported tube, then its parts hanging over on each ſide, being larger than the part which lies between the ſupporters, will, by their weight, pull downwards, and conſequently force the middle part, reſting upon its two props, upwards: and being leſs advanced towards the fire, as being leſs heated, will, by their oblique ſituation, pull the middle part backwards alſo from the fire, which will cauſe a rotatory regreſſive motion, quite contrary to what the tube had when ſupported near its extremities. And when a ſingle tube lies inclining oppoſite to the fire, either to the right hand or to the left, out of a plane perpendicular to the ſurface of the fire, gravity will not permit the curved part to reſt, but pull it down till it coincides with a plane perpendicular to the horizon; and conſequently, as new curves are generated, new motions will be ſo too; that is, the tube will be made to move about its axis, with this difference, when the tube inclines to the right hand, the motion will be from eaſt to weſt; when to the left hand, from weſt to eaſt. The juſtneſs of this reaſoning is made manifeſt, by bending a wire, and ſupporting it firſt near its extremities, then near its centre on each ſide, afterwards inclining it to the right and to the left; the bending in every caſe repreſenting the curved part of the tube next the fire. This ſolution of the phenomena is rendered the more probable from hence, that when four ſupporters were made uſe of, one at each extremity, and two near the middle, there was no motion at all, either backward or forward. Nor does the increaſe of contact hinder the motion, becauſe the plate of glaſs was ſo broad as to have a much greater contact with the tube, and yet both the rotatory and regreſſive motions were manifeſt.

Theſe experiments ſucceeded beſt with tubes about twenty or twenty-two inches long; the diameter about one-tenth of an inch: and they had in each a pretty ſtrong pin fixed in cork, for an axis to roll with on the ſupporting tubes. Phil. Tranſ. N° 476.

Glass *receivers, how to cement the cracks of.* See Cæment and Receiver.

Glass, *how to take the impreſſion of antique gems in.* See Gem.

The property which glaſs poſſeſſes in common with other ſubſtances of being expanded by heat, and contracted by cold, was long ago obſerved and evinced by Mr. Hook. See Birch's Hiſt of the Royal Society, vol. i. p. 411. See Thermometer.

Glass, *Laws relating to.* No glaſs ſhall be imported into Ireland, other than the manufacture of Great Britain, on pain of forfeiting the ſame, and ſhip, and 10*s.* a pound. 19 G. II. c. 12. If any foreign glaſs ſhall be landed or unſhipped before entry and payment of the duties, or without warrant from the proper officer, the ſame ſhall be forfeited, or its value; and the maſter or other perſon having command of the veſſel, and every other perſon concerned in ſuch landing or unſhipping, ſhall forfeit 100*l.* 17 G. III. c. 39. And by 38 G. III. c. 33. for preventing the fraudulent importation of glaſs, every package containing any plate or plates of glaſs unframed, being *plate, crown,* or *ſheet* glaſs, which ſhall be imported, or brought into this kingdom for exportation, ſhall be marked on the outſide in Roman letters four inches long at leaſt, with the word Glass, on pain of forfeiture, together with the package, and all goods contained in it. The maſter of the veſſel importing ſuch package, ſhall, in reporting his cargo, expreſs every ſuch package of glaſs, on pain of forfeiting the ſame, and alſo 100*l.* Nor ſhall any ſuch package be imported, which ſhall not contain 500 weight, on pain of forfeiture; but not extending to any plate of glaſs 60 inches in length or upwards, on account of the package not being marked. By 43 G. III. c. 69. For every 100 weight of materials, &c. that ſhall be made uſe of in Great Britain for the making of *plate* or *flint glaſs,* or *enamel, ſtained,* or *paſte glaſs,* or *phial glaſs,* ſhall be paid by the maker thereof 1*l.* 12*s* 8*d.*; for every hundred weight of materials uſed in making *ſpread window glaſs,* commonly called *broad glaſs,* 8*s.* 2*d.*; for every hundred weight of materials uſed for making all other *window glaſs* (not being ſpread glaſs), whether flaſhed, or otherwiſe manufactured, commonly called *crown glaſs,* or *German ſheet glaſs,* 1*l.* 4*s.* 6*d.*; for every hundred weight of materials uſed in making *common bottles* (not being phials), and of veſſels uſed in *chemical laboratories,* and of *garden glaſſes,* and of all other veſſels or utenſils made of common bottle metal, 4*s.* 1*d.*; and for every hundred weight of plate glaſs, and of all other glaſs manufactures, which ſhall be imported into Great Britain, the ſame not being flaſks, in which wine or oil is imported, nor foreign green glaſs bottles, nor Iriſh glaſs, or glaſs manufactures imported directly from Ireland, to be paid by the importer before the landing thereof, 2*l.* 2*s.* And any glaſs-maker ſhall take out a licence, for which he ſhall pay 10*l.*, to be renewed annually ten days at leaſt before the end of the year, on the penalty of 50*l.* 24 G. III. c. 41. 43 G. III. c. 69. The place of making glaſs ſhall be entered, before the commencement of manufacture, and all work-houſes, furnaces, pots, annealing arches, &c. &c. on pain of forfeiting 200*l.* 19 G. II. c. 12. 17 G. III. c. 39. 35 G. III. c. 114. Officers may enter and ſurvey, and mark pots; and any perſon counterfeiting or altering ſuch mark, or conniving at its being done, ſhall forfeit 500*l.*; or defacing, or cauſing to be defaced or obliterated ſuch mark, incurs a forfeiture of 200*l.* 35 G. III. c. 114. Notice of beginning to work ſhall be given in writing, on pain of forfeiting 20*l.* 19 G. II. c. 12. And notice of filling every pot ſhall be given twelve hours before the operation is begun, on pain of 50*l.* 19 G. II. c. 12. 17 G. III. c. 39. Annealing arches are to be made of a certain form, and numbered, on pain of forfeiting 100*l.* Annealing arches are to be locked, except at certain times; and breaking ſuch lock, &c. incurs a forfeiture of 200*l.* 35 G. III. c. 114. The ſame act comprehends ſeveral other proviſions, enforced by certain penalties. Bottles are not to be removed till they are weighed, (penalty 100*l.*) which are to be kept ſeparate from thoſe that are unweighed, on pain of forfeiting 50*l.* No phials, &c. are to be made in places entered for making common glaſs bottles, on pain of forfeiting 200*l.* Entry ſhall be made of the glaſs manufactured every month within the bills, and elſewhere every ſix weeks, on pain of 20*l.* The maker, within the bills, ſhall, in four weeks, and elſewhere in ſix weeks after entry, pay off the duties, on pain of double duty. If glaſs, ſhipped for exportation, ſhall be re-landed, it ſhall be forfeited, and every perſon concerned therein ſhall forfeit 100*l.* 17 G. III. c. 39. For the drawbacks on exportation of glaſs, ſee 43 G. III. c. 69. Obſtructing officers in ſecuring the duties incurs a forfeiture of 50*l.* 19 G. II. c. 12. 17 G. III. c. 39. Penalties are appropriated, half to the uſe of the king, and half to him that ſhall ſue.

Glass-*Carrick Point,* in *Geography,* a cape of Ireland, on the eaſtern coaſt of the county of Wexford. N. lat. 52° 35′. W. long. 6° 12′.

Glass-*Caſe,* in *Gardening,* a light ſort of erection formed with glaſs ſaſhes in proper frame-work, moſtly upright in the front part and ends, but ſloping at top from a back wall, or other convenient building, to the fore-part; the front, top, and both ends being of glaſs-work. The ſituation for this purpoſe ſhould face the ſouth, in order to have the full influence of the ſun. Conſtructions of this nature are uſeful for protecting many ſorts of curious tender plants in winter which want it only occaſionally from ſevere froſt, and other ſimilar cauſes.

Buildings of this kind may be conſtructed, occaſionally, either againſt ſome ready-built ſouth wall, which ſerves for the back, all the other parts forward being wood-work and glaſs; or detached in a ſimilar ſituation, ſo as that the whole front may ſtand to the ſouth; the back being framed of brick-work, &c. or of wood double planked; but the former is preferable; the whole being generally ranged lengthways, nearly in an eaſt and weſt direction.

The dimenſions may be from five or ſix, to eight or ten feet in width, by ten, fifteen, or twenty feet in length or more, as may be required; and from ſix or eight, to ten feet high behind, by five or ſix to ſeven or eight in the front, both ends in proportion with the top, ſloping gradually, as juſt noticed, from the back, having an entrance, or door, in front, or at one end. The glaſs-work ſhould be made to ſlide readily backwards and forwards.

Sometimes fire-flues are carried along the back and front internally, proceeding from an external furnace, for occaſional fire-heat in winter, which render them more convenient and uſeful for different purpoſes.

Theſe caſes, as mentioned above, are uſed as preſervatory departments, in which to winter many ſorts of curious exotics of the hardier green-houſe kinds, which only want protection from ſevere cold, as well as many choice kinds of the open ground, which are rather tenderiſh in their minor growth, or any other particular or curious hardy plants, whether flowers, ſhrubs, or young trees, eſpecially the choice evergreen kinds, which require effectual protection from the ravages of rigorous froſts or cutting winds, in winter or early ſpring; and, at the ſame time, in mild open weather, to enjoy the full air by opening the glaſſes; all which, being in pots, can be readily placed in this preſervatory at the approach of ſevere weather, and be thus kept in good condition till ſettled weather in ſpring, &c.; then removed into the full air. In ſummer and autumn, when unoccupied in this way, theſe caſes may be of ſome utility to place ſome curious kinds of tender plants in, when in flower for ſeeding, to guard them from heavy or inceſſant rain, or cold night dews in autumn, which, in many ſorts retard, or ſometimes wholly fruſtrate their production of good ſeed, as in many ſorts of curious tender annuals; particularly the fine double balſams, cock's-combs, tricolors, double ſtramoniums, diamond ficoides, and various others.

They are alſo capable of being uſed in ſpring and the early part of ſummer, as in April, May, and June, as a kind of drawing-frames, for ſome particular ſorts of curious annuals to bring them to a tall growth, ſuch as the large or giant cock's-combs, tricolors, double ſtramoniums, double-ſtriped balſams, egg-plants, &c. the plants being firſt raiſed in hot-beds, under garden-frames, till of twelve or fifteen inches growth, then a hot-bed made in the glaſs-caſe, earthed at top, and the plants in pots, ſingly plunged into the earth of it; the glaſſes, in theſe caſes, ſhould be ſhut cloſe, only a neceſſary admiſſion of freſh air being given every day, by which they run up to a tall ſtature in the beſt perfection of ſtrength for flowering. See *Annual* PLANTS.

Theſe ſorts of glaſs-caſes are alſo ſometimes made uſe of as a kind of appurtenances to hot-houſes, or ſtoves, detached from them, having, as obſerved above, internal flues for fire-heat, when neceſſary, ſerving as preſervatories for many ſorts of exotics, which are tenderer than common green-houſe plants, but do not require the conſtant full heat of the more tender hot-houſe kinds, but only the aſſiſtance of moderate fire-heat in winter, in cold nights, or when very damp, cloudy, foggy-weather and ſevere froſts prevail. They are ſometimes uſed in the buſineſs of forcing different kinds of flowering plants and eſculents, either by means of an internal bark-bed, or flues for fire-heat.

When intended for this purpoſe, it is convenient to have both an internal pit for a bark-bed, and flues for fire-heat, in order to uſe either ſeparately, or ſometimes both, as may be found neceſſary. See HOT-HOUSE.

GLASS-*Faces*, in *Mining*, is a term for the poliſhed ſurfaces, or ſlickenſides, which are found in ſome of the mineral veins in Derbyſhire, ſomething like the poliſhing which is ſeen often on the ſides of faults. See SLICKENSIDE.

GLASS *Iſle*, called alſo *Scalpey*, in *Geography*, one of the Hebrides, near the N.E. extremity of Harris. It is a ſmall, low, round iſland, covered with heath, and indented by the ſea. Near its weſtern extremity are two good natural harbours, and on its eaſt point a light-houſe was erected A. D. 1788. It lies at the entrance of Eaſt Loch Tarbot. N. lat. 57° 50′. W. long. 6° 40′.

GLASS-*Lead*, in *Mining*, according to Mr. Mawe, "Mineralogy of Derbyſhire," p. 105, is an opaque waxy lead-ore found in that county: ſometimes alſo it is tranſparent and cryſtallized, appearing as though it had undergone the action of fire.

GLASS-*Lough*, in *Geography*, a lake of Ireland, in the county of Moneghen, near which is a village of the ſame name, about five miles from the town of Moneghen. The lake contains 120 acres; and a wood, ſpreading over a fine bold hill, hangs down to the water in one deep ſhade, the effect of which is remarkably beautiful. The county around is very fine. Young.

GLASSES are diſtinguiſhed, with regard to their form, uſe, &c. into various kinds, as drinking-glaſſes, optic-glaſſes, looking-glaſſes, burning-glaſſes, &c.

GLASSES, *Drinking*, are ſimple veſſels of common glaſs or cryſtal, uſually made in form of an inverted cone.

Each glaſs conſiſts of three parts, *viz.* the calyx or bowl; the bottom, and the foot; which are all wrought or blown ſeparately.

Nothing can be more dexterous and expeditious than the manner wherein theſe parts are all blown; two of them opened, and all three joined together. An idea is only to be had thereof, by ſeeing them actually at work.

The glaſſes chiefly uſed in England are made of the aſhes of fern; cryſtal glaſſes being leſs frequent in uſe. The exceeding brittleneſs of this commodity, notwithſtanding the eaſy rate of each glaſs, renders the conſumption thereof very conſiderable. For the method of gilding the edges of drinking-glaſſes, ſee GILDING *on Enamel and Glaſs*.

GLASSES, *Metallic*, in *Chemiſtry*, are the oxyds, or ſometimes the ſulphuretted oxyds of the different metals, vitrified by heat.

GLASSES, *Optic*, are thoſe made uſe of to ſtrengthen, improve, or preſerve the ſight. See OPTIC *Glaſſes*.

GLASSES, *Convex*. See CONVEXITY.

GLASSES, *Concave*. See CONCAVE.

GLASS, *Infernal*. See INFERNAL.

GLASSES, *Lenticular*. See LENS.

GLASSES, *Meniſcus*. See MENISCUS, &c.

GLASSES, *Plain*. See PLAIN *Glaſs*.

GLASSES, *Plano-Concave*. See PLANO-CONCAVE.

GLASSES, *Plano-Convex*. See PLANO-CONVEX.

GLASSES, *Teleſcope*. See TELESCOPE.

GLASS, *Object*. See OBJECT-*Glaſs*.

GLASSES, *Eye*. See EYE-*Glaſs*.

GLASS, *Magnifying*. See MAGNIFYING.

GLASS, *Multiplying*. See MULTIPLYING.

GLASSES, *Muſical*. See ARMONICA.

Glass, *Perſpective.* See Perspective.

Glass, *Looking.* See Looking-*Glaſs*, Mirror, and Foliating.

Glass, *Burning.* See Burning-*Glaſs*.

Glass, *Weather.* See Weather-*Glaſs*.

Glass, *Cupping.* See Cupping-*Glaſs*.

Glass, *Window.* See Window and Glass, *ſupra.*

Glass, *Axis of a.* See Axis.

Glass, *Pole of a.* See Pole.

Glass, *Hour.* See Hour-*Glaſs*.

Glass, *Tin.* See Bismuth.

Glass, *Watch.* See Watch.

Glass-*Wort.* See Kali.

Glass-*Wort, Berry-Bearing,* in *Botany.* See Anabasis.

Glass-*Wort, Jointed.* See Salicornia and Kelp.

GLASSHATTEN, or Glasitten, in *Geography*, a town of Hungary, celebrated for its hot-baths, and having near it ſome rich gold mines; 7 miles from Schemnitz.

GLASS-HOUSE Bay, a bay on the E. coaſt of New Holland, betweeen cape Moreton, and the Glaſs-houſes, which are three hills, ſo called by captain Cook in 1770, ſituated in S. lat. 26° 28′.

GLASSHUTTEN, a town of Saxony, near which is a ſilver mine; 8 miles S. of Dreſden.

GLASSIUS, Solomon, in *Biography*, was born in the year 1593, and it is ſuppoſed he was educated at Jena, where he was admitted to the degree of doctor of divinity, and for ſome time filled the theological chair with diſtinguiſhed reputation. He was appointed ſuperintendant of the churches and ſchools in the duchy of Saxe-Gotha, and exerciſed the duties of his function with prudence, equity, and impartiality. He died at Gotha in 1656, and left behind him, as a memorial of his fame and learning, a work publiſhed in quarto in 1623, entitled "Philologia Sacra," which is pronounced by Moſheim an ineſtimable and immortal work, than which none can be more uſeful for the interpretation of Scripture, as it throws much light upon the language and phraſeology of the inſpired writers, He was author, likewiſe, of "Onomatologia Meſſiæ Prophetica;" "Chriſtologia Moſaica et Davidica;" "Exegeſis Evangeliorum et Epiſtolarum," and ſome other pieces. Moreri.

GLASSNEVIN, in *Geography*, a village near Dublin, in Ireland, remarkable for the very extenſive and valuable botanical garden belonging to the Dublin ſociety. See Dublin *Society*.

GLASSY Humour. See Eye and Vitreous.

GLASTONBURY, in *Geography*, a market town in the hundred of Glaſton, and county of Somerſet, England, is ſituated on the great road from Wells to Exeter. The ſcite occupied by it was originally called Ynyſwytryn, or the Glaſs Iſland, and in Latin Avalonia.

A town is ſaid to have been built here, and largely endowed by king Ina about the year 708: in the next century it was laid waſte by the Danes, and rebuilt by king Edmund, who granted it many additional privileges. In 1184 it was deſtroyed by fire, and was again reſtored by the munificence of Henry II. The chief celebrity attached to the town was derived from its abbey; which, during ſix centuries, ſurpaſſed in authority and revenues every other in England, excepting that of Weſtminſter. The abbots enjoyed a ſtate of regal ſplendour, with an income of nearly 40,000*l* per annum, had the title of lords, and ſat with the barons in parliament. The abbey and its offices occupied an area of land of nearly ſixty acres within the walls.

The laſt abbot, Richard Whiting, who was the ſixtieth in ſucceſſion, refuſing to ſurrender his abbey to king Henry VIII. was, with two of his monks, drawn on a hurdle to the Torr, near the town, and there hanged: the abbot's head was ſet on the gate of the abbey, and his quarters were ſent to Bath, Wells, Bridgewater, and Ilcheſter.

It being traditionally recorded, that this was the burial place of king Arthur, Henry II. ordered a ſearch to be made, when a leaden croſs was diſcovered with a Latin inſcription in rude characters, thus tranſlated; "Here lies the famous king Arthur, buried in the iſle of Avalon." Beneath was found a coffin hollowed out of the ſolid rock, wherein were the bones of a human body, ſuppoſed to be thoſe of Arthur; which were then depoſited in the church under a monument. Scarcely any veſtige remains of theſe extenſive buildings, except ſome ruins of the church, part of a chapel dedicated to Joſeph of Arimathea, and the abbot's kitchen, which ſeems to be of a more recent ſtructure than the other offices.

Among the religious relics with which the town and its environs abound, the moſt conſpicuous is the Torr, or St. Michael's Tower (on which abbot Whiting was executed,) ſtanding on an eminence eaſt of the town, where was formerly a ſmall oratory, dedicated to St. Michael the archangel.

The town of Glaſtonbury conſiſts of two principal ſtreets, and is divided into two pariſhes, St. John's and St. Benedict's. It was formerly a parliamentary borough, but was disfranchiſed on the confiſcation of the abbey in 1539. A charter of incorporation was granted by queen Anne, by which the civil government was veſted in a mayor, a juſtice, eight aldermen, and ſixteen burgeſſes. The principal buildings are the two pariſh churches, two meeting-houſes, two alms-houſes, and a free ſchool. The George, a reſpectable inn, was anciently an hoſpital for the accommodation of pilgrims reſorting to the ſhrine of St. Joſeph. In the centre of the town was formerly a large ſtone croſs, originally appropriated to ſhelter perſons who attended the market. It was taken down about five years ago: but a plate and deſcription are preſerved in the firſt volume of the Architectural Antiquities of Great Britain. Glaſtonbury is 130 miles diſtant from London; has a market on Tueſdays, and four annual fairs: the population return, in 1801, was 410 houſes, and 2035 inhabitants, of whom only 104 were employed in trade, which is chiefly that of manufacturing worſted ſtockings.

South-weſt of the town is Wearyall hill, ſo called from a tradition that St. Joſeph and his companions, weary with their journey, reſted here; and that St. Joſeph ſtuck his hawthorn ſtaff in the earth; it took root, and conſtantly budded on Chriſtmas day. This famous thorn had two trunks, of which one was deſtroyed in queen Elizabeth's reign, the other in the great rebellion: but there are trees, originally from the old ſtock, ſtill growing in the gardens of Glaſtonbury, and in various other parts of the kingdom. Collinſon's Hiſt. Somerſetſhire, 3 vols. 4to. Maton's Weſtern Counties, 2 vols. 8vo.

Glastonbury, a townſhip of America, in the county of Bennington, and ſtate of Vermont; having only 48 inhabitants.—Alſo, a handſome little town in Hartford county, Connecticut, ſituated on the E. ſide of Connecticut river, oppoſite to Weathersfield; containing 2718 inhabitants.

Glastonbury *Thorn*, in *Botany.* See Mespilus.

GLASTUM, from the German word *Glaſt*, an old name for Woad; (ſee Isatis.) Hence ſeveral plants have the ſpecific name of *glaſtifolia*, on account of the ſimilitude of their leaves to that herb.

GLATT, in *Geography*, a river of Germany, which runs into the Neckar, 2 miles N. from Sultz in Wurtemberg.

GLATT, or *Glatten*, a town of Germany, in the county of Fugger; 4 miles E. of Dornſtetten.

GLATT, a river of Switzerland, which runs into the Rhine; 2 miles below Egliſau.

GLATTEN, a mountain of Switzerland; 10 miles S. S. W. of Glaris.

GLATZ, a principality of Sileſia, bordering on Bohemia, and ſurrounded by mountains. The internal territory is mountainous, interſected with vallies, meadows, corn-fields, woodlands and ſmall rivers. It produces wheat, generally ſufficient for its inhabitants, and has paſture for a great number of cattle. It contains quarries of mill-ſtones, free-ſtone, and marble; as well as a great variety of precious ſtones. It has alſo mines of coal, copper, and ſilver; with ſeveral mineral ſprings. From 1561 to 1742, Glatz was annexed to the crown of Bohemia; in 1742 it was ceded by the empreſs Maria Thereſa to Frederick II. king of Pruſſia, and his heirs. It forms one circle, divided into ſix diſtricts.

GLATZ, the capital of the principality above-mentioned, is ſituated on the Neiſſe, and built on the ſide of a mountain, having upon its ſummit a ſtrong caſtle. The town contains about 400 houſes within the walls, and as many in four fauxbourgs. It is a place of conſiderable trade. It has been frequently pillaged and burnt; 54 miles E. of Breſlau. N. lat. 50° 16′. E. long. 16° 26′.

GLATZ *Kogel*, a mountain of Auſtria; 12 miles S. of Steyr.

GLAVACIA, a town of Walachia; 35 miles W. of Buchareſt.

GLAUBER, JOHN RODOLPH, in *Biography*, a celebrated chemiſt of Amſterdam, who was eſteemed the Paracelſus of his age, was born in Germany in the beginning of the ſixteenth century. He travelled much in the purſuit of chemical knowledge, and collected many ſecret proceſſes; and his experiments contributed to throw much light on the compoſition and analyſis of the metals, inflammable ſubſtances, and ſalts. In fact he paſſed the greater part of his life in the laboratory. He did not always ſee the proper application of his own experiments, and vainly fancied that he had diſcovered the panacea, and the philoſopher's ſtone, which were at that time objects of purſuit: and the diſappointment of many perſons, who had been ſeduced by his promiſes, contributed to bring the art of chemiſtry into contempt. His theory is full of obſcurity; but his practice has perhaps been miſrepreſented by thoſe who liſtened to his vain and pompous pretenſions; and who accuſe him of a diſhonourable traffick, in firſt ſelling his ſecrets to chemiſts at an enormous price, of again diſpoſing of them to other perſons, and laſtly, of making them public in order to extend his reputation. Glauber publiſhed about twenty treatiſes; in ſome of which he appears in the character of phyſician, in others in that of an adept or metallurgiſt; in the latter he moſt particularly excelled. However, it would be unjuſt not to give him the praiſe of acuteneſs of mind, of facility and addreſs in the proſecution of his experiments, and of extenſive chemical knowledge. He was the inventor of a ſalt, which to this day retains his name in the ſhops of our apothecaries. The works of Glauber have appeared in different languages; the majority of editions are in German, ſome in Latin, and others in French. A collection of the whole in Latin was publiſhed at Frankfort in 1658, in 8vo. and again 1659 in 4to. An Engliſh tranſlation was publiſhed by Chriſtopher Pack, London, 1689, in folio. Eloy. Dict. Hiſt.

GLAUBER *Salt, native* or *natural*, in *Mineralogy*, the ſulphat of ſoda of chemiſts, was diſcovered by baron Born in the ſalt mines of Upper Auſtria; after which Monnet, Volta, Suckow, Gmelin, Breiſlak, Pallas, and others have added to the liſt of the localities of this ſaline ſubſtance, which is more frequently found in a native ſtate than has been ſuppoſed by ſome writers. It generally occurs as mealy eﬄoreſcence; ſometimes maſſive, ſeldom ſtalactitical or cryſtallized: in which latter caſe the cryſtals are deſcribed as acicular and as ſix-ſided priſms, more or leſs flatly acuminated by three planes, ſet on the lateral edges, or ſometimes on the lateral planes: they are ſhining: their internal luſtre is vitreous. Fracture of the cryſtals ſmall conchoidal. It varies from tranſparent to opaque according to its freſhneſs. It is brittle. Its taſte is a mixture of ſalt and bitter. Beſides in the above forms, it occurs alſo, and moſt frequently, diſſolved in certain mineral waters, in the neighbourhood of ſalt mines and ſalt lakes, where alſo the eﬄoreſcence is moſtly found on mooriſh ground, ſand ſtone, marle ſlate, and new walls. For the chemical character of this ſalt, ſee SODA, *Sulphat of.*

Brongniart has given the moſt complete liſt of the localities of Glauber ſalt. In ſolution it occurs in the waters of ſeveral lakes of Auſtria and Lower Hungary, eſpecially in that of Neuſiedel, between the counties of Oedenburg and Wieſelburg. It is met with in Switzerland; in Spain, round a ſource in the neighbourhood of Aranjuez, and near Vacia-Madrid, as eﬄoreſcence, at the bottom of a ravine: the ſource which iſſues from the ravine contains a great proportion of this ſalt. Alſo the water of the Tagus is ſaid to hold it in ſolution. In France it has been found near Grenoble. The ſteep ſides of the Solfatara of Pouzzole yield this ſalt, in one place, on the north ſide. It is common in the lakes of Siberia; and it has been obſerved that the bottom of the lake Guniſkoi, between Toïon and Ilynſkoy, is covered with a cruſt of Glauber ſalt as ſoon as the temperature is below the freezing point. Pallas tells us that the apothecaries of Orenburg annually collect a quantity of this ſalt, which is depoſited in autumn at the bottom of a lake between the Tobol and Mioes. It is alſo found in a lake near Gourief; in another between Utoiſka and Miniuſkaïa, in the neighbourhood of Eniſſey; likewiſe at the foot and in the middle of the chains of the Ural mountains, near Tſheliabinſk: in the laſt of theſe places, the ſalt iſſues in the ſpring ſeaſon out of the earth in the form of eﬄoreſcence or froth. The clayey ſoil of that neighbourhood does not contain any Glauber ſalt; whence this is ſuppoſed to be formed, in the ſame manner as ſalt-petre is, at the ſurface of the earth, and by the action of the atmoſphere. Laſtly, this ſalt is alſo obtained from the alum-ſlate of Duttweiler, near Saarbrück, in the department of la Sarre, and from the aluminiferous waters of Freyenwalde, in Brandenburg.

GLAUBER's *Salt*, in *Chemiſtry* and *Materia Medica*. See *Sulphat of* SODA.

GLAUBER's *Spirit of Marine Salt*. See MURIATIC *Acid*.

GLAUBER's *Spirit of Nitre*. See NITRIC *Acid*.

GLAUBERITE, a lately diſcovered mineral, belonging to the claſs of ſalts, and of which M. Brongniart has given the deſcription and analyſis. This ſubſtance (called glauberite by its diſcoverer, both in honour of the well-known Glauber, and on account of its containing a conſiderable quantity of the ſalt which bears the name of that alchemiſt) was found among pieces of rock-ſalt brought from Ocana in New Caſtile, in cryſtals reſembling thoſe of thumſtone, or axinite. They were (chiefly on account of their mode of occurring) miſtaken in Spain for gyps-cryſtals.

The form of theſe ſecondary cryſtals, is that of an oblique very ſhort priſm with rhomboidal baſe. The planes of the baſe are generally ſmooth and ſhining; the lateral planes ſtriated parallel to the edges of the baſe. Cleavage double, the one parallel to the baſes, the other leſs diſtinct and parallel to the edges of the baſe; in all other directions the fracture is vitreous. Hence the primitive form is an oblique priſm with rhomboidal baſe, the obtuſe angles of which correſpond with the obtuſe angles of the ſecondary priſm. The cryſtals are from topaze yellow to nearly colourleſs; they are tranſparent, and, provided they are kept dry, preſerve their tranſparency and ſolidity though expoſed to the air. Their hardneſs ſurpaſſes that of ſulphat, but is inferior to that of carbonat of lime.

Expoſed to an intenſe heat, the glauberite decrepitates and melts into a white enamel. Immerſed in water, its ſurface is covered by a milk-white cruſt, which penetrates deeper and deeper, till the whole cryſtal is white and opaque throughout: taken out of the water and dried, the white cruſt crumbles into duſt, leaving the nucleus, if there be any remaining, unaltered and perfectly tranſparent. Specific gravity about 2.73.

From M. Brongniart's experiments it appears, that glauberite is eſſentially compoſed of anhydrous ſulphat of lime and of ſulphat of ſoda, equally anhydrous. 2. That theſe two ſalts exiſt in this ſubſtance nearly in the following proportions:

Anhydrous ſulphat of lime - - - -	0.49
Anhydrous ſulphat of ſoda - - - -	0.51
	100

A trace of water, indicated by the calcination, is not brought into account, as little as the accidental admixture of a ſcarcely perceptible quantity of iron, to which the yellowiſh colour of this ſubſtance appears to be owing.

Mr. B. adds the following obſervations: the above-mentioned pieces of ſalt from Ocana, which contain this ſubſtance, have generally ſome clay adhering, which penetrates into the ſtriæ of the ſurfaces, but ſeldom into the ſubſtance of the glauberite.

The efflоreſcence on glauberite, when moiſtened, and the property this ſalt poſſeſſes of becoming opaque in water, proceed from this, that the water, by diſſolving the ſulphat of ſoda, transforms the ſulphat of lime into a ſpongy ſubſtance, and thus produces a phenomenon which is the reverſe of that exhibited by the hydrophane.

The exiſtence of native ſulphat of ſoda, or Glauber ſalt, is well known to mineralogiſts, and, indeed, it has been met with in the neighbourhood of beds of rock-ſalt; but this was only as ſolution in the water of ſalt-ſprings, or as efflоreſcence near ſalt-mines: in a ſolid and cryſtallized ſtate, entirely deſtitute of water of cryſtallization, and intimately united with ſelenite, it had never before been obſerved. Even the anhydrous ſulphat of ſoda was almoſt entirely unknown, till Berthier proved that it conſtitutes nearly the fifth part of thoſe hard ſcales found at the bottom of the pans in which the ſea-ſalt is obtained by evaporation.

It remains to be aſcertained, under which circumſtances the rock-ſalt occurs which contains the glauberite, and particularly in what relation this latter ſtands to it, and whether it occur in the rents or on the ſurface of the beds. See Journal des Mines for 1808.

Haüy places the glauberite ſeparately at the end of the *ſubſtances acidifères;* and it appears to this mineralogiſt, that the integrant molecules of the two ſalts of which it is compoſed exiſt together in the glauberite. He refers, for an analogous combination, to Leblanc's experiments, according to which a ſolution of ſulphat of copper and ſulphat of iron mixed, yielded cryſtals compoſed of theſe two ſubſtances, while their primitive form proved to be that of the latter, which had impreſſed on this mixture the character of its particular cryſtallization. The queſtion, therefore, is, whether the glauberite be in a ſimilar caſe. Its form has, indeed, nothing in common with that of the anhydrous ſulphat of lime; but we are totally unacquainted with the cryſtalline form of the anhydrous ſulphat of ſoda. But even if it ſhould be found that in this caſe the two molecules combine in ſuch a manner as to produce a third of a different form from either, this circumſtance could, according to Haüy's opinion, not be adduced as an objection againſt the theory of cryſtallization, and muſt be conſidered as a problem, the ſolution of which is more intereſting to the chemiſt than to the mineralogiſt.

GLAUBOTTE, in *Geography*, a town of Pruſſia, in Natangen; 14 miles S.E. of Bartenſtein.

GLAUCEDO, in *Surgery*. See GLAUCOMA.

GLAUCHA, in *Geography*, a town of Saxony, in the lordſhip of Schonburg, on the Mulda, containing about 600 houſes; the inhabitants are employed in the manufacture of ſtuffs; 46 miles W. of Dreſden. N. lat. 50° 45′. E. long. 12° 25′.

GLAUCHE, a town of Germany, in the duchy of Magdeburg, adjoining to the town of Halle, but governed by its own magiſtrates; in which are four ſeminaries, where the languages, theology, mathematics, muſic, &c. are taught by 120 preceptors.

GLAUCION, in *Ornithology*, a ſpecies of *Anas*, the grey-headed duck. See DUCK.

GLAUCIUM, in *Botany*, is ſo named from its glaucous, or ſea-green, colour. Whether the plant intended by Pliny be the Yellow Horned Poppy, according to the opinion generally received, or any maritime ſpecies of *Euphorbia*, ſeems a point not eaſily determined. Γλαυκιον of Dioſcorides appears to be the juice of the firſt-mentioned in its wild ſtate, though he compares it to his μηκων κερατιτις, (which is evidently the Yellow Horned Poppy itſelf,) ſaying the plant which yields the γλαυκιον, and grows at Jeruſalem, has almoſt the leaves of the μηκων κερατιτις, but thicker, and ſpread on the ground, ſtrong ſmelling, and more bitter, yielding plenty of ſaffron-coloured juice. Poſſibly this may refer to one of our other ſpecies of *Glaucium*, if not to the common wild *luteum*. Moſt commentators have taken *Argemone mexicana* for the plant of Dioſcorides; but that is a tropical production, unknown in Europe, as we preſume, previous to the diſcovery of America, though now naturalized in the Eaſt Indies; ſee ECHTRUS. Neither does the above deſcription ſuit this plant, for its leaves are much thinner than thoſe of the Horned Poppy, and their juice pale yellow; nor are they ſpread on the ground. Matthiolus ſeems to take the drug Gamboge for γλαυκιον, but this does not at all help us, as to the botanical queſtion, nor has it any probability in its favour.—Tourn. Inſt. 254. t. 130. Sm. Fl. Brit. 563. Prod. Fl. Græc. v. 1. 357. Juſſ. 236. Gærtn. t. 115. (Chelidonium; Linn. Gen. 262. Schreb. 350. Willd. Sp. Pl. v. 2. 1141. Lamarck. Illuſtr. t. 450. f. 2. Mart. Mill. Dict. v. 2.)—Claſs and order, *Polyandria Monogynia*. Nat. Ord. *Rhœadeæ*, Linn. *Papaveraceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of two ovate, concave, bluntiſh, deciduous leaves, often tipped with a point near the ſummit. *Cor.* Petals four, large, roundiſh, ſlightly concave, nearly equal, with a ſhining ſpot near the baſe. *Stam.* Filaments numerous, ſhorter than the corolla, flat, incurved, rather dilated upwards; anthers erect, roundiſh, of two lobes. *Piſt.* Germen nearly cylindrical, curved, longer than the ſtamens; ſtyle none; ſtigma with two or three lobes, downy. *Peric.* Pod linear, curved, very long, of two or three cells, and as many concave valves. *Seeds* numerous, globular, dotted. *Receptacle* linear, ſpongy, parallel to the valves, its ſurface cellular to receive the ſeeds.

Eſſ. Ch. Calyx of two leaves. Petals four. Pod ſuperior, linear, of two or three cells and two or three valves. Seeds numerous, dotted.

Obſ. This genus is very naturally diſtinguiſhed from *Chelidonium* by its habit, and eſſentially characterized by having more than one cell in its pod, and no creſt to its ſeeds.

1. G. *luteum.* Yellow Horned-Poppy. Scop. Carn. v. 1. 369. Gærtn. v. 2 166. (G. flore luteo; Tourn. Inſt. 254. Chelidonium glaucium; Linn. Sp. Pl. 724. Engl. Bot. t. 8. Papaver cornutum, flore luteo; Ger. em. 367.)—Stem ſmooth. Stem-leaves rounded, waved. Pods roughiſh with minute tubercles. Flowers ſtalked.—Native of ſandy ſea-ſhores throughout Europe, flowering in ſummer and autumn. *Root* perennial, tap-ſhaped. Whole *herb* roughiſh and very glaucous. *Stems* three feet high, ſpreading, branched, leafy, ſmooth. Radical *leaves* numerous, pinnatifid in a lyrate form; the reſt rounded, wavy or ſinuated, alternate, ſeſſile, claſping the ſtem. *Flowers* ſolitary, on axillary or terminal ſtalks, two inches broad, of a full ſhining yellow. Their calyx is hiſpid and deciduous, and the petals laſt but one day. The *pods* are often near a foot long, cylindrical, but compreſſed.

2. G. *fulvum.* Orange Horned-Poppy. Sm. Exot. Bot. v. 1. 11. t. 7. (G. glabrum, flore phœniceo; Tourn. Inſt. 254? Chelidonium corniculatum; Donn. Cant. ed. 5. 131.)—Stem ſmooth. Stem-leaves rounded, waved. Pods rough. Flowers nearly ſeſſile.—Suppoſed to be a native of the ſouth of Europe, but we know it as a garden plant only. This differs from the former in the rather more blue caſt of its herbage, nearly or quite ſeſſile *flowers*, and ſmaller petals of a rich tawny orange-colour. We have thought the *root* annual, but we find it will ſurvive a mild winter, about as well as the firſt ſpecies, which indeed is often killed, and never lives many years, at leaſt in a garden. The G. *fulvum*, whether a diſtinct ſpecies or only a permanent variety, propagates itſelf by ſeed and remains unaltered. Its flowers, contraſted with the leaves, have a ſingularly elegant effect. Their petals fall, in hot weather, before noon, but in the autumn will endure till the next morning, or longer, which is alſo the caſe when they are gathered and placed in a room. —If our quotation of Tournefort be right, our plant is figured in Lobel's Icones 271, f. 2, but not happily.

3. G. *rubrum.* Red Horned-Poppy. Sm. Prodr. Fl. Græc. v. 1. 357. (G. orientale, flore magno rubro; Tourn. Cor. 18.)—Stem hairy. Stem-leaves pinnatifid, cut. Pod ſlightly hairy.—Gathered by Dr. Sibthorp by the wayſide between Smyrna and Burſa, as well as in the iſle of Rhodes. The *root* ſeems to be annual. *Stems* ſpreading, or nearly proſtrate, clothed with ſoft expanded hairs. *Stem-leaves* elongated, and deeply pinnatifid, by which it eſſentially differs from both the preceding, as it does from the following in the ſoft hairs, inſtead of rigid briſtles, which clothe the pods and ſtem. The *flowers* are ſtalked, with obovate petals, narrower and flatter than in either of the former, of a tawny red, with a violet ſpot on the claw. Lobel's Papaver corniculatum phœniceum alterum, Ic. 271. f. 2, agrees with this rather than with the laſt in its petals, and ſomewhat in its leaves; but if Tournefort be correct, it cannot be deſigned for the preſent ſpecies, which he gives in his Corolla as different from all he had previouſly enumerated, including Lobel's plant.

4. G. *phœniceum.* Scarlet Horned-Poppy. Sm. Fl. Brit. 964. Prodr. Fl. Græc. v. 1. 357. Engl. Bot. t. 1433. (G. hirſutum, flore phœniceo; Tourn. Inſt. 254. G. corniculatum; Curt. Lond. faſc. 6. t. 32. Chelidonium corniculatum; Linn. Sp. Pl. 724. Papaver cornutum, flore phœniceo; Lob. Ic. 271. f. 1.)—Found in cultivated fields in the ſouth of Europe; a doubtful native of England, though eaſily naturalized in a garden. It is annual, flowering in ſummer and autumn, and grows rather more erect and buſhy than the laſt, from which it differs in the rigid cloſe-preſſed briſtles which clothe the *pods.* The *petals* moreover are larger, rounder, and of a rich ſcarlet, though each marked with a violet ſpot like the laſt; and the ſpreading briſtles on the *ſtem* are very different from the ſoft hairs of that ſpecies.

5. G. *violaceum.* Violet Horned-Poppy. Sm. Fl. Brit. 565. Prodr. Fl. Græc. v. 1. 358. (G. flore violaceo; Tourn. Inſt. 254. Chelidonium hybridum; Linn. Sp. Pl. 724. Engl. Bot. t. 201.)—Leaves bipinnatifid, linear. Pods of three valves.—Native of fields in the ſouth of Europe; rare in England. The *root* is annual. *Stem* branched, upright and buſhy, a foot high, occaſionally ſmooth, or clothed with ſpreading hairs, as is likewiſe the caſe with the *leaves*, which are twice, or even thrice, pinnatifid; their ſegments linear and acute. *Flowers* rather large, of a fine violet colour; their *pods* of three valves, though ſcarcely three-celled, except in an early ſtage of their formation.

Glaucium, in *Ornithology*, a name given by Briſſon to the Anas *Fuligula* or tufted duck. See Duck; and alſo to the Anas *Marila*, or ſcaup-duck. See Duck.

GLAUCOMA, or Glaucosis, a term, in *Surgery*, importing, with the Greeks, according to Mr. Samuel Sharp, what the Latin writers underſtand by *ſuffuſio*, and what we call a *cataract.* This diſeaſe, as we have elſewhere explained, is an opacity of the cryſtalline lens. (See Cataract.) Mâitre-Jean, St. Yves, and other oculiſts, however, think, that glaucoma is a cataract complicated with the gutta ſerena, or an inſenſible ſtate of the retina and optic nerve. (See Gutta Serena.) The word is derived from γλαυκος, *blue*, the pupil frequently having that colour. Some writers have regarded glaucoma as a defect of ſight, originating from an opaque, or otherwiſe morbid ſtate of the vitreous humour. Such a caſe is uncommon; but were an opacity of this kind to impede viſion, an endeavour ſhould be made to diſperſe it with ſmall doſes of calomel, and by expoſing the eye to the vapour of ether. In the event of theſe means failing, the opacity might be broken and diſturbed with a couching-needle. The fungus hæmatodes of the eye muſt be diſcriminated. See Fungus.

GLAUCOPIS, in *Ornithology*, a genus of the order Picæ. The bill is incurvate and arched; the lower mandible ſhorter, and caruncculate beneath at the baſe; noſtrils depreſſed, and half-covered with a ſomewhat cartilaginous membrane; tongue ſubcartilaginous, divided at the end, and ciliated; legs formed for walking; toes three before and one behind.

The only ſpecies of this extraordinary genus at preſent known, is the wattle bird of Dr. Forſter, deſcribed in the Voyages of Captain Cook, and which appears, from the later obſervations of other naturaliſts, to be excluſively confined to the Auſtralaſian regions. Its ſize is equal to that of the jay, the length from the bill to the tail fifteen inches. The bill remarkably ſtrong, an inch and a quarter in length, and of a black colour. The noſtrils are ſituated in a hollow at the baſe of the bill, and are half-covered by a membranous cartilage which falls over as a cover. Its wattles are pendent from the baſe of the lower mandible on each ſide, and in texture reſemble the wattle of the common cock; the colour at firſt blue, and afterwards fine orange. The irides fine blue. From the forehead to the eye the colour is deep black: the other parts of the plumage dark aſh-colour. The tail long, wedge-ſhaped, and compoſed of twelve feathers. Legs long, and the hind claw much longer than the reſt.

This bird inhabits New Zealand, where it ſubſiſts on berries and inſects, and is ſometimes ſeen perched on trees, though rarely, as it is uſually ſeen walking on the ground: its note is a kind of whiſtling or rather murmuring noiſe; and the fleſh ſavoury and delicate.

GLAUCUM, in *Ancient Geography*, a promontory of the Libyan nome, on the confines of Marmarica and Egypt, upon which was a town of the ſame name. Ptolemy.

GLAUCUS, a river of the Peloponneſus, in Achaia, near Patras. Pauſanias.—Alſo, a river of Aſia Minor, in Lycia, having its mouth N. E. of the town of Telmiſſus, in the gulf of Glaucus.—Alſo, a river of Aſia, in the territory of Colchis, where it diſcharges itſelf into the Phaſis. Pliny.—Alſo, a gulf of Aſia Minor, in a direction from N. W. to S. W. More anciently this gulf was denominated the gulf of Telmiſſus, from the name of the town, ſituated near its termination in the eaſtern part of it.

Glaucus, in *Ichthyology*, a ſpecies of *Chætodon*; which ſee.—Alſo, a ſpecies of *Scomber*.—Alſo, a ſpecies of *Falco*, which ſee reſpectively.

GLAUX, in *Botany*, ſo called by Pliny, and Γλαυξ by Dioſcorides, is of uncertain derivation, though ſome have deduced its name from γαλα, *milk*. Moſt probably the word *glaucous* is ſimilarly derived, as it conveys the idea of a milky green colour.—Linn. Gen. 114. Schreb. 159. Tourn. 60. Willd. Sp. Pl. v. 1. 1210. Sm. Fl. Brit. 268. Mart. Mill. Dict. v. 2. Lamarck Dict. v. 2. 722. Juſſ. 333.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Calycanthemæ*, Linn. *Salicariæ*, Juſſ.

Gen. Ch. *Cal.* none: unleſs the corolla be conſidered as ſuch. *Cor.* of one petal, five-cleft, bell-ſhaped, erect, permanent, with obtuſe revolute lobes. *Stam.* Filaments five, awl-ſhaped, erect, the length of the corolla; anthers roundiſh. *Piſt.* Germen ovate; ſtyle filiform, as long as the ſtamens; ſtigma capitate. *Peric.* Capſule globoſe, pointed, of one cell, with five valves. *Seeds* five; roundiſh; receptacle very large, globoſe, hollowed for the ſeeds.

Eſſ. Ch. Calyx of one leaf. Corolla none. Capſule of one cell, with five valves and five ſeeds.

1. G. *maritima*. Black Salt-wort. Linn Sp. Pl. 301. Engl. Bot. t. 13. This is the only ſpecies known, being very frequent in ſalt-marſhes throughout Europe, and flowering in ſummer. The *root* is perennial and creeping. Stem about four inches high, erect, ſomewhat branched, thickly covered with ovate, ſeſſile *leaves*, and fleſh-coloured, purpliſh, or whitiſh flowers. Dr. Withering has remarked that cows eat this herb, and that it is uſed for a pickle, being found every where from Lapland to the Archipelago. The deſcription in Dioſcorides, book 4. chap. 141. is ſo exact that it is impoſſible to be miſtaken; yet we do not find this plant in the Prodromus Floræ Græcæ, becauſe Dr. Sibthorp did not himſelf obſerve it in his journey.

GLAZIC, in *Geography*, a ſmall iſland in the Engliſh Channel, near the coaſt of France. N. lat. 47 26. W. long. 2 56.

GLAZIER, an artificer or dealer in glaſs.

GLAZING. The Roman method of glazing ſome of their urns might give our workmen a hint toward a method greatly ſuperior to any thing now in practice for the glazing of earthen-ware. There is a ſort of red urns found in Yorkſhire, which are, inſtead of glazing, covered all over inſide and out with a fine coral-coloured varniſh, that gives them a beauty, which no earthen-ware of our times can attain; and is not only far more durable than our way of doing it with lead, which is apt to crack and fly, both with wet and with heat, but far more ſafe and wholeſome; and being well known to be a vapourable metal, and its fumes very noxious, there is great reaſon to ſuſpect that it muſt be unwholeſome when brought to the fire. This ancient glazing ſeems to have been done either by the bruſh, or elſe by dipping, for both the inſide and outſide are varniſhed with equal regularity; and ſomething may be gueſſed at as to the materials they uſed in it, from what Pliny has left us. This author occaſionally obſerves, that ſuch earthen-ware as was painted with bitumen never loſt its beauty; and afterwards, that it was a cuſtom to cover over whole ſtatues with this ſort of glazing, which he obſerves did not only make a ſmooth coat, but ſunk into the matter of the ſtone or earth, and therefore this could not be likely to crack and fly off like our lead-coats on plates, &c. which is merely a cruſt laid over them. Hook's Philoſ. Collect. p. 89.

A common glazing for any kind of earthen-ware may be made of white ſand forty pounds, of red-lead twenty pounds, of pearl-aſhes twenty pounds, and of common ſalt twelve pounds. Powder the ſand by grinding it, and then add it to the other ingredients and grind them together: after which calcine them for ſome time with a moderate heat, and when the mixture is cold, pound it to powder; and when wanted for uſe, temper it with water. The proportion of theſe ingredients may be occaſionally varied. We may obſerve, in general, that lead ought to be excluded from the compoſition of glazings, and other fluxes ſubſtituted in its ſtead. See Colica *Dammoniorum*.

A tranſparent glazing may be prepared, without lead, by calcining forty pounds of white ſand, twenty-five pounds of pearl-aſhes, and fifteen pounds of common ſalt; and proceeding as before: and a more perfect tranſparent glazing may be made of ſand forty pounds, of wood-aſhes perfectly burnt, fifty pounds, of pearl-aſhes ten pounds, and of common ſalt twelve pounds. The following recipes are taken, for the moſt part, from Kunckel, who ſays that they are the true glazings uſed at Delft, and other Dutch manufactories.

Glazing, *Black*, is made of eight parts of red-lead, iron filings three, copper-aſhes three, and zaffre two meaſures. This, when melted, will make a brown black; and if you want it blacker, add more zaffer to it.

Glazing, *Blue*, is thus prepared: take lead-aſhes, or red-lead, one pound, clear ſand, or powdered flints, two pounds, common ſalt two pounds, white calcined tartar one pound, Venice or other glaſs half a pound, zaffer half a pound: mix them well together, and melt them for ſeveral times, quenching them always in cold water. If you would have it fine and good, it will be proper to put the mixture into a glaſs furnace for a day or two.

Another blue glazing may be formed of one pound of tartar, a quarter of a pound of red-lead, half an ounce of zaffer, and a quarter of a pound of powdered flints, which are to be fuſed and managed as in the laſt recipe. Or, take two pounds of calcined lead and tin, add five pounds of common ſalt, five pounds of powdered flints, and of zaffer, tartar, and Venetian glaſs, each one pound. Calcine and fuſe the mixture as before.

Or, again, take of red-lead one part, of ſand three parts, and of zaffer one part. For a violet blue glazing, take four ounces of tartar, two ounces of red-lead, five ounces of powdered flints, and half a dram of manganeſe.

Glazing, *Brown*, is made of red-lead and flints, of each fourteen parts, and of manganeſe two parts, fuſed: or, of red-lead twelve parts, and manganeſe one part, fuſed. A brown glazing, to be laid on a white ground, may be made of manganeſe two parts, and of red-lead and white glaſs, of each one part, twice fuſed.

Glazing, *Fleſh-coloured*, is made of twelve parts of lead-aſhes, and one of white glaſs.

Glazing, *Gold-coloured.* To make gold-coloured glazing, take of litharge three parts; of ſand, or calcined flint, one part: pound, and mix theſe very well together; then run them into a yellow glaſs with a ſtrong fire. Pound this glaſs, and grind it into a ſubtile powder, which moiſten with a well ſaturated ſolution of ſilver; make it into a paſte, which put into a crucible, and cover it with a cover. Give at firſt a gentle degree of fire; then increaſe it, and continue it till you have a glaſs, which will be green. Pound this glaſs again, and grind it to a fine powder; moiſten this powder with ſome beer, ſo that by means of an hair pencil you may apply it upon the veſſels, or any piece of earthen ware. The veſſels that are painted or covered over with this glazing, muſt be firſt well heated, then put under a muffle; and as ſoon as the glaſs runs, you muſt ſmoak them, by holding them over burning vegetables, and take out the veſſels. Mr. Heinſius of Peterſburg, who ſent this receipt to the Royal Society, uſes the words *afflare debes fumum*, which is rendered *ſmoak them*, in the Tranſactions. Phil. Tranſ. N° 465. § 6.

Kunckel gives ſeveral preparations for a gold-coloured yellow glazing. This may be produced by fuſing a mixture of three parts of red-lead, two parts of antimony, and one part of ſaffron of Mars; by again melting the powdered maſs, and repeating the operation four times; or, by fuſing four or five times a compoſition of red-lead and antimony, of each an ounce, and of ſcales of iron half an ounce: or by calcining and fuſing together eight parts of red-lead, ſix parts of flints, one part of yellow ochre, one part of antimony, and one part of white glaſs. A tranſparent gold-coloured glazing may be obtained by twice fuſing red-lead and white-flints, of each twelve parts, and of filings of iron one part.

Glazing, *Green*, may be prepared of eight parts of litharge, or red-lead, eight parts of Venice glaſs, four parts of braſs-duſt, or filings of copper; or, of ten parts of litharge, twelve of flints or pebble, and one of *æs uſtum*, or copper-aſhes.

A fine green glazing may be produced by uſing one part of the Bohemian granate, one part of filings of copper, one part of red-lead, and one part of Venetian glaſs; or by fuſing one part of white glaſs, the ſame quantity of red-lead, and alſo of filings of copper; powdering the maſs, and adding one part of Bohemian granate to two parts of this powder. A fine green may be obtained by mixing and grinding together any of the yellow glazings with equal quantities of the blue glazings; and all the ſhades and teints of green will be had by varying the proportion of the one to the other, and by the choice of the kind of yellow and blue.

Glazing, *Iron-coloured*, is prepared of fifteen parts of lead-aſhes, or red-lead, fourteen of white ſand, or flints, and five of calcined copper. This mixture is to be calcined and fuſed.

Glazing, *Liver-coloured*, is prepared of twelve parts of litharge, eight of ſalt, ſix of pebble or flint, and one of mangeneſe.

Glazing, *Purple-brown*, conſiſts of lead-aſhes fifteen parts, clear-ſand, or powdered flints, eighteen parts, mangneſe one part, and white glaſs fifteen meaſures; to which ſome add one meaſure of zaffer.

Glazing, *Red*, is made of antimony three pounds, litharge, or red-lead, three, and ruſt of iron, one; grind them to a fine powder. Or take two pounds of antimony, three of red-lead, and one of calcined ſaffron of Mars, and proceed as before.

Glazing, *Sea green*, is made of five pounds of lead aſhes, one pound of tin-aſhes, three pounds of flint, three quarters of a pound of ſalt, half a pound of tartar, and half a pound of copper duſt.

Glazing, *White.* A fine white glazing for earthen-ware is thus prepared: Take two pounds of lead, and one of tin; calcine them to aſhes: of this take two parts, calcined flint, white ſand, or broken white glaſs, one part, and ſalt one part: mix them well together, and melt them into a cake for uſe. The trouble of calcining the tin and lead may be prevented, by procuring them in a proper ſtate.

The white glazing for common ware is made of forty pounds of clear ſand, ſeventy-five pounds of litharge, or lead-aſhes, twenty-ſix of pot-aſhes, and ten pounds of ſalt: theſe are three times melted into a cake, quenching it each time in clear cold water. Or, it may be made of fifty pounds of clean ſand, ſeventy of lead-aſhes, thirty of wood-aſhes, and twelve of ſalt.

A very fine white glazing may be obtained by calcining two parts of lead, and one part of tin; and taking one part of this maſs, and of flints and common ſalt, of each one part, and fuſing the mixture. See Delf-*ware*.

A white glazing may be prepared by mixing one hundred pounds of maſticot, ſixty-pounds of red-lead, twenty pounds of calcined tin or putty, and ten pounds of common ſalt; and calcining and powdering the mixture ſeveral times.

Glazing, *Yellow*, is prepared of red-lead, three pounds; calcined antimony and tin, of each two pounds: or, according to ſome, of equal quantities of the three ingredients. Theſe muſt be melted into a cake, then ground fine; and this operation repeated ſeveral times: or, it may be made of fifteen parts of lead-ore, three parts of litharge of ſilver, and fifteen parts of ſand.

A fine yellow glazing may be procured by mixing five parts of red-lead, two parts of powdered brick, one part of ſand, one part of the white glazings, and two parts of antimony, calcining the mixture and then fuſing it. Or, take four parts of white glaſs, one part of antimony, three parts of red-lead and one part of iron ſcales, and fuſe the mixture: or, fuſe ſixteen parts of flints, one part of iron-filings, and twenty-four parts of litharge. A light yellow glazing may be produced with ten parts of red-lead, three parts of antimony, and three of glaſs, and two parts of calcined tin. See *Gold-coloured* Glazing.

Glazing, *Citron-yellow*, is made of ſix parts of red-lead, ſeven parts of fine red brick-duſt, and two parts of antimony. This mixture muſt be calcined day and night for the ſpace of four days, in the aſh-hole of a glaſs-houſe furnace, and at laſt urged to fuſion.

Glazing *of Delf-ware.* See Delf-*ware*.

Glazing *of Porcelain.* See Porcelain.

Glazing *of Stone-ware, and Queen's ware.* See Pottery.

Glazing *for Tobacco Pipes.* See Tobacco-pipes.

Glazing, in *Painting*, a term of the art, expreſſive of a peculiar mode or variety in the practice of it. It conſiſts in laying a tranſparent colour, made very thin by a great quantity of oil, or other vehicle, over a ſolid body of opaque colour; and its intent is, to give a greater degree of clearneſs and brilliancy to the colour produced by this proceſs, than can be obtained by mixing together in ſubſtance the two colours thus employed. In this mode their hues are blended, without diſparagement of each other; whereas, in mixing them in the ordinary way, a certain diminution of their brilliancy takes place, produced by the diſſimilar nature of their qualities.

Glazing appears to have been practiſed very early in oil-painting; and probably the uſe of varniſhes over pictures painted with water-colours may have firſt ſhewn its utility. Indeed it could not fail to be the caſe, if the varniſh employed happened to be tinged with any colour; for the luſtre pictures acquired by that circumſtance muſt be ſtrikingly engaging: a harmony and ſweetneſs are thereby gained, which all other means are vainly employed to obtain. It is therefore ſurprizing that all thoſe who practiſed the art of painting after the diſcovery of the uſe of oil, ſhould not have given in to the application of it. Yet it is certain that the Roman ſchool is remarkably deficient in the knowledge of the value of this practice, and moſt frequently neglected to uſe it; owing probably to the employment painting found in freſco. The Venetian and Dutch ſchools, on the other hand, employed it in perfection, and it is in their works that a knowledge of it may beſt be acquired.

The principal difficulty attending the uſe of glazing, is to avoid the too common application of it; as it does not ſuit the repreſentations of all ſubſtances, in its more immediate ſenſe; though one general glaze over a picture, completed in its forms, will at all times benefit the work; if it happens not to be too low, or inſipid, in its tones of colour.

All kinds of gems and poliſhed ſubſtances, ſuch as metals, ſilks, velvets, &c. are imperfectly wrought to effect, when it is not employed; and fleſh, which is in nature compounded of a great variety of colours, is ſeldom quite perfect in its hue, when glazing is not employed to finiſh with. It is a ſpecies of it, produced by the yellow varniſh being but partially removed from old pictures, which gives them their peculiar and brilliant luſtre. It is quite impoſſible to make any effect exactly like it with freſh colours, unleſs ſome artifice be uſed to forerun the effects of time; ſuch as rubbing in dirt, and then partially removing it, &c. tricks which picture dealers are perfectly converſant with; and by which many an ingenious copy is paſſed off upon the unlearned amateur, to the enrichment of the dealer, and the future annoyance of the buyer, when time and improved information let him into the ſecret.

Glazing is the moſt valuable part of the practice of painting, when judiciouſly employed; as it produces clear broken tones of colour, which leave no remembrance of the paliette, but deceive the eye by the variety of hues, and dazzling effect of light, produced by one colour ſhining through another in different degrees of illumination; much more like the effects of natural objects, than the uſe of opaque colours can poſſibly produce. But then great dexterity and judgment are required to uſe it properly in ſo general a manner. A well-informed and ſcientific artiſt knows the tone which one colour glazed over another will produce; and without that knowledge, a dirty dulneſs may be the effect, inſtead of the clearneſs required: and if not ſucceſsful, it is always injurious; there is no medium in the application of it. If the under colour is not improved, it is ſure to be deteriorated; and it will require repainting, to reſtore its original freſhneſs. So that when a painter has prepared a work for glazing, (which ſhould always be done with great clearneſs and preciſion,) the moſt extreme caution is requiſite in adapting the tone of the glaze which he propoſes to uſe to the general hue of the picture before he applies it. It is not poſſible to give rules more explicit on this matter; the indefinite ſubdiviſions of hues which all colours are capable of, muſt for ever leave to the feeling and judgment of the artiſt their peculiar application. It is hardly neceſſary to ſtate that a glaze of red, over blue, will produce purple; of blue, over yellow, green; and of red, over yellow, orange; but it may aid the ſtudent in his practice, if he conſiders, that all the varieties of tone the original colours are capable of, will, when equally employed, produce a correſponding compound; and, of courſe, if his picture be of too red a hue, though of a light tone, a correſponding one of blue, or of yellow, will change it to the one he may require; and if he uſe the blue and yellow together as a green, it will produce a negative colour; totally deſtroying the red: but the varieties are too complicated and numerous to follow.

Glazing *of Cloth*. The proceſs of glazing is uſed for all the ſtout fabrics of cotton goods, and ſometimes for thoſe of linen. It is a part of the general proceſſes of finiſhing goods for the market, and which is carried on by thoſe who are generally called cloth-lappers, or calendermen. The glazing is done by putting on the cloth a ſmall quantity of white wax, ſuch as that uſed in the manufacture of wax candles, and the gloſs is afterwards effected by the friction of any ſmooth body on the ſurface of the cloth. By the ordinary proceſs the apparatus is very ſimple, conſiſting merely of a ſmooth table, a little inclined towards the operator, like a common writing deſk, upon which the cloth to be glazed is ſpread ſmoothly, and drawn over, as occaſion requires, from one end of the piece to the other. Above this is a lever, ſuſpended from any convenient fixture to the roof, the lower end hanging in contact with the cloth, and by moving this backward and forward, the neceſſary friction is produced. The end of the lever next to, and in contact with the cloth, is faced with a ſmooth piece of flint or pebble, finely poliſhed, and of a cylindrical form, the under ſurface of which is in contact with the cloth. This lever being drawn backward and forward by the operator's hands, the whole cloth is poliſhed or glazed in ſucceſſion, the joint at the top of the lever being fitted into a horizontal ſlider, which allows the poliſher or flint to be moved from one ſide of the cloth to the other. In this way of glazing, the whole is performed by the power of a man's arms and hands; and, from the poſition of his body being conſtantly inclined over the table, is found to be a very laborious and fatiguing operation. The great number of people neceſſarily employed by this operation, and the difficulty of getting large quantities of goods rapidly glazed to anſwer the demands of hurried ſhipments for exportation, ſuggeſted lately the idea of a more ſpeedy and efficacious manner of performing the operation of glazing by an improvement and alteration in the conſtruction of the common five-bowl calender. This improvement was planned and executed at the extenſive works of the late Mr. John Miller of Glaſgow, who furniſhed the inventor with the means of carrying his plan into effect, and upon a proof of its efficacy on trial, his majeſty's royal letters patent for its excluſive uſe to the inventor or his aſſignees within Scotland were obtained in the uſual form. Two or three machines were then conſtructed for his own works, to which, as far as we know, they are ſtill confined; and theſe machines have given the moſt univerſal ſatisfaction to all who have had their goods glazed by them, while at the ſame time an immenſe reduction of labour has been effected by their uſe.

The patent glazing machine, like the common calender, conſiſts of five bowls, or cylinders, four of which are of caſt iron, ſmoothly turned, and finely poliſhed on the ſurface, and the large or intermediate cylinder is generally of paſteboard on an iron axis. In the common operation of ſmoothing by means of the calender, the velocity of the cylinders revolving upon their own *axes*, is in the ratio of their reſpective diameters, ſo that an equal quantity of ſuperficies is conſtantly expoſed of each. In the glazing-calender, or machine, it is only neceſſary that the motions of one of the cylinders ſhould be ſo much accelerated as to produce the friction neceſſary to effect the glazing by rubbing againſt the other cylinders with which it is in contact, ſo as not to be liable to tear or otherways injure the fabric. This motion is produced by means of wheels placed in the following manner: On the axis of the main cylinder A, is a caſt iron wheel of any convenient diameter and number of teeth. This wheel works into the ſtud-wheel B, the number of whoſe teeth is not material to the ſpeed, and whoſe diameter may be regulated ſo as to pitch well into the remaining wheels. The wheel is placed to revolve looſely on an iron ſtud, ſcrewed into the frame-work of the machine. The ſtud-wheel B gives motion to the ſecond ſtud-wheel C, and it continues the motion to the wheel D, which is faſtened on the axis of the firſt iron cylinder. The upper cylinder works merely by friction, as in a common calender, and when the intermediate ſtud-wheel B is removed by being taken off the ſtud, the whole cylinders will revolve exactly as in the common machines, without producing any glazing effect. The ſimplicity of this machine, the regularity of the gloſs which it gives, and the immenſe ſaving of labour, are powerful recommendations in its favour. The great quantity alſo which may be effected by it in a very limited time, renders it peculiarly adapted to meet the occaſional exigencies of the exporter; and the additional advantage of its facility of adaptation to the purpoſes of the common calender, when glazing is not required, adds to its value and utility. Upon preſſing occaſions, one of theſe engines, by being conſtantly employed night and day, will glaze from 600 to 800 pieces of cloth, of 28 yards each, weekly.

Thoſe employed in the late Mr. Miller's works are driven by means of a ſteam engine, by which alſo various other kinds of machinery, adapted to the various operations of the buſineſs, are ſet in motion Should any machinery of this deſcription be conſtructed in works where there may be a general neceſſity of keeping them conſtantly employed for the purpoſe of glazing, it will be very neceſſary that care ſhould be taken that the moving power, whether water, ſteam, or horſes, ſhould be ample; as it muſt be evident, even to thoſe who are not practically converſant with the calculation of power and reſiſtance, that this calender, when employed to glaze, muſt require conſiderably greater force to keep it in motion, than when the cylinders revolve in the ratios of their diameters, for the mere purpoſe of common calendering or ſmoothing.

We are not in poſſeſſion of ſufficient *data* to enable us to aſcertain, with any tolerable preciſion, the quantum of reſiſtance added by the friction; nor are we aware that any accurate experiments have been made for that purpoſe: but it is evident that it muſt be very great in all caſes. It is reaſonable alſo to infer, that it may be conſiderably increaſed or diminiſhed by the texture or fabric of the ſtuff upon which the glazing operation is performed. Hence, if theſe machines be employed conſtantly in large works, and ſet in motion by the ſame power, which alſo drives machinery adapted to other purpoſes, care muſt be taken that the power be ſufficient to effect all the various purpoſes to which it is applied. And ſhould this be attempted, under the impreſſion that the glazing might be performed by the ſame power as common calendering, a deficiency would be found, which muſt render it neceſſary to diſengage part of the machinery, in order to give ſufficient momentum to the reſt. This is, perhaps, one of the moſt common, and at the ſame time, moſt ruinous errors into which the projectors of large works, who are not mechanics, are apt to fall. In the firſt inſtance, deſirous that a large eſtabliſhment ſhould be ſet to work at the leaſt poſſible expence, they too frequently calculate too barely, and are then obliged either to abandon their whole ſcheme at a great loſs, to work it under ſerious and ruinous inconveniences, or to repair, at a triple expence, what they have left deficient at firſt.

GLAZOV, in *Geography*, a town of Ruſſia, in the government of Viatka, on the Tchevtza; 56 miles E.S.E. of Viatka. N. lat. 58° 5'. E. long. 51°.

GLEAD, or GLADE, in *Ornithology*, a name uſed in the northern parts of the kingdom for the *milvus*, or *kite*. See FALCO *Milvus*.

GLEAM is popularly uſed for a ray or beam of light. Among falconers, a hawk is ſaid to gleam, when ſhe caſts or throws up filth from the gorge.

GLEAN, in *Geography*, a river of England, which riſes about four or five miles N. of Stamford in Lincolnſhire, and runs into the eſtuary called the Waſh, five miles N.E. of Spalding.

GLEANING, the act of gathering or picking up the ears of corn left behind, after the field has been reaped, and the crop carried home.

By the cuſtoms of ſome countries, particularly thoſe of Melun and Eſtampes, all farmers and others are forbidden, either by themſelves or ſervants, to put any cattle into the fields, or prevent the gleaning in any manner whatever, for the ſpace of twenty-four hours after the carrying off the corn; on penalty of confiſcation, &c. It hath been ſaid, that by the common law and cuſtom of England the poor are allowed to enter and glean upon another's ground after the harveſt, without being guilty of treſpaſs. Gilb. Jo. 253. Trials *per pais*, ch. 15. 438. This humane proviſion ſeems to be borrowed from the Moſaic law. Levit. xix. 9. xxiii. 22. Deut. xxiv. 19, &c.

Gleaning is a practice that is little heard of in the more northern parts of the kingdom, but which prevails greatly in ſome of the ſouthern diſtricts. The cuſtom is of great antiquity; and whether or not the poor have any legal right, in this country, to glean, except by the expreſs permiſſion of the farmer, it has however been ſo long ſanctioned by its continuance, that it is but rarely interrupted or put a ſtop to by him.

In ſome places where it is carried on to exceſs, it would ſeem neceſſary for the farmers to make regulations in reſpect to it, that ſhould not be broken through on any account whatever. If this be not the caſe, the abuſe is frequently ſo great that they are much injured by it, "as the poor glean among the ſheaves, and too often from them," as is notorious to thoſe who have attended to the practice. It has been therefore ſuggeſted to make it a rule not to ſuffer a gleaner to enter a wheat field until it is wholly cleared of the crop, which would, no doubt, prove a very beneficial regulation. It does not, however, upon the whole, appear that much benefit is derived to the poor from the cuſtom, while it evidently leads to idleneſs, immorality, pilfering, and a looſeneſs of diſpoſition.

GLEBA ALANA, a name by which ſome call the yellowiſh white tripoli.

GLEBÆ, *Addicti*. In the civil law, ſlaves were ſaid to be annexed to the glebe; *i. e.* they went with it, were ſold with it, &c.

The right of patronage ſhould be annexed to a glebe.

GLEBE, Gleba, in *Natural Hiſtory*, *Chemiſtry*, &c. a clod, or piece of ſtone or earth, frequently containing ſome metal, or mineral.

The glebes are carried to the forges to be waſhed, purified, and melted, &c.

Glebe, or *Glebe-land*, is properly uſed for church-land ; "Dos vel terra ad eccleſiam pertinens."

Glebe-land is moſt commonly uſed for land belonging to a pariſh-church, beſide the tithes.

Thus, Lindwood: "Glebe eſt terra in qua conſiſtit dos eccleſiæ ; generaliter tamen ſumitur pro ſolo, vel pro terra culta." Though in the moſt general, and extenſive uſe of the word, glebe is applicable to any land or ground belonging to any benefice, fee, manor, inheritance, or the like.

If any parſon, vicar, &c. hath cauſed any of his glebe lands to be manured and ſowed at his own coſts, with any corn or grain, the incumbents may deviſe all the profits and corn growing upon the ſaid glebe by will. (Stat. 28 H. 8. cap. 11.) And if a parſon ſows his glebe and dies, the executors ſhall have the corn ſowed by the teſtator. But if a glebe be in the hands of a tenant, and the parſon dies after ſeverance of the corn, and before his rent due ; it is ſaid, neither the parſon's executors nor his ſucceſſor can claim the rent, but the tenant may retain it and alſo the crop, unleſs there be a ſpecial covenant for the payment to the parſon's executors proportionably, &c. Wood's Inſt. 163.

GLEBEC, in *Geography*, a town of America, in the ſtate of Virginia ; 10 miles S.E. of Tappahanoc.

GLEBOUS, in *Rural Economy*, a term ſometimes provincially ſignifying the turf or graſſy ſurface.

GLEBOW, in *Geography*, a town of the duchy of Courland ; 18 miles S. of Mittaw.

GLECHOMA, in *Botany*, is derived from Γληχων of Dioſcorides, though the latter is uſually taken for *Pulegium*, or Penny-royal.—Linn. Gen. 291. Schreb. 388. Willd. Sp. Pl. v. 3. 85. Mart. Mill. Dict. v. 2. Sm. Fl. Brit. 625. Juſſ. 113.—Claſs and order, *Didynamia Gymnoſpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, tubular, cylindrical, ſtriated, very ſmall, permanent ; its mouth having five ſharp unequal teeth. *Cor.* of one petal, ringent ; tube ſlender, compreſſed ; upper lip erect, obtuſe, lower lip ſpreading, larger than the upper one, obtuſe, three-cleft, its middle lobe larger, emarginate. *Stam.* Filaments four, under the upper lip, two of which are ſhorter ; each pair of anthers forming themſelves into a croſs. *Piſt.* Germen four-cleft ; ſtyle thread-ſhaped, bending under the upper lip ; ſtigma cloven, acute. *Peric.* none ; the calyx nouriſhing four, ovate *ſeeds* in its boſom.

Eſſ. Ch. Calyx five-cleft. Each pair of anthers converging in form of a croſs.

1. G. *hederacea*. Ground-ivy. Linn. Sp. Pl. 807. Engl. Bot. t. 853.—"Leaves kidney-ſhaped, crenate."—Found in woods and hedges, flowering in April and May. *Root* perennial, and creeping. *Leaves* on foot-ſtalks, dotted beneath with glandular points. *Flowers* axillary, about three to each leaf, prettily ſpeckled with white and blue. *Calyx* ſtriated. *Anthers* white. Ground-ivy has been ſo long and ſo generally known, that it has obtained various appellations, ſuch as Ale-hoof, Gill, Robin-run-in-the-hedge, Cat's-foot, &c. Before the introduction of Hops its leaves ſeem to have been uſed for flavouring and clarifying ale. Gerarde has enumerated a long train of "Vertues" ſuppoſed to be poſſeſſed by this plant ; and when infuſed into tea or honey, it is ſtill a favourite medicine with the common people for coughs. Many animals eat it, though it is ſaid to injure horſes if taken too copiouſly. The ſpecific character is now ſuperfluous, as two ſpecies enumerated in the firſt edition of the *Species Plantarum* are now referred to other *genera*.

Glechoma *Hederacea*, *ground-ivy* or *gill*, in the *Materia Medica*, is a well known plant, growing commonly under hedges and flowering in April. Ground-ivy has a peculiar ſtrong ſmell ; the leaves, according to Dr. Withering, being beſet underneath with hollow dots, in which are glands ſecreting an eſſential oil, and above with little eminences, which do not ſecrete any odoriferous oil ; for this ſurface, when rubbed, yields no peculiar ſcent, whereas the under ſurface affords a pleaſant reviving ſcent. The taſte is bitteriſh, and ſomewhat aromatic. This plant was formerly ſuppoſed to poſſeſs great medicinal powers, not diſcovered by later experience ; accordingly it is omitted in the materia medica by the London college. Its qualities have been deſcribed by different authors, as pectoral, detergent, aperient, diuretic, vulnerary, corroborant, errhine, &c. and it has been recommended for the cure of thoſe diſeaſes to which theſe powers ſeem to be moſt adapted, but chiefly in pulmonary and nephritic complaints. In obſtinate coughs it is a favourite remedy with the poor, who, probably deriving benefit from it, perſiſt in its uſe. Ray, Mead, and ſome others, ſpeak of its being uſefully joined with fermenting ale ; but Dr. Cullen obſerves, "it appears to me frivolous. In ſhort, in many caſes where I have ſeen it employed, I have had no evidence either of its diuretic or of its pectoral effects. In common with many others of the verticillatæ, it may be employed as an errhine, and in that way cure a head-ache, but no otherways by any ſpecific quality." It is uſually taken in the way of infuſion, or decoction, as tea. Woodville Med. Bot.

GLECHONITES, a name given by the ancient *Phyſicians*, to a ſort of wine impregnated with penny-royal, much recommended in all obſtructions. It takes its name from *glechon*, the Greek name of *penny-royal*, or *pulegium*.

GLEDITSIA, in *Botany*, named by Clayton, and adopted by Linnæus, in honour of Dr. John Gottlieb Gleditſch, profeſſor of medicine and botany at Berlin, an advocate of Linnæus againſt Sigeſbeck, and author of a *Syſtema Plantarum*, founded on the inſertion of the ſtamens, as well as of an arrangement of *Fungi*, and various other botanical treatiſes in Latin and German. He died in 1786, aged 72. Linn. Gen. 549. Schreb. 735. Ait. Hort. Kew. v. 3. 444. Mart. Mill. Dict. v. 2. Juſſ. 346. Lamarck Illuſtr. t. 857. Gærtn. t. 146. Claſs and order, *Polygamia Diœcia*; or rather *Diœcia Hexandria*. Nat. Ord. *Lomentaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of three ſmall, ſpreading, acute leaves. *Cor.* Petals three, roundiſh, ſeſſile, ſpreading, reſembling the calyx-leaves. Nectary turbinate, united by its border to the other parts of fructification. *Stam.* Filaments ſix, thread-ſhaped, longer than the corolla; anthers oblong, compreſſed, two-lobed, incumbent.

Female, on a ſeparate plant, *Cal.* Perianth like the male, but of five leaves. *Cor.* Petals five, long, acute, rather ſpreading. Nectaries two, ſhort, like abortive filaments. *Piſt.* Germen ſuperior, broad, compreſſed, longer than the corolla; ſtyle ſhort, reflexed; ſtigma thick, the length of the ſtyle, to which it is longitudinally affixed, downy in the upper part. *Peric.* Legume very large, broad, compreſſed quite flat, divided by numerous tranſverſe partitions, and filled with pulp. *Seeds* ſolitary, roundiſh, hard, and poliſhed.

At the ſummit, generally, of the male ſpike is an united flower, with four calyx-leaves and as many petals, with a nectary and ſtamens like the male, but with a piſtil, producing perfect fruit, as in the female. Hence Linnæus referred this genus to his claſs *Polygamia*, but if it remains there it muſt rather be on account of the difference of ſtructure in its male and female flowers, than for their ſlight ſexual anomalies. Even for this difference of ſtructure we ſhould rather place it in *Diœcia*. See Sm. Introd. to Botany, 470, 485.

Obſ. This genus has conſiderable affinity with *Ceratonia*, eſpecially in the fruit. We cannot apply the term *amentum* to its infloreſcence, which is a ſpike.

Eſſ. Ch. Male, Calyx of three leaves. Petals three. Nectary turbinate. Stamens ſix.

Female, Calyx of five leaves. Petals five. Nectaries two. Piſtil one. Legume.

Some flowers united, four-cleft.

The ſpecies of *Gleditſia* are as yet a maſs of confuſion. *G. triacanthos*, Linn. Sp. Pl. 1509, the original one, a native of North America, was cultivated by biſhop Compton in 1700, and is a tall handſome tree, which bears our climate well, except being ſometimes broken, like *Robinia Pſeudo-acacia*, by ſtrong winds. It is remarkable for its large trifid or compound ſpines, which grow on the trunk to the length of ſix or eight inches, from a very ſlender baſe. The leaves are deciduous, bipinnate, large, conſiſting of innumerable elliptical, ſlightly toothed, nearly ſmooth leaflets, half an inch or near an inch long. Flowers greeniſh, in axillary ſpikes. Some leaves appear to be ſimply pinnate, but we know not whether this is a ſpecific difference or not.

A very diſtinct ſpecies is cultivated with us by the name of *G. chinenſis*, which Linnæus alſo had at Upſal, but he does not ſeem to have deſcribed it The ſpines are compound. Leaves ſimply and abruptly pinnate, of ſeven or eight pair of thin, ſquariſh, unequal-ſided, crenate leaflets, gradually larger upwards, the terminal pair being ſometimes twice the dimenſions of the next.

In Sion gardens, belonging to the duke of Northumberland, is a tree of another ſpecies, of which we find no mention. Its leaves are ſimply pinnate like the laſt, and the leaflets alſo gradually larger upwards, but they are coriaceous, elliptical, their ſides very ſeldom unequal. The calyx-leaves and petals are narrower, ſhorter, and blunter than in *G. triacanthos*. Of its ſpines we have no account, but the leaves and flowers were communicated to us by Mr. Hoy, in Auguſt 1796, as a *Gleditſia* not in the *Hortus Kewenſis*, where, indeed, all that are known are made varieties of the *triacanthos*. From the new edition of this valuable work perhaps more information may be expected.

G. inermis, firſt mentioned by Linnæus in the ſecond edition of Sp. Pl. 1509, ſeems to have been adopted without a ſpecimen, from Plukenet's t. 123. f. 3, to which is added Miller's t. 5, which laſt repreſents a *Mimoſa*, nor does any ſubſequent writer appear to know any thing of this ſpecies.

It would be a tedious and unprofitable taſk to attempt a determination of the ſynonyms of this genus, even if the ſpecies were defined. The latter is a deſirable object, and worthy the attention of thoſe who have perpetual acceſs to the old botanic gardens about London, and can obſerve theſe trees at different periods of growth. It is neceſſary to determine whether the ſimply or doubly pinnated leaves mark a ſpecific diſtinction; whether the ſpines vary according to the age of the tree; and whether the legume is, in any ſpecies, conſtantly ſingle-ſeeded, or merely from accidental abortion. Travellers in America can ſcarcely be expected to throw any light on ſuch botanical queſtions as theſe, though a careful obſerver, reſident there, might render highly important ſervices to botany, and to the moſt uſeful arts of life, by determining firſt the ſpecific differences, and then the economical qualities, of all the American trees, among which the *Gleditſiæ* claim a diſtinguiſhed place. The labours of a Lambert among the Pines, and a Michaux among the Oaks, are models for future enquirers.

GLEDITSIA, in *Gardening*, comprehends a plant of the deciduous tree or ſhrub kind; of which the ſpecies uſually cultivated is the three-thorned acacia (G. triacanthos), which ſeldom riſes higher than a ſhrub in this country.

There are ſeveral varieties with different numbers of ſpines, and with ſtronger and weaker ſpines.

Method of Culture.—Theſe trees are capable of being increaſed by ſowing the ſeeds, which are obtained freſh from America, in a bed of light earth, in the early ſpring ſeaſon, watering them occaſionally when the ſeaſon is dry. It is, however, a much more expeditious practice to ſow them in pots, and plunge them in a moderate hot-bed. The plants ſhould be kept clean during the firſt ſummer after they appear, and in the ſucceeding winter be well protected from ſevere froſts, eſpecially ſuch as are in pots.

The young plants may, moſt of them, in the following ſpring, be removed and ſet out into nurſery rows, at a foot or eighteen inches diſtant from each other, and eight or ten inches in the rows. Such ſmall plants as remain, may be put out in the ſame manner in the next autumn or ſpring.

The plants ſhould continue in this ſituation till they have had two or three years growth, after which they may be tranſplanted into the ſituations in which they are to remain any time towards the latter part of the ſpring ſeaſon.

Theſe plants are found to ſucceed beſt in ſituations where the ſoils are of the more light deep kinds, and rather ſheltered from the inclemency of the atmoſphere.

They are all very ornamental trees, and well adapted to large ſhrubberies, plantations, and pleaſure grounds. When planted alone, on lawns, and large open ſpaces that are kept in ſhort graſs, they produce a fine appearance. They have, however, the diſadvantage of putting forth their leaves at rather a late period.

GLEE, a muſical term derived by Skinner, Junius, Johnſon, and all the etymologiſts, from ȝlıȝȝe, Saxon, *joy*, *mirth*, *ſport*.

> His merry men commaunded he
> To maken him both game and glee.
>
> Chaucer, Rim. S^{r}. Tap. v. 126.

The term, we believe, is not to be found in muſic-books, or muſical writers, before the middle of the 17th century. The firſt time it appears in the title of a collection of canons, rounds, and catches, is in a publication by John Playford, 1667, under the title of "Dialogues, Glees, Ayres, and Ballads, of two, three, and four Voyces."

A glee in muſic implies nothing more in its original ſenſe, in our printed muſic-books, than "a ſong of three or more parts, upon a gay or merry ſubject, in which all the voices begin and end together, ſinging the ſame words." When ſubjects of fugue or imitation occur, and the compoſition is more artificial than ſimple counterpoint, it leſs reſembles a glee than a madrigal, which it might, with more propriety, be called, if the words are ſerious: for a ſerious glee ſeems a ſoleciſm, and a direct contradiction in terms. The word glee, in Saxon, German, and Engliſh dictionaries, ancient and modern, implying *mirth*, *merriment*, and in Chaucer and other old authors, *muſic* itſelf.

GLEET, in *Surgery*, commonly ſignifies the continuation of a thin diſcharge from the urethra, after the inflammatory ſymptoms of a clap have for ſome time ceaſed. However, the running which takes place from the urethra, in caſes of ſtrictures, diſeaſed proſtate gland, &c. is alſo frequently called a gleet. A mere gleet, unattended with any other diſeaſe of the parts, is not accompanied with the remarkable pain and ſcalding ſenſation in making water, which are produced by gonorrhœa. The latter affection may be conſidered as *acute*, while the gleet is quite of a *chronic* nature. It was one of the opinions of Mr. Hunter, that a gleet differed from a gonorrhœa, likewiſe, in not being infectious. It is well known that it was one of the doctrines of this eminent ſurgeon, that the poiſon of gonorrhœa, and that which is productive of lues venerea, are of the ſame quality, and that the different effects are owing to the different ſtructure of the parts concerned in the two diſeaſes. We need not here enter into an inveſtigation of this part of the ſubject. All that we wiſh to obſerve is, that if Mr. Hunter means, when he ſtates, that a gleet differs from a gonorrhœa in not being *infectious*, that a gleet is *not capable of communicating the venereal diſeaſe*, no one can queſtion the accuracy of the obſervation. But, on the contrary, if the aſſertion implies that the matter of a gleet, when applied to the pudenda muliebria, will not bring on a pain in making water, a diſcharge, &c. then we diſſent from the opinion altogether. We have known an inſtance, in which a gentleman, who had had a gleet upon him for upwards of a year, and who, on the preſumption that it was not infectious, ventured to have connection with a young woman, of whoſe continency, with regard to other men, we ourſelves entertain no doubt. However, there may be gleets of various kinds, and ſome of them may be infectious, and others not ſo. When, after a gonorrhœa, a thin diſcharge continues, for a long while, to take place from the urethra, the complaint may depend upon a weakneſs of the veſſels, or, as Mr. Hunter expreſſes it, upon a habit of action, which the parts have contracted. When a gleet ariſes from a ſtricture in the paſſage, or from a diſeaſe of the proſtate gland, the cauſe muſt be referred to irritation, and the cure depends on the removal of the original complaint.

Gleets, which are the conſequence of gonorrhœa, are often exceedingly difficult of cure, and what is very curious, it frequently happens, that, after they have reſiſted every ſort of remedy, and after the patient has long given up the uſe of medicines and injections, a ſudden cure ſpontaneouſly occurs. Many gleets undergo a temporary ſtoppage under particular modes of treatment; but, as ſoon as this is remitted, regularly return again. A vaſt number of gleets depend upon the preſence of a ſtricture in the urethra, and of courſe are not curable by injections. We have often thought that in all caſes of gleets, it ſhould be the invariable cuſtom of the ſurgeon to introduce a bougie, for the purpoſe of aſcertaining whether there is any obſtruction in the paſſage; for, when the diſcharge depends on a ſtricture, the patient might make uſe of balſams, turpentines, and bougies, for years, and yet receive no benefit whatever. At all events, whenever a gleet reſiſts ordinary means, the ſtate of the urethra and of the proſtate gland ought to be examined. See Prostate Gland, *Diſeaſe of*; and Stricture.

Mr. Hunter was of opinion, that the ſpontaneous diſappearance of a gleet, after a long reſiſtance to every ſort of medicine and application, very frequently depended upon accidental changes in the patient's conſtitution. It was another ſentiment of this celebrated ſurgeon, that ſome gleets were connected with ſcrofula. This idea is founded on the circumſtance, that more gleets may be cured by ſea bathing, than any other kind of bathing. It is alſo ſupported by the fact, of ſea water being ſometimes an effectual means of cure, when employed as an injection.

We have always found fault with this plan of judging of the nature of diſeaſes. If a diſorder yields to mercury, practitioners are apt to decide immediately, that the complaint is venereal. If a malady, like a gleet, gives way to ſea bathing, which benefits ſcrofulous complaints, ſuch ſurgeons, as reaſon on Mr. Hunter's principles, will immediately ſet down the caſe as ſcrofulous. It is never remembered in this calculation, that mercury cures many diſeaſes beſides the venereal; and ſo does ſea bathing many complaints beſides thoſe which are of a ſcrofulous nature.

Gleets have alſo been repreſented as always connected with a relaxed conſtitution, though we think we have ſeen the complaint in ſubjects, who were ſtrong, robuſt, and young, with every appearance of general health, and whoſe ſtate ſeemed to us a ſtriking contradiction to the foregoing obſervation.

Gleets, as we have before ſtated, are often exceedingly difficult of removal. Sometimes, indeed, they may be got rid of with tolerable eaſe; but in other inſtances, they completely fruſtrate the art of ſurgery, and the patient, tired of the inefficacy of different remedies, relinquiſhes the trial of all. In ſlight caſes, and occaſionally in inveterate ones, a cure may be effected by exhibiting internally the balſam of copaiva, the oleum terebinthinæ, or the tincture of lyttæ (cantharides). It is well worthy of notice, that when a cure can be accompliſhed by theſe means, benefit is ſoon derived from their employment. For this reaſon, when they neither diminiſh, nor remove the gleet in the courſe of five or ſix days, Mr. Hunter made it a rule never to continue their uſe any longer, but have recourſe at once to other methods. We have already remarked the great tendency of many gleets to return, after being for a time ſtopped by different modes of treatment. Hence practitioners ſhould never diſcontinue the ſucceſsful plan immediately the diſcharge ceaſes, but perſiſt in its adoption for ten days or a fortnight, after all the ſymptoms have entirely gone off.

In relaxed habits, gleets are very likely to be cured by the cold bath, ſea bathing, bark and ſteel medicines. Cold bathing indeed often ſucceeds in every kind of conſtitution, when other methods are of no avail. We have known ſtrong young men labouring under gleets, who could not get rid of them in any way in London; but who got well almoſt immediately on going to the ſea ſide, and bathing there. There can be no doubt alſo, that ſome beneficial revolution in the ſyſtem, ariſing from the change of air, might have a conſiderable ſhare in the cure. We lately had under our care a gentleman with a gleet, which had laſted nine months, but diſappeared all at once on the patient going for a ſhort time to a part of the country which was not near the ſea.

There are two principal kinds of injections in uſe for the cure of gleets, *viz.* aſtringent and irritating ones.

The aſtringent ones are, for the moſt part, ſuch as the decoction of bark, and ſolutions of zincum vitriolatum, alum, or acetite of lead. An injection of proper ſtrength, containing cuprum vitriolatum, bolus gallicus, and camphor, is alſo an exceedingly eligible one.

The beſt irritating injection which we know of, is that made by diſſolving two grains of the hydrargyrus muriatus in eight ounces of diſtilled water.

Bougies may alſo be conſidered as acting on the urethra as irritating applications, and hence they are occaſionally recommended to be worn for the cure of gleets. In general, common bougies are employed; but ſometimes others, medicated with camphor or turpentine, are uſed.

In irritable conſtitutions, the latter kind of injection and the bougies may excite a good deal of irritation, pain, ſtranſgury, &c. ſo that ſome circumſpection is neceſſary in the employment of ſuch means. We may ſtate, indeed, that no endeavour ſhould ever be made to cure a gleet, by exciting irritation in the urethra with ſtimulating injections, or bougies, before milder means have failed. We have found a weak injection of the hydrargyrus muriatus more frequently ſucceſsful than any other. One grain to ſix ounces of water is quite ſtrong enough to begin with, and the ſtrength may be gradually augmented, in proportion as the urethra appears capable of bearing it. The practitioner muſt not leave off the injection as ſoon as the diſcharge ceaſes; for if he does ſo, the gleet will generally recur. The plan ſhould ſtill be followed up for about a fortnight.

When gleets are to be cured by bougies, it is neceſſary to wear theſe inſtruments about a month or ſix weeks before any dependence can be put in the permanence of the cure.

Neither the ſurgeon nor the patient ſhould be deterred from perſiſting in the trial of irritating injections or bougies, by the circumſtance of their appearing to increaſe the diſcharge at firſt. This they always do.

Mr. Hunter thought that moderation and regularity in diet were conducive to the cure of gleets. So is a quiet kind of life in the generality of caſes, but there are inſtances in which gleets ſeem to be benefited and cured by rough exerciſe on horſeback.

A return or an increaſe of a gleet is very apt to be the conſequence of intercourſe with women, and the patient often thinks that he has received a freſh infection. Mr. Hunter thought that the caſe might be diſcriminated by the ſhort time which intervenes between the connection and the re-appearance of the diſcharge. Gleets are often ſo exceedingly obſtinate, that the ſurgeon cannot be informed of too many modes and principles of cure. On this account we deem it right to mention that gleets ſeem to be curable on the principle of counter-irritation. Hunter has ſeen a gleet ſtop on the breaking out of two chancres on the glans penis, and the diſcharge has been known to ſtop as ſoon as a bliſter was applied to the under part of the penis.

Gleets have likewiſe been cured by electricity.

Women are liable to gleets, and the diſeaſe being ſituated in leſs irritable parts, whatever injections are uſed, may be made ſtronger than for male patients.

It is almoſt unneceſſary to remark, that balſams and turpentines, internally given, can have no ſpecific effect on the parts affected in women, as they have on the urethra in men. Hence it would be abſurd to preſcribe ſuch medicines for female patients.

GLEIBERG, or GLITZBERG, in *Geography*, a town of Germany, in the principality of Naſſau Weilburg; eight miles N.E. of Wetzlar.

GLEICHAN, a county of Germany, in the principality of Gotha, divided between the princes of Gotha, Hohenloe, Hatzfield, and Schwartzburg, ſituated on the banks of the Ohr, between Erfurt and Gotha.

GLEICHEN, FREDERIC VON, in *Biography*, was born in the year 1714. He was intended and educated for the profeſſion of arms, and ſpent the early part of his life as an officer in the ſervice of Bayreuth, and was diſtinguiſhed by his attention to military diſcipline. He roſe to the rank of lieutenant-colonel, and obtained the favour of the margrave. His honours did not ſit eaſy upon him, he ſighed for retirement, and in 1756 his wiſhes were accompliſhed; he obtained a diſmiſſion from the ſervice with a handſome penſion, to which was afterwards added the rank of privy counſellor. He now had leiſure to diſtinguiſh himſelf as a philoſopher, a naturaliſt, and a writer. His attention was accidentally excited to microſcopical obſervations, and not ſatisfied with the inſtruments already in exiſtence he conſtructed an univerſal microſcope, with which he combined the ſolar microſcope. His principal obſervations relate to ſeminal animalcula, and infuſion animals: he would ſit day after day at his glaſs, and was always diſpleaſed if he experienced any interruption while engaged in his favourite purſuit. By daily practice he had acquired uncommon acuteneſs of ſight, which was of the greateſt advantage to him in his reſearches. Though he had an ardent attachment to ſcience for the love of it, yet he deviſed various economical plans, from which he expected to derive great emolument, but they were the ſchemes of a theoriſt, and did not prove of real advantage either to himſelf or the world. He died in June 1783, leaving behind him numerous works in natural hiſtory, as "Obſervations on the Parts of Fructification in Plants when in bloom, and on the Inſects found in them:" "Hiſtory of the Common Houſe Fly:" "Treatiſe on ſeminal Animalcula and infuſion Animals:" "Eſſay towards the Hiſtory of the Tree-louſe of the Elm:" this inſect, the aphis ulmi campeſtris, coſt our author the labour of eight years; it is the cauſe of the bladders on the leaves of the elm-tree during the ſpring. Gen. Biog.

GLEICHENBERG, in *Geography*, a town of the duchy of Stiria; 10 miles N. of Racklſburg.

GLEICHENBERGAN, or GLEICHEM BERG, a town of Germany, in the county of Henneberg; four miles E. of Romhild.

GLEICHENIA, in *Botany*, named by the writer of this article in honour of Philip Frederick, Baron von Gleichen, author of a ſplendid microſcopical work on the ſtructure and phyſiology of the parts of fructification in ſeveral plants, publiſhed at Nuremberg, in folio, with coloured plates, in 1764. As the ſeeds of ferns were among the ſubjects to which Baron Gleichen paid great attention, a genus belonging to this curious tribe was judged peculiarly proper to commemorate him. Smith in Mem. de l'Acad. de Turin, v. 5. 419. t. 9. f. 10. Tracts, 258. t. 1. f. 10. Swartz. Fil. 165. Brown. Prod. v. 1. 160. (Mertenſia; Willden. in Act. Holm. ann. 1804. 165. t. 4, 5. Swartz. Fil. 163.)—Claſs and order, *Cryptogamia Filices*: ſect. *Annulatæ*. Nat. Ord. *Filices dorſiferæ*.

Eſſ. Ch. Capſules in a ſimple, concentric, orbicular ſeries; each ſeries conſtituting a round ſeparate dot, on the back of the leaf. Cover none.

This genus was firſt founded on the *Onoclea polypodioides* of Linnæus, an elegant and ſingular fern, native of the Cape of Good Hope. In this the capſules are uſually three, rarely four together, half immerſed in the under ſide of the frond, and as each burſts by a longitudinal fiſſure, they all together have exactly the appearance of a ſingle capſule, of three cells, and three valves, the partitions ſeeming to originate from the centre of each valve. Traces of a jointed ring appear on ſome of the valves only, and rather reſemble the corrugations of thoſe ferns termed *ſpuriouſly annulated*. Several other ſpecies, ſtrictly allied to the original one in habit and appearance, ſo as to be at firſt ſight ſcarcely diſtinguiſhable from it, have been found in New Holland, and have been defined by Dr. Swartz and Mr. Brown. In theſe the capſules are not immerſed in the leaf, though each ſeries ſtands in a ſlight depreſſion. In *G. dicarpa* of Brown there are only two together; in others three, four, or even ſix. Theſe new diſcovered ſpecies evince the propriety of Mr. Brown's meaſure, of reducing the *Mertenſia* of Willdenow and Swartz to *Gleichenia*, as their fructifications exactly agree. *Dicranopteris* of Bernhardi does not in our opinion ſo well aſſort with them, having an irregular accumulation of ſtalked capſules in each dot, though its habit is preciſely that of *Mertenſia*. Mr. Brown, having examined theſe ferns alive, determines them to be furniſhed with a complete, ſtriated, tranſverſe, rarely oblique, ring.

This genus naturally divides itſelf into two ſections. The original *Gleicheniæ*, of which there are five ſpecies, have the ultimate branches of their repeatedly forked ſtem pinnate, their leaflets or *pinnæ* deeply pinnatifid, with ſhort, triangular, or rounded ſegments, each ſegment bearing a ſingle dot or ſeries of capſules. The *Mertenſiæ* have their ultimate branches deeply pinnatifid, the ſegments linear, with a row of numerous dots on each ſide of the midrib of each ſegment, eſpecially at its lower half. Of theſe we are acquainted with five or ſix ſpecies, all natives of the Eaſt or Weſt Indies, or of New Holland and its neighbourhood.

GLEICHENSTEIN, in *Geography*, a town and caſtle of Germany, in the territory of Eichsfeld; ſeven miles S.E. of Heiligenſtadt.

GLEINSTOLLEN, a town of the duchy of Stiria; 14 miles S.E. of Voitſberg.

GLEISS, a town of Switzerland, in the Valais; 26 miles E. of Sion.

GLEIWITZ, or GLIWICE, a town of Sileſia, in the principality of Oppeln; 20 miles N.E. of Ratiſbon. N. lat. 50° 17′. E. long. 18° 35′.

GLEN RIVER, is a river of Lincolnſhire, which riſes near Ropſley, and purſues a courſe nearly S.S.E. to Bracebrough, when, turning ſuddenly N.E., it paſſes to Kates bridge and through the Fens, by Surfleet, to the ſea at Foſdyke Waſh; for the greater part of its courſe through the Fens this river is navigable for barges, a circumſtance which was over-looked in compiling the alphabetical liſt of inland navigations in our article CANAL. The ſmall river or drain called the Bourne, which branches from the Glen and proceeds up to Bourne town, is alſo navigable for ſome diſtance upwards. The South Forty-foot navigable drain commences very near to this river, below the mouth of the Bourne, and proceeds by a circuitous route to Boſton. See SOUTH FORTY-FOOT.

GLENAA, a mountain in the county of Kerry, Ireland. See KILLARNEY.

GLENAN ISLANDS, a cluſter of ſmall iſlands in the Atlantic, near the coaſt of France. N. lat. 47° 43′. W. long. 3° 55′.

GLENARM, a poſt town of the county of Antrim, Ireland, on the eaſt coaſt of it, adjoining which is Glenarm caſtle, the ſeat of the counteſs of Antrim. The town is pleaſantly ſituated on the ſea-ſhore, near the bay of the ſame name. It is 104 miles N. from Dublin, and 24 N. from Belfaſt.

GLENAVY, a poſt-town of the county of Antrim, Ireland, ſituated near the eaſtern border of Lough Neagh. It is 77 miles N. from Dublin on the road to Antrim.

GLENCOE, a vale of Scotland, in the county of Argyle, near Loch Leven, where, in the year 1691, the inhabitants were maſſacred contrary to the faith of a royal proclamation; 17 miles N. of Inverary.

GLENDALOUGH, GLANDELOUGH, or *Glendalloch*, commonly called the *Seven Churches*, an intereſting object to travellers in the county of Wicklow, Ireland, 22 miles S. from Dublin, and about ſeven or eight miles weſt from Rathdrum. Its name is derived, according to Mr. Ledwich, from its being ſituated in a valley with lakes, from *glen*, a valley, and *loch*, a lake. That this was the true origin of the name ſeems to be confirmed by Hoveden, who was chaplain to Henry II., and who calls it equivalently in Latin, Epiſcopatus Biſtagnenſis, the biſhopric of the two lakes. Glendalough is ſurrounded on all ſides, except to the eaſt, by ſtupendous mountains, whoſe vaſt perpendicular height throws a gloom on the vale below, well ſuited to inſpire religious dread. From theſe, many mountain-ſtreams fall into the valley, and, forming a junction, aſſume the name of Avonmore. One of theſe ſtreams, called St. Kevin's keeve, is ſtill an object of ſuperſtition; weak and ſickly children being dipped in it every Sunday and Thurſday before ſun-riſe, and on the third of June, which is St. Kevin's day. The two lakes in the vale are divided from each other by a rich meadow; the reſt of the ſoil is ſo rocky as to be incapable of tillage by the plough. The names of the adjoining mountains, in which the word *Derry* often occurs, are ſuppoſed to denote that they were formerly covered with wood; at preſent they have only brown heath, or more ſable peat. Between the cathedral and upper lake is a group of thorns of great ſize; and near the cathedral the trunk of an aged yew, which meaſures three yards in diameter. From the remains of walls above, and the traces of foundations below the ſurface of the earth, the town is ſuppoſed to have been once pretty large, but the only ſtreet appearing is the road leading from the market place into the county of Kildare. It is in good preſervation, being paved with ſtones placed edgewiſe, and ten feet in breadth. There are ſeven churches of conſiderable antiquity, and ſome chapels which appear to be of later conſtruction. St. Kevin was the patron ſaint, and his name conſequently is given to many of the ſurrounding objects. He is ſaid to have founded the town or monaſtery in the ſixth century; but Ledwich attributes the erection to the Oſtmen, who infeſted Ireland, in the ninth century. Some figures in a chapel, containing the tomb of St. Kevin, furniſh ſome plauſible arguments in ſupport of this opinion. There are two round towers at Glendalough, both of which are adjoining churches, but neither the cathedral nor abbey has ſuch an addition, though if a belfry were the object of theſe buildings, the preference would probably have been given to them. Theſe towers were alſo, in Mr. Ledwich's opinion, the work of the Oſtmen. The arguments for and againſt this opinion will be conſidered under the article ROUND TOWERS. A monaſtery having been founded here, and the ſuppoſed miracles of St. Kevin having been proclaimed, numbers flocked to his ſhrine; as Girald Cambrenſis ſays, in what had been a barren wilderneſs, were to be found, after a few years, not only churches and good houſes, but much wealth. According to the Iriſh annals, the town thus founded was often plundered by the piratical freebooters of the north, who, as they ſubſiſted ſolely by depredations, without reluctance, frequently pillaged their own countrymen. In 1162, Laurence O'Toole, afterwards archbiſhop of Dublin, was elected abbot; and in a few years after earl Strongbow granted the abbey and parſonage to Thomas, the nephew of Laurence. The charter is one of the moſt valuable and ancient in Ireland, as it preſerves the poſſeſſions, privileges, and immunities of the abbey. Previous to this, Glendalough had alſo had a biſhop; but, in 1152, Cardinal Paparon endeavoured to unite it to the ſee of Dublin. This was reſiſted, and, in 1179, pope Alexander III. confirmed the city to its biſhop, ſaving the rights of the abbot. A letter, written in 1214, is quoted by Ledwich, to ſhew that Glendalough was at that time become a neſt of thieves and robbers. In the reign of king John, the ſee was united to that of Dublin; but the ſect of the O'Tooles, who were very powerful, kept it, in ſome degree, independent until 1497, when the biſhop formally ſurrendered his right and claim in the Chapter-houſe of St. Patrick, Dublin. The Seven Churches, when approached by the bridge of Derrybawn, form a very pictureſque and pleaſing ſcene. The bridge is thrown over the Avonmore, and is compoſed of three elliptic arches. Derrybawn, covered to a great extent with an oak coppice on one ſide, and the huge broccagh on the other, confines the view up the river to the valley; at the end of which the great round tower, and the other ruins, appear to great advantage. As the new military road has made Glendalough eaſily acceſſible, it is frequently viſited by travellers. Ledwich's Antiquities.

GLENE, Γληνη, properly ſignifies the cavity or ſocket of the eye.

Glene is more frequently uſed by anatomiſts for the ſhallower cavities of bones, into which ſome other bone is received and articulated.

By which it ſtands diſtinguiſhed from *cotyle* or *acetabulum*, which is a deeper cavity, intended by nature for the like purpoſe.

GLENEGAD Head, in *Geography*, a cape of Ireland, in the peninſula of Inis Lowen, county of Donegal. W. long. 7° 41′ from Greenwich, N. lat. 55° 20′.

GLENGARRIFF, a harbour of Ireland, in the county of Cork, on the north-eaſt part of Bantry-bay. The arbutus grows in this neighbourhood in great perfection.

GLENGARY, the name of a county in Upper Canada, bounded on the E. by the line which ſeparates Upper from Lower Canada; on the S. by the river St. Lawrence; and on the W. by the townſhip of Cornwall, running N. 24° W., until it interſects the Ottawa or Grand river, thence deſcending the ſaid river till it meets the fore-mentioned ſeparating line. Glengary county comprehends all the iſlands contiguous to it in the river St. Lawrence.

GLENICZA, a river of the duchy of Warſaw, which runs into the Obra, near Koſten.

GLENKEN'S Canal, is the parliamentary name of an inland navigation, made ſince the year 1802, in Kirkcudbright county in Scotland. See Canal.

GLENLUCE, a town of Scotland, in the county of Wigton, which ſprang from an abbey of Ciſtertians, founded in 1190, called "Vallis Lucis." It is ſituated at the northern extremity of a large bay to which it gives name; 18 miles W. of Wigton. N. lat. 54° 58′. W. long. 4° 27′. The bay extends on the S. coaſt of Scotland from the Mull of Galloway to Burrowhead. N. lat. 54° 50′. W. long. 4° 50′.

GLENMORE, a ſmall iſland on the W. coaſt of Scotland, at the mouth of Loch Suart. N. lat. 56° 38′.

GLENOID, in *Anatomy*, from γληνη, *the articular cavity of a bone*, and ειδος, *form*, a term applied to certain articular ſurfaces, particularly where the hollow is not deep.

GLERS, in *Geography*, a town of Germany, in the county of Tyrol; 21 miles W. of Bolzano.

GLESE, a river of Louiſiana, which runs into the Miſſiſippi, N. lat. 37° 15′. W. long. 90° 14′.

GLESUM, or Glæsum, in *Natural Hiſtory*, a name given by many of the ancients to the common yellow amber or ſuccinum. The word ſeems to have been originally German, and to have been adopted by the Romans in their conqueſts in that part of the world. They ſeem to have uſed the word in general for any tranſparent ſubſtance, and thence to have applied it to amber as a tranſparent ſtone. See Glass.

GLETCHERHORN, in *Geography*. See Jungfrau.

GLIANY, a town of Poland, in Galicia; 20 miles E. of Lemberg.

GLIESA, a town of Sweden, in Weſt Bothnia; 25 miles W.N.W. of Tornea.

GLIGVI, a town of Aſia, in Dageſtan; 90 miles N. of Teflis.

GLIKEON, a town of European Turkey, in the province of Epire; 26 miles W. of Arta.

GLIMS Holm, one of the ſmall Orkney iſlands, which affords paſtures; 2 miles S. of Pomona, between that and Barray.

GLIMMER, or Cat-silver, in *Mineralogy*, according to Dr. Woodward, "Method of Foſſils," p. 14, are names for *Mica*, which ſee. Gliſt, ſpangles, daze, and ſilver, are other names by which the miners and quarrymen deſignate the ſhining plates of this ſubſtance which they meet with diſperſed in the earths and ſtones in their works. The late Mr. William Martin obſerves, "Outlines," p. 141, "Glimmer is frequently diſperſed through the ſand-ſtones and clay, forming vegetable petrifactions, but never conſtitutes their whole ſubſtance." In Derbyſhire, it is not uncommon to find nodules, or round neſts or maſſes of mica, in thin and ſeparate plates, in the firſt, or millſtone grit, which fall out on expoſure, and leave ſpherical holes, a circumſtance which has, according to Mr. Farey, given riſe to rock-baſins or holes on the tops of large looſe blocks of ſtone where the water ſtands in many inſtances after rain, but not perpetually, as the vulgar opinion is. See Rock-Basins.

GLINA, in *Geography*, a river of Croatia, which runs into the Save; 12 miles W. of Patrinia.

GLINLOUGH, a lake of Ireland, in the northern part of the county of Leitrim, from which a ſmall river flows to Sligo bay.

GLINNINO, a town of Ruſſia, in the government of Novogorod, on the Mſta; 12 miles S.E. of Borovitchi.

GLINSK, a town of Ruſſia, in the government of Tchernigof, on the river Sula; 80 miles S.E. of Tchernigof.

GLINUS, in *Botany*, derives its name from γλινος or γλεῖνος, a word uſed by Theophraſtus, and denoting a kind of maple, though we cannot trace any ſimilitude between that tree and the little herbaceous plant, to which the name was applied by Loefling; but it was adopted by Linnæus. —Linn. Gen. 243. Schreb. 328. Loefl. Iter. 145. Willd. Sp. Pl. v. 2. 929. Mart. Mill. Dict. v. 2. Lamarck Dict. v. 2. 728. Gærtn. t. 130. Juſſ. 316.—Claſs and order, *Dodecandria Pentagynia*. Nat. Ord. *Caryophyllei*, Linn. *Ficoideæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of five ovate, acute, concave leaves, coloured within, permanent, and downy. *Cor.* none; nectaries about five, reſembling narrow petals, ſhorter than the calyx, and unequally two or three-cleft. *Stam.* Filaments about fifteen, awl-ſhaped, flat, as long as the calyx; anthers incumbent, oblong, compreſſed, two-lobed. *Piſt.* Germen of five ſides; ſtyles five, ſhort; ſtigmas ſimple. *Peric.* Capſule ovate, with five cells, five ſides, and five valves. *Seeds* numerous, roundiſh, in a ſingle row at the baſe of the valves, tubercled, each attached by a long thread-like ſtalk.

Eſſ. Ch. Calyx five-cleft. Corolla none. Nectaries cloven briſtles. Capſule five-cornered, five-celled, five-valved, with many ſeeds.

1. G. *lotoides*. Linn. Sp. Pl. 663. Burm. Ind. 112. t. 36. f. 1. "Stem hairy. Leaves obovate."—Native of Spain, and found by Loefling in a gravelly ſoil near Talavera del Badajoz, alſo in a dried-up rivulet between Merida and Truxillo. *Root* annual. *Stems* procumbent, jointed, hairy. *Leaves* obovate, on foot-ſtalks. *Flowers* nearly ſeſſile, crowded together, ſometimes on very ſhort hairy ſtalks. A figure of this ſpecies is deſtined to appear in the *Flora Græca*, t. 472, from a drawing made at Smyrna, and from which it appears that what Gærtner conſidered as *petals*, are more probably *nectaries*, as not being external to the ſtamens; after all, they ought perhaps to be called

barren filaments. They ſeem, from the dried ſpecimens, to be ranged alternately with the real ſtamens.

2. G. *dictamnoides.* Willd. Sp. Pl. v. 2. 929. Pluk. Amal. 10. t. 356. f. 6.—“ Leaves round, hairy. Stem ſhrubby, proſtrate. Leaflets of the calyx lanceolate.”—Native of India. It ſeems doubtful whether G. *dictamnoides* be not merely a variety of *lotoides*; but as Willdenow ſtill keeps them ſeparate, on the authority of a dried ſpecimen, we have retained the ſpecies.

3. G. *ſetiflorus.* Willd. Sp. Pl. v. 2. 929. Vahl. Symb. 3. 64.—“ Leaves obovate, plaited. Stem ſhrubby. Leaflets of the calyx ovate.”—Native of inundated woods in Arabia Felix during the rainy ſeaſon. The whole plant is hoary, from very thick hairs, which are longer than in G. *lotoides*. This ſpecies was firſt deſcribed by Vahl, from Forſkal's ſpecimen which we have examined. The pubeſcence is beautifully ſtellated and very denſe.

Glinus, in *Ichthyology*, a name by which Bellonius and ſome other authors have called a ſmall ſea-fiſh, more commonly known by the name of the dracunculus.

GLIS. In the common acceptation of the word, this only ſignifies the dormouſe: but Linnæus has uſed *glires* in a larger ſenſe: and, in his Syſtem of Zoology, makes it the name of the fourth order of the mammalia claſs of animals. The characters of the creatures of this claſs are, that they have only two fore-teeth in each jaw; they have no *dentes canini*, or dog-teeth; and the feet have toes, and are formed for leaping when they run. The animals of this claſs are the ſeveral ſpecies of the *Hyſtrix*, *Cavia*, *Caſtor*, *Mus*, *Arctomys*, *Sciurus*, *Myoxus*, *Dipus*, *Lepus*, and *Hyrax*; which ſee reſpectively.

Glis, a name given to ſeveral ſpecies of *Myoxus*; of *Didelphis*; of *Mus*; and of *Arctomys*; which ſee reſpectively.

Glis *Volans*. See Vespertilo *Spaſma*.

GLISCHROMICTHES, in *Natural Hiſtory*, the name of a genus of compound earths. The word is derived from γλισχρος, *touch*, and μιχθεις, *mixed*. The bodies of this genus are loams compoſed of ſand and a more viſcid clay, and are of a tough and firm texture.

The earths of this genus are uſed in making bricks, and on ſome other occaſions; and are of ſeveral diſtinct ſpecies.

GLISSA, in *Ichthyology*, the name of a ſea-fiſh of the tunny kind, but of a perfectly ſmooth ſkin, and wholly free from ſcales. It uſually grows to the length of two cubits, and the thickneſs of a man's body: it is of a very round body, and has very rough jaws, but no diſtinct teeth; its tail is forked, but not ſo arched or lunated as that of the tunny; it lives in deep water, and is a fiſh of very delicate taſte. Geſner. De Piſc. p. 1158.

GLISSON, Francis, in *Biography*, was born at Rampiſham, in Dorſetſhire, in the year 1597, and educated at Caius college, Cambridge, of which he became a fellow, and in 1627 was incorporated M.A. in Oxford. He then applied himſelf to the ſtudy of phyſic, in which faculty he took his degree of doctor at Cambridge, and in that univerſity was made regius profeſſor of phyſic, which office he held about 40 years. He ſettled in London for the practice of his profeſſion, and was admitted a fellow of the College of Phyſicians in 1635. In 1639 he was choſen reader of anatomy in the college, and in that department acquired great reputation by his lectures “De Morbis Partium,” which he was particularly requeſted by his colleagues to make public. During the civil wars he retired to Colcheſter, where he practiſed with great credit in thoſe times of confuſion, and was in the town at its memorable ſiege by the parliamentary forces in 1648. He was one of that ſmall, but illuſtrious ſociety, who inſtituted a weekly meeting in London about the year 1645, for the purpoſe of promoting inquiries into natural and experimental philoſophy, which, after having removed to Oxford during the troubles, was augmented in London after the reſtoration, and became ultimately the Royal Society. He was afterwards ſeveral years preſident of the College of Phyſicians, and died in 1677, in the pariſh of St. Bride's, London, aged 80. Gliſſon left the following works: 1. “Tractatus de Rachitide, ſeu morbo puerili Rickets dicto,” firſt publiſhed in 1650; it went through ſeveral editions abroad, and two tranſlations into Engliſh the year after its publication, by Philip Armin, and Nicholas Culpepper. 2. “Anatome Hepatis, &c.” London, 1654; afterwards reprinted at Amſterdam and the Hague. This work contains a much more exact deſcription of the liver than had before appeared. The capſule of the *vena portarum* was ſuppoſed to be firſt diſcovered by him, and has ever ſince borne his name; but Walæus and Pecquet had ſeen it a ſhort time before, and he has only the merit of having firſt examined and deſcribed it with accuracy. Dr. Gliſſon's largeſt work is a metaphyſical piece, *viz.* 3. “Tractatus de Natura Subſtantiæ Energetica, ſeu de Vita Naturæ, ejuſque tribus primis Facultatibus,” Lond. 1672, in 4to., a profound and laborious performance, in the very depths of the Ariſtotelic philoſophy, with all its numerous diviſions, and an extraordinary effort of the underſtanding in a man of an advanced age.—4. His laſt publication, “Tractatus de Ventriculo et Inteſtinis, cui præmittitur alius de partibus continentibus in genere, et in ſpecie, de iis Abdominis,” Lond. 1676, 4to., Amſt. 1677, 12mo, contains every thing at that time known concerning the alimentary canal, arranged in a clear manner, with various new obſervations. In a word, Gliſſon was exceeded in judgment and accuracy by none of that group of Engliſh anatomiſts, who followed the ſteps of Harvey with great ardour and ſucceſs; inſomuch that Boerhaave terms him “omnium anatomicorum exactiſſimus,” and Haller ſpeaks in praiſe of all his writings. Aikin Biog. Mem. of Med. Eloy. Dict. Hiſt.

GLISTER. See Clyster.

GLITNESS, in *Geography*, one of the ſmaller Shetland iſlands, on the E. coaſt of Shetland; 11 miles N. of Lerwick. N. lat. 60° 22′. W. long. 1° 16′.

GLIUBEN, a town of European Turkey, in Dalmatia; 18 miles S.E. of Moſtar.

GLIZADE, in *Fencing*, is an operation performed by dextrouſly making your blade ſlip along that of your adverſary by a movement of the wriſt, and a quick forward extenſion of the arm, without deviating from the line of direction. This is a ſimple, and at the ſame time a maſterly movement in fencing.

GLOBBA, in *Botany*, a Malay name adopted by Rumphius and Linnæus, under which, however, they have included a very heterogeneous aſſemblage of ſpecies. We ſhall ſpeak only of ſuch as agree in generic character with the original one, ſeen and deſcribed by Linnæus, and preſerved in his herbarium. Linn. Mant. 2. 143. Schreb. 25. Willd. Sp. Pl. v. 1. 153. Mart. Mill. Dict. v. 2. Roſcoe in Tr. of Linn. Soc. v. 8. 355. t. 20. f. 13. Ait. Hort. Kew. ed. 2. v. 1. 9. Juſſ. 63. Lamarck Dict. v. 2. 729.—Claſs and order, *Monandria Monogynia*. Nat. Ord. *Scitamineæ*, Linn. *Cannæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, tubular, permanent; its border three-lobed. *Cor.* of one petal; tube long, cylindrical, ſlender; outer limb in three, nearly equal, ovate, ſpreading lobes; inner of two ſimilar lobes, and a central, vertical, prominent lip, cloven at each extremity. *Stam.* Filament one, prominent, long, linear, channelled, dilated at its ſummit; anther oblong, of two diſtinct parallel lobes, attached by its back to the dilated part of the filament. *Piſt.* Germen inferior, roundiſh; ſtyle thread-ſhaped, the length of the filament and embraced by it; ſtigma obtuſe. *Peric.* Capſule roundiſh, of three cells and three valves. *Seeds* numerous.

Eſſ. Ch. Anther in two parts. Filament elongated, incurved, bearing a lobed appendage. Style thread-ſhaped, embraced by the anther. Corolla with three outer lobes and three inner, the middlemoſt vertical and cloven.

1. G. *marantina.* Linn. Mant. 2. 170. Sm. Exot. Bot. v. 2. 85. t. 103. (Colebrookia bulbifera; Donn Cant. 1.)—Appendage of the filament four-lobed, divaricated, terminal. Spike not taller than the leaves. Bracteas elliptical, broad, longer than the calyx.—Native of Bengal, from whence it was ſent by Dr. Roxburgh to the late lady Amelia Hume in 1800. It flowers in the ſtove in July and Auguſt. *Root* perennial, tuberous. *Stems* ſeveral, herbaceous, about two feet high, ſimple, leafy. *Leaves* elliptical, acute, entire, with one rib and numerous parallel ſimple veins; ſmooth above; ſoft and finely downy beneath; their footſtalks long, ſheathing, bearded at the top, which is extended upwards into a pair of rounded auricles. *Spike* terminal, ſolitary, ſimple, erect, more or leſs lax, about as tall as the leaves, or rather under that height. *Bracteas* alternate, ſeſſile, elliptical, broad, concave, many-ribbed, ſomewhat downy, minutely dotted; the lower ones each bearing one ovate bulb; the upper ones a cluſter of ſeveral *flowers*, each of which is accompanied by its own ſmaller bractea. Theſe *flowers* are very tranſient, ſlender, orange-coloured, with a deeper ſpot in the centre of the lip.

2. G. *racemoſa.* Sm. Exot. Bot. v. 2. 115. t. 117. (Deoſara; of the inhabitants of Nepal.)—Appendage of the filament arrow-ſhaped, narrower than the anther. Cluſter elongated, cylindrical. Bracteas ſhorter than the calyx, deciduous.—Gathered by Dr. F. Buchanan in the woods of Upper Nepal, flowering in June. Habit of the laſt, but taller, with larger more pointed *leaves.* The *infloreſcence* is much more ſtriking, and conſiſts of a long terminal *racemus* of numerous orange-coloured *flowers*, which are twice the ſize of the former, and eſſentially diſtinguiſhed from that by the arrow-ſhaped form of the appendage to their filament, which does not extend beyond the anther, except at its rounded termination.

3. G. *verſicolor.* Sm. Exot. Bot. v. 2. 116. t. 117, *a, b, c,* (Hura Siamenſium; Kœnig in Retz. Obſ. faſc. 3. 49.)—Appendage of the filament four-lobed, divaricated. Cluſter ſomewhat corymboſe. Bracteas ſhorter than the calyx. Lip towards the middle of the filament.—Found by Kœnig plentifully in graſſy ſhady parts of the iſland called Young Ceylon, in the Eaſt Indies. The *cluſter* of flowers is ſhorter and more corymboſe than in *G. racemoſa*, and the corolla is variegated with orange, white, and different ſhades of violet. The appendage of the filament nearly reſembles that of *G. marantina*, but the ſituation of the lip, thruſt, as it were, half way up the filament, above the other lobes of the corolla, is altogether peculiar. For this, however, we depend on a drawing made by Mr. Sidney Parkinſon, and communicated by ſir Joſeph Banks, of the accuracy of which we have no reaſon to doubt. Kœnig mentions a more dwarf variety, found near the town of Malacca. Can this be what has lately been introduced into the ſtoves about London by Dr. Roxburgh, and which we have ſeen and examined at ſir Abraham Hume's, and at Meſſrs. Lee and Kennedy's, flowering in June 1810? It is figured in Curtis's Magazine, t. 1320, where Dr. Sims has, we think, juſtly made this pretty plant a new genus, by the name of *Mantiſia ſaltatoria.* It differs from *Globba* in having a radical, not terminal, infloreſcence, which, as far as we know, is an infallible indication of a generic difference in this natural order, and therefore the flower affords, as was neceſſarily to be expected, clear eſſential characters of diſtinction, in the two long linear appendages to the lower part of the filament, which ſupply the place of two of the inner ſegments of the corolla, while the lip, which makes the third, is not bifid at its upper extremity. The large purple *bracteas*, and the branched *flower-ſtalk*, are alſo remarkable. S.

GLOBE, in *Geometry*, a round or ſpherical body, more uſually called a *ſphere;* which ſee.

The earth and water together are ſuppoſed to form a globe; hence called the terraqueous globe.

The planets, both primary and ſecondary, are ſuppoſed, as well as our earth, to be ſolid globes.

The earth is, in a particular ſenſe, called the globe, or globe of earth; though it is now well known that this is not its true figure. See *Figure of the* EARTH.

GLOBE, *Reſiſtance of a.* See RESISTANCE.

GLOBE is more particularly uſed for an artificial ſphere of metal, plaſter, paper, or ſome other matter; on whoſe convex ſurface is drawn a map, or repreſentation, either of the earth or heavens, with the ſeveral circles conceived thereon.

GLOBES are of two kinds, *terreſtrial* and *celeſtial:* each of very conſiderable uſe, the one in aſtronomy, and the other in geography, to perform many of the operations thereof in an eaſy, ſenſible manner, ſo as to be conceived without any knowledge of the mathematical grounds of thoſe arts.

The fundamental parts, common to both globes, are an axis, repreſenting that of the world, and a ſpherical ſhell or cover, which makes the body of the globe, on whoſe external ſurface the repreſentation is drawn.

Globes, we have obſerved, are made of divers materials, *viz.* ſilver, braſs, paper, plaſter, &c. Thoſe commonly uſed are of plaſter and paper; the conſtruction whereof is as follows.

GLOBES, *Conſtruction of.* A wooden axis is provided, ſomewhat leſs than the intended diameter of the globe; and into the extremes hereof two iron wires are driven for poles: this axis is to be the beam or baſis of the whole ſtructure.

On the axis are applied two ſpherical, or rather hemi-ſpherical caps, formed on a kind of wooden mould or block. Theſe caps conſiſt of paſteboard and paper, laid, one lay after another, on the mould, to the thickneſs of a crown piece; after which, having ſtood to dry and embody, making an inciſion along the middle, the two caps, thus parted, are ſlipped off the mould.

They remain now to be applied on the poles of the axis, as before they were on thoſe of the mould; and to fix them in their new place, the two edges are ſown together with packthread, &c.

The rudiments of the globe thus laid, they proceed to ſtrengthen and make it ſmooth and regular. In order to this, the two poles are haſped in a metalline ſemi-circle of the ſize intended; and a kind of plaſter, made of whiting, water, and glue, heated, melted, and incorporated together, is daubed all over the paper ſurface. In proportion as the plaſter is applied, the ball is turned round in the ſemi-circle, the edge whereof pares off whatever is ſuperfluous, and beyond the due dimenſion, leaving the reſt adhering in places that are ſhort of it.

After ſuch application of plaſter, the ball ſtands to dry; which done, it is put again in the ſemi-circle, and freſh matter applied: thus they continue alternately to apply the compoſition, and dry it, till ſuch time as the ball everywhere accurately touches the ſemi-circle; in which ſtate it is perfectly ſmooth, regular, firm, &c.

The ball thus finiſhed, it remains to paſte the map or deſcription thereon: in order to this, the map is projected in ſeveral gores or guſſets, all which join accurately on the ſpherical ſurface, and together cover the whole ball. To direct the application of theſe gores, lines are drawn by a ſemi-circle on the ſurface of the ball, dividing it into a number of equal parts correſponding to thoſe of the gores, and ſubdividing thoſe again anſwerably to the lines and diviſions of the gores.

The papers thus paſted on, there remains nothing but to colour and illuminate the globe, and to varniſh it, the better to reſiſt duſt, moiſture, &c.

The globe itſelf thus finiſhed, they hang it in a braſs meridian, with an hour circle and quadrant of altitude, and thus fit it into a wooden horizon.

GLOBES, *Deſcription of the.* The things common to both globes are either delineated on the ſurface, or added as appendages without it.

Without the ſurface are, 1. The two poles whereon the globe is turned, repreſenting thoſe of the world. (See POLE.) 2. The brazen meridian, which is divided into degrees, and paſſes through the poles. 3. The wooden horizon, whoſe upper ſide repreſents the horizon, and is divided into ſeveral circles; the innermoſt whereof contains the twelve ſigns of the zodiac, ſubdivided into their degrees; the next the Julian; and the third the Gregorian calendar; without ſide of all theſe, are drawn the points of the winds. 4. A braſs quadrant of altitude, divided into 90 degrees, to be faſtened on the meridian at the diſtance of 90 degrees from the horizon. 5. The hour-circles, divided into twice twelve hours, and fitted on the meridian, round the poles, which carry an index pointing to the hour. A mariner's compaſs is ſometimes added on the bottom of the frame, and ſometimes a ſemi-circle of poſition.

On the ſurface are delineated, 1. The equinoctial line, divided into 360 degrees, commencing from the vernal interſections. 2. The ecliptic, divided into twelve ſigns, and theſe ſubdivided into degrees. 3. The zodiac. 4. The two tropics. And, 5. The polar circles. All which ſee under their proper articles.

What elſe belongs to globes, either as to conſtruction or deſcription, is different as the globe is either *celeſtial* or *terreſtrial.*

Our common globes, though inſtructive inſtruments for explaining the firſt rudiments of geography and the ſpherical doctrine of aſtronomy, yet labour under ſeveral defects; as they do not ſhew how the phenomena, illuſtrated by them, ariſe from the motion of the earth, which is the principal thing beginners eſpecially ſhould have in view, and as they are only formed for the preſent age, and do not ſerve the purpoſes of chronology and hiſtory, which they might be made to do, if the poles, whereon they turn, were contrived to move in a circle round thoſe of the ecliptic, according to its preſent obliquity.

Mr. John Senex, F.R.S. invented a contrivance for remedying theſe defects, by fixing the poles of the diurnal motion to two ſhoulders or arms of braſs, at the diſtance of 23°½ from the poles of the ecliptic. Theſe ſhoulders are ſtrongly faſtened at the other end to an iron axis, which paſſes through the poles of the ecliptic, and is made to move round with a very ſtiff motion; ſo that when it is adjuſted to any point of the ecliptic, which the equator is made to interſect, the diurnal motion of the globe on its axis will not be able to diſturb it. When it is to be adjuſted for any time, paſt or future, one of the brazen ſhoulders is brought under the meridian, and held faſt to it with one hand, whilſt the globe is turned about with the other, ſo that the point of the ecliptic, which the equator is to interſect, may paſs under 0 degree of the brazen meridian: then holding a pencil to that point, and turning the globe about, it will deſcribe the equator according to its poſition at the time required; and transferring the pencil to 23°½, and 66½ on the brazen meridian, the tropics and polar circles will be ſo deſcribed for the ſame time. By this contrivance, the celeſtial globe may be ſo adjuſted, as to exhibit not only the riſings and ſettings of the ſtars, in all ages and in all latitudes, but likewiſe the other phenomena that depend upon the motion of the diurnal axis round the annual axis. Senex's celeſtial globes, eſpecially the two greateſt, of ſeventeen and twenty-eight inches in diameter, have been conſtructed on this principle: ſo that by means of, a nut and ſcrew, the pole of the equator is made to revolve about the pole of the ecliptic. Phil. Tranſ. Nº 447, p. 201. 203. or Martyn's Abr. vol. viii. p. 217. and Nº 493, art. 18. in Phil. Tranſ. vol. xlvi. p. 290.

Mr. Joſeph Harris, late aſſay-maſter of the mint, contrived to remedy the former of the defects above-mentioned, by placing two horary circles under the meridian, one at each pole; theſe circles are fixed tight between two braſs collars placed about the axis, ſo that when the globe is turned, they are carried round with it, the meridian ſerving as an index to cut the horary diviſions. The globe, in this ſtate, ſerves readily for ſolving problems in north and ſouth latitudes, and alſo in places near the equator; whereas, in the common conſtruction, the axis and horary circle prevent the braſs meridian from being moveable quite round in the horizon. This globe is alſo adapted for ſhewing how the viciſſitudes of day and night, and the alteration of their lengths, are really occaſioned by the motion of the earth; for this purpoſe, he divides the braſs meridian, at one of the poles, into months and days, according to the ſun's declination, reckoning from the pole. Therefore, by bringing the day of the month to the horizon, and rectifying the globe according to the time of the day, the horizon will repreſent the circle ſeparating light and darkneſs, and the upper half of the globe the illuminated hemiſphere, the ſun being in the zenith.

Mr. Harris alſo gives an account of a cheap machine for ſhewing how the annual motion of the earth in its orbit cauſes the change of the ſun's declination, without the great expence of an orrery. Phil. Tranſ. Nº 456, p. 321, &c. or Martyn's Abr. vol. viii. p. 352.

The late Mr. George Adams, mathematical inſtrument maker to his majeſty, has made ſome uſeful improvements in the conſtruction of the globes. His globes, like others, are ſuſpended at their poles in a ſtrong braſs circle, and turn therein upon two iron pins, which are the axis. They have beſides a thin braſs ſemi-circle, moveable about the poles, with a ſmall, thin, ſliding circle upon it. On the terreſtrial globe, the thin braſs ſemi-circle is a moveable meridian, and its ſmall ſliding circle the viſible horizon of any particular place to which it is ſet. On the celeſtial globe, the ſemi-circle is a moveable circle of declination, and its ſmall annexed circle an artificial ſun or planet. Each globe hath a braſs wire circle, placed at the limits of the twilight, which, together with the globe, is ſet in a wooden frame, ſupported by a neat pillar and claw, with a magnetic needle at its baſe. On the terreſtrial globe the diviſion of the earth into land and water is laid down from the lateſt diſcoveries; there are alſo many additional circles, as well as the rhumb-lines, for ſolving all the neceſſary geographical and nautical problems. On the celeſtial globe, all the ſouthern conſtellations, lately obſerved at the Cape of Good Hope by M. de la Caille, and all the ſtars in Mr. Flamſteed's Britiſh Catalogue, are accurately laid down and marked with Greek and Roman letters of reference, in imitation of Bayer. Upon each ſide of the ecliptic are drawn eight parallel circles, at the diſtance of one degree from each other, including the zodiac; and theſe are croſſed at right angles with ſegments of great circles at every fifth degree of the ecliptic, for the more readily noting the place of the moon, or of any planet upon the globe. The author has alſo inſerted, from Ulugh Beigh, printed at Oxford in 1665, the manſions of the Moon of the Arabian Aſtronomers, ſo called, becauſe they obſerved the moon to be in or near one of theſe every night during her monthly courſe round the earth, to each of which the Arabian characters are fixed. On the ſtrong braſs circle of the terreſtrial globe, and about $23^\circ\frac{1}{2}$ on each ſide of the north pole, the days of each month are laid down according to the ſun's declination; and this braſs circle is ſo contrived, that the globe may be placed with the north and ſouth poles in the plane of the horizon, and with the ſouth pole elevated above it. The equator, on the ſurface of either globe, ſerves the purpoſe of the horary circle, by means of a ſemi-circular wire placed in the plane of the equator, carrying two indices, one of which is occaſionally to be uſed to point out the time. For a farther account of theſe globes, with the method of uſing them, the reader may conſult Adams's Treatiſe on their Conſtruction and Uſe, &c. 1769.

Globe, *Celeſtial*, is an artificial ſphere, on whoſe convex ſurface the fixed ſtars are laid down, at proportionable diſtances, together with the principal circles of the ſphere.

The ſurface of the celeſtial globe may be eſteemed a juſt repreſentation of the concave expanſe of the heavens, notwithſtanding its convexity; for if the eye were placed in the centre of it, and the globe made of glaſs, the ſtars that are drawn upon it would appear in a concave ſurface, exactly correſponding to thoſe in the heavens. The uſe of theſe globes is to exhibit the phenomena of the motions of the ſun and ſtars, in an eaſy and obvious manner; which, though ſomewhat inaccurate, is yet exact enough for the common uſes of life, and may ſave the trouble of trigonometrical calculations.

To exhibit the ſtars, circles, &c. on the ſurface of a given ſphere or ball, and fit for the uſes of aſtronomy.—1. Aſſume any two points diametrically oppoſite to each other, as P and Q (*Plate* XIV. *Aſtronomy, fig.* 117.) and in theſe fix up axes, P A and Q C, for the ball to turn round on. The points P and Q, or A and C, will exhibit the poles of the world.

2. Divide a brazen circle A B C D into four quadrants, A E, E C, C F, and F D; and ſubdivide each quadrant into 90 degrees, numbered from the points E and F, towards the poles A and C.

3. Incloſe the globe in this circle, as in a meridian, at the points A and C, ſo as it may freely turn therein.

4. Apply a ſtyle or pin to the ſurface of the globe, in the firſt degree of the meridian, and turn the ball round; by this means will a circle be deſcribed on the ſurface, repreſenting the equator to be divided into degrees.

5. From the pole of the world P towards M, and from the other pole C towards N, number $23\frac{1}{2}$ degrees; the points M and N will be the poles of the ecliptic.

6. Apply a ſtyle to the meridian, in the point M, and turn the globe round; by this rotation will the arctic polar circle be deſcribed: and after the ſame manner is the antarctic polar to be deſcribed about the point N.

7. Number $23\frac{1}{2}$ deg. from the equator towards the poles P and Q, and note the points H and I; then applying a ſtyle to the meridian, as before, two circles will be deſcribed parallel to the equator, whereof that drawn through H will be the tropic of Cancer, and the other through I the tropic of Capricorn.

8. Hang the globe within the meridian, in the poles of the ecliptic, as before in the poles of the world; and applying a ſtyle to E, turn it round: by this means will the ecliptic be delineated, which remains to be divided into twelve ſigns; and each of theſe, again, divided into thirty degrees.

9. While the globe remains thus ſuſpended, bring the degree of longitude of any ſtar under the meridian; and in the meridian, number as many degrees towards the pole as is the degree of latitude of the place: the point of interſection is the place of that ſtar on the ſurface of the globe. After the like manner may the place of the ſtar be determined from the right aſcenſion and declination given, the globe being ſuppoſed ſuſpended from the poles of the world, or the equator.

10. All the ſtars of a conſtellation thus laid down, the figure of the conſtellation is to be deſigned; after which it may either be coloured or engraven.

11. Place the globe with the meridian, in a wooden frame or horizon, D B L, ſupported on four feet, in ſuch manner as to be divided thereby into two hemiſpheres, and that the pole A may be raiſed or depreſſed at pleaſure.

12. On the limb or edge of the horizon deſcribe a circle, which divide into 360 degrees, and inſert the calendars and winds.

13. Laſtly, To the pole A fit a brazen circle, divided into twenty-four horary parts, and numbered twice twelve, ſo that the line of diviſion of XII. may be in the plane of the meridian, on either ſide the pole; and on the pole itſelf apply an index, to turn round with the globe. See *Horary* Circle. Thus is the globe complete.

It may be here obſerved, that as the longitude of the ſtars is continually increaſing, a common globe does not remain of perpetual uſe: but the increaſe in ſeventy-two years only amounting to a degree, the whole will make no conſiderable error in a hundred years; the deſign of a globe being only to repreſent things ſomething near the truth.

Globe, *to make a celeſtial.* This method is that the moſt frequently uſed; and we only premiſed the former as being the moſt eaſily conceived, and leading more naturally to this.

1. From the given diameter of the globe, find a right line A B, *fig.* 118. equal to the circumference of a great circle, and divide it into twelve equal parts.

2. Through the ſeveral points of diviſion, 1, 2, 3, 4, &c. with the interval of ten of them, deſcribe arches, mutually interſecting each other in D and E: theſe figures or pieces, duly paſted or joined together, will make the whole ſurface of the globe.

3. Divide each part of the right line A B into thirty equal parts, ſo that the whole line A B, repreſenting the periphery of the equator, may be divided into 360 degrees.

4. From the poles D and E, *fig.* 119. with the interval of $23\frac{1}{2}$ deg. deſcribe arches *a, b;* theſe will be twelve parts of the polar circles.

5. After the like manner, from the ſame poles D and E, with the interval of $66\frac{1}{2}$ deg. reckoned from the equator,

deſcribe arches *c*, *d*; theſe will be twelfth parts of the tropics.

6. Through the degree of the equator *e*, correſponding to the right aſcenſion of any given ſtar, and the poles D and E, draw an arch of the circle, and taking in the compaſſes the complement of the declination from the pole D, deſcribe an arch interſecting it in *i*; this point *i* will be the place of that ſtar.

7. All the ſtars of a conſtellation being thus laid down, the figure of the conſtellation is to be drawn according to Bayer, Hevelius, or Flamſteed.

8. Laſtly, after the ſame manner are the declinations and right aſcenſions of each degree of the ecliptic *d g* to be determined.

9. The ſurface of the globe thus projected on a plane is to be engraven on copper, to ſave the trouble of doing this over again for each globe.

10. A ball, in the mean time, is to be prepared of paper, plaſter, &c. after the manner above directed, and of the intended diameter of the globe: on this, by means of a ſemi-circle and ſtyle, is the equator to be drawn: and through every 30th degree a meridian. The ball thus divided into twelve parts, correſponding to the ſegments before projected, they are to be cut from the printed paper, and paſted on the ball.

11. Nothing now remains but to hang the globe, as before, in a brazen meridian and wooden horizon; to which may be added a quadrant of altitude H I, *fig.* 120. made of braſs, and divided in the ſame manner as the ecliptic and equator.

If the declinations and right aſcenſions of the ſtars be not given, but their longitudes and latitudes in lieu thereof, the ſurface of the globe is to be projected after the ſame manner as before: except that, in this caſe, D and E, *fig.* 121. are the poles of the ecliptic, and *f h* the ecliptic itſelf; and that the polar circles and tropics, with the equator *g d*, and the parallels thereof, are to be determined from their declinations.

One of the fulleſt catalogues of the ſtars is that of Mr. Flamſteed; wherein the right aſcenſions and declinations, as well as the longitudes, latitudes, &c. are every where expreſſed.

GLOBE, *uſe of the celeſtial.* The uſe of this inſtrument is very extenſive; there being ſcarcely any thing in the ſpherical aſtronomy but may be exhibited thereby.

The principal points are contained in the following problems, with their ſolution; which will let the reader enough into the nature and reaſon of this noble inſtrument, to apply it, of his own accord, in any other caſes.

To find the right aſcenſion and declination of a ſtar, repreſented on the ſurface of the globe.—Bring the ſtar to the graduated ſide of the brazen meridian: then the number of degrees intercepted between the equator, and the point on the meridian cut by the ſtar, gives its declination; and the degree of the equator which comes under the meridian, together with the ſtar, is its right aſcenſion.

To find the longitude and latitude of a ſtar.—Apply the centre of the quadrant of altitude over the pole of the ecliptic in the ſame hemiſphere with the ſtar, and bring its graduated edge to the ſtar: the degree on the quadrant cut by the ſtar is its latitude, reckoned from the ecliptic; and the degree of the ecliptic cut by the quadrant its longitude.

To find the ſun's place in the ecliptic.—Seek the day of the month in the proper calendar on the horizon, and againſt the day in the circle of ſigns is the ſign and degree the ſun is in for that day; this done, find the ſame ſign upon the ecliptic, on the ſurface of the globe; this is the ſun's place for that day.

To find the declination of the ſun.—The ſun's place for the day given being brought to the meridian, the degrees of the meridian intercepted between the equinoctial and that place, are the ſun's declination for that day at noon.

To find the place of a planet, with its right aſcenſion and declination; its longitude and latitude for the time being given.—Apply the centre of the quadrant of altitude on the pole of the ecliptic (the pole, we mean, of the ſame denomination with the latitude), and bring it to the given longitude in the ecliptic: this point is the planet's place; and bringing it to the meridian, its right aſcenſion and declination will be found, as already ſhewn of a ſtar.

To rectify the globe, or adjuſt it to the place, &c. ſo as it may repreſent the preſent ſtate or ſituation of the heavens.—1. If the place be in north latitude, raiſe the north pole above the horizon; if in ſouth, raiſe the ſouth pole; till the arch intercepted between the pole and horizon be equal to the given elevation of the pole. 2. Fix the quadrant of altitude on the zenith, *i. e.* on the latitude of the place. 3. By means of a compaſs or meridian line, place the globe in ſuch a manner as that the brazen meridian may be in the plane of the terreſtrial meridian. 4. Bring the degree of the ecliptic the ſun is in to the meridian, and ſet the horary index to twelve; thus will the globe exhibit the face of the heavens for the noon of that day. 5. Turn the globe till the index come to any other given hour: thus will it ſhew the face of the heavens for that time.

To know all the ſtars and planets by means of the globe.—1. Adjuſt the globe to the ſtate of the heavens for that time. 2. Look on the globe for ſome one ſtar which you know, *e. gr.* the middlemoſt ſtar in the tail of the Great Bear. 3. Obſerve the poſitions of the other more conſpicuous ſtars in the ſame conſtellation; and by transferring the eye from the globe to the heavens, you will eaſily note the ſame there. 4. After the ſame manner may you proceed from this to the neighbouring conſtellations, till you have learned them all.

If the planets be repreſented on the globe, after the manner above deſcribed, by comparing them with the neighbouring ſtars you will likewiſe know the planets.

To find the ſun's oblique aſcenſion, his eaſtern amplitude, and azimuth, with the time of riſing.—1. Rectify the globe for the hour of twelve, and bring the ſun's place to the eaſtern ſide of the horizon: then the number of degrees, intercepted between that degree of the equator now come to the horizon and the beginning of Aries, is the ſun's oblique aſcenſion. 2. The degrees on the horizon, intercepted between the eaſt point thereof and the point wherein the ſun is, is the ortive or riſing amplitude. 3. The hour, pointed to by the index, is the time of the ſun's riſing. 4. Turning the globe till the index points to the preſent hour, lay the quadrant to the ſun's place: the degree cut by the quadrant, in the horizon, is the ſun's azimuth.

To find the ſun's oblique deſcenſion, weſtern amplitude, and azimuth, with the time of ſetting.—The ſolution of this problem is the ſame as that of the former; excepting that the ſun's place muſt be here brought to the weſtern ſide of the horizon, as in the former it was to the eaſtern.

To find the length of day and night.—1. Find the time of the ſun's riſing, which being numbered from midnight, the double thereof gives the length of the night. 2. Subtract the length of the night from the whole day, or twenty-four hours, and the remainder is the length of the day.

To find the riſing, ſetting and culminating of a ſtar; its continuance above the horizon for any place and day; together with its oblique aſcenſion and deſcenſion, and its eaſtern and weſtern amplitude and azimuth.—1. Adjuſt the globe to the ſtate of the heavens at twelve o'clock that day. 2. Bring the ſtar to the eaſtern ſide of the horizon: thus will the weſtern amplitude and azimuth, and time of riſing, be found, as already taught of the ſun. 3. Bring the ſame ſtar to the weſtern ſide of the horizon: thus will the weſtern amplitude and azimuth, and the time of ſetting, be found. 4. The time of riſing, ſubtracted from that of ſetting, leaves the continuance of the ſtar above the horizon. 5. This continuance above the horizon, ſubtracted from twenty-four hours, leaves the time of its continuance below the horizon. 6. Laſtly, the hour to which the index points, when the ſtar is brought to the meridian, gives the time of its culmination.

To find the altitude of the ſun, or ſtar, for any given hour of the day or night.—1. Adjuſt the globe to the poſition of the heavens, and turn it till the index point at the given hour. 2. Fix on the quadrant of altitude, at 90 degrees from the horizon, and bring it to the ſun's or ſtar's place; the degrees of the quadrant, intercepted between the horizon and the ſun or ſtar, is the altitude required.

The altitude of the ſun by day, or of a ſtar by night, being given, to find the time of that day or night.—1. Rectify the globe as in the preceding problem. 2. Turn the globe and quadrant, till ſuch time as the ſtar, or degree of the ecliptic the ſun is in, cut the quadrant in the given degree of altitude; then does the index point at the hour ſought.

The azimuth of the ſun or a ſtar given, to find the time of the day or night.—Rectify the globe, and bring the quadrant to the given azimuth in the horizon; turn the globe, till the ſtar come to the ſame: then will the index ſhew the time.

To find the interval of time between the riſings of two ſtars, or the culminations.—1. Raiſe the pole of the globe ſo many degrees above the horizon, as is the elevation of the pole of the place. 2. Bring the firſt ſtar to the horizon, and obſerve the time the index points to. 3. The ſame do by the other ſtar: then ſubtracting the former time from the latter, the remainder is the interval between the riſings.

After the like manner is the interval between two culminations found, by bringing both ſtars to the meridian.

The day of the month being given, to find when any ſtar will come to the meridian.—Rectify for the ſun's place; turn the globe till the given ſtar comes to the meridian; then the index will point to the time ſought.

To find when any given ſtar will come to the meridian, at any given hour of the night.—Bring the given ſtar to the meridian; ſet the index to twelve at noon; then turn the globe eaſtward, till the index points to an hour as far diſtant in the forenoon from twelve as the given hour is in the afternoon, obſerve the degree of the ecliptic then at the meridian, over-againſt which degree, in the calendar, is the day of the month, when the given ſtar will be upon the meridian at the given hour.

By obſervation of a ſtar upon the meridian, to find the hour of the night.—Rectify for the latitude and the ſun's place; bring the given ſtar to the meridian, and the index will ſhew the hour of the night.

To find the beginning and ending of the crepuſculum or twilight.—1. Rectify the globe, and ſet the index to the twelfth hour, the ſun's place being in the meridian. 2. Note the ſun's place, and turn the globe weſtward, as alſo the quadrant of altitude, till the point oppoſite the ſun's place cut the quadrant of altitude in the eighteenth degree above the horizon: the index will then ſhew the time when the twilight commences in the morning. 3. Taking the point oppoſite to the ſun, bring it to the eaſtern hemiſphere, and turn it, till it meet with the quadrant of altitude in the eighteenth degree: then will the index ſhew the time when the twilight ends.

Given the ſun's longitude and the obliquity of the ecliptic, to find the ſun's right aſcenſion and declination.—Find the ſun's longitude or place on the ecliptic, and bring it to the brazen meridian. Then the arc of the equator, between the firſt point of Aries and the brazen meridian, ſhews the ſun's right aſcenſion; and the arc of the brazen meridian between the equator and the ecliptic ſhews the declination.

Given the obliquity of the ecliptic and the ſun's declination, to find the ſun's longitude and right aſcenſion.—Mark the ſun's declination on the brazen meridian, and turn the globe till the ecliptic comes under the figure; then will the diſtance from the meridian to the firſt point of Aries ſhew the ſun's longitude on the ecliptic, and its right aſcenſion on the equator.

Given the obliquity of the ecliptic and the ſun's right aſcenſion, required the ſun's declination and longitude.—Bring the ſun's right aſcenſion in the equator to the brazen meridian, then will the intercepted arc of the ecliptic to Aries ſhew the ſun's longitude; and the arc of the meridian, that is between the ſun's right aſcenſion and longitude, will ſhew the declination.

To find on what day the ſun begins to ſhine conſtantly at any given place in either of the frigid zones, and how long he continues to ſhine without intermiſſion at the ſame place.—Subtract the latitude of the given place from 90°, and find in what two days of the year the ſun's declination is exactly equal to the remainder, and of the ſame kind as the latitude of the place; then on the firſt of thoſe days in the ſpring quarter, the ſun ceaſes to ſet at the given place, and ſhines without intermiſſion there till he arrives at another point of the ecliptic, as many degrees on the other ſide of the ſummer ſolſtice, when his declination is again equal to the complement of the latitude: the ſpace of time between thoſe two days is the length or duration of the longeſt day.

To find the latitude of thoſe places in the north frigid zone, where the ſun begins to ſhine conſtantly on any day between the vernal equinox and the ſummer ſolſtice, or in the ſouth frigid zone on any day between the autumnal equinox and the winter ſolſtice.—Find the ſun's declination for the given day; ſubtract it from 90°, and the remainder will be the latitude of thoſe places: where the ſun begins to ſhine conſtantly the latitude is of the ſame kind as the ſun's declination.

To determine under what latitude two given ſtars riſe or ſet at the ſame inſtant.—Bring one of the ſtars to the horizon, and, keeping it there, raiſe or depreſs the pole till the other is on the horizon at the ſame time, obſerving whether this is effected on the eaſt or weſt poſition of the horizon; then the degree of the meridian, interſected by the horizon, will be the latitude of the place required.

To find at what place a given ſtar is vertical at any given hour at London; e. g. at what place will Capella be vertical the 2d of March at 10 *o'clock afternoon, at London time.*

N. B.—This problem requires the aſſiſtance of both the terreſtrial and celeſtial globes.

1. Find, as above, the time of the meridian paſſage of the

ſtar: in the preſent inſtance Capella paſſes about 6 o'clock in the afternoon.

2. Find under what meridian they reckon 6 o'clock when it is 10 with us, which will be four hours to the weſt.

3. Obſerve under this meridian the place whoſe latitude is equal to the declination of the ſtar, which, in this example, is nearly 46°: and this place, which is near Louiſburg, in North America, will be the place required.

To explain the phenomena of the harveſt-moon by the globe, ſee Moon.

Globe, *Terreſtrial,* is an artificial ſphere, on whoſe ſurface are delineated the principal places of the earth, in their proper ſituations, diſtances, &c. together with their circles imagined on the ſurface of the terreſtrial ſphere. The uſe of the terreſtrial globe, is to exhibit the ſeveral affections and phenomena of the different places of the earth, depending on magnitude, &c. in an eaſy obvious manner, without the trouble of trigonometrical calculations.

Globe, *To conſtruct a terreſtrial.*—The conſtruction of a terreſtrial globe, whether of metal, plaſter, paper, &c. is the ſame as that of a celeſtial. The ſame circles are delineated on both: and as for the places, *viz.* cities, towns, &c. they are laid down from the longitudes and latitudes given, as the ſtars are from their right aſcenſions and declinations.

Hence all problems, depending on the circles, may be equally wrought on either globe; as the aſcenſions, deſcenſions, amplitudes, azimuths, riſings, ſettings, altitudes, &c. of the ſun; the lengths of day and night; hours of the day and night; crepuſcula, &c.

We ſhall here, therefore, only give what is peculiar to the terreſtrial globe.

Globe, *Uſe of the terreſtrial. To find the longitude and latitude of any place delineated on the globe.*—Bring the place to the graduated ſide of the braſs meridian: the degree of the meridian it cuts is the latitude required; and the degree of the equator, at the ſame time under the meridian, is the longitude required.

The longitude and latitude given, to find the place on the globe.—Seek, in the equator, the given degree of longitude, and bring it to the meridian: then count from the equator on the meridian the degrees of latitude given, towards this or that pole, as the latitude is either north or ſouth: the point under this is the place required.

The hour being given at any place, to find what hour it is in any other part of the world.—Bring the given place to the meridian, and ſet the hour-index to the given hour; then, by turning the globe, bring any place to the meridian, and the index will point to the hour of that place.

To find the antœci, periœci, and antipodes of any place.—1. The given place being brought to the meridian, count as many degrees on the meridian from the equator towards the other pole: the point which is thus arrived at is the place of the antœci. 2. Note the degree of the meridian over the given place and its antœci, and turn the globe till the oppoſite degree of the equator come under the meridian; or, which amounts to the ſame, till the index, which before ſtood at twelve, come to the other twelve: then will the place, correſponding to the former degree, be the periœci; and the latter, that of the antipodes.

To find what place of the earth the ſun is vertical to at any time aſſigned.—1. Bring the ſun's place found in the ecliptic to the meridian, and the index to the hour of twelve, noting what point of the meridian correſponds thereto. 2. If the given hour be before noon, ſubtract it from twelve hours, and turn the globe towards the weſt, till the index points at the hours remaining: thus will the place required be under the point of the meridian before noted. 3. If the hour be after noon, turn the globe in the ſame manner towards the weſt, till the index points at the given hour: thus, again, will the place required be found under the point of the meridian before noted.

If, at the ſame time, you note all the places which are under the ſame half of the meridian with the place found, you will have all the places to which the ſun is then in the meridian; and the oppoſite half of the meridian will ſhew all the places in which it is then mid-night.

A place being given in the torrid zone, to find the two days in the year wherein the ſun is vertical in the ſame.—1. Bring the given place to the meridian, and note the degree of the meridian correſponding thereto. 2. Turn the globe about, and note the two points of the ecliptic paſſing through that degree. 3. Find on what days the ſun is in theſe points of the ecliptic: for on thoſe days he is vertical to the given place.

To find thoſe places in the torrid zone to which the ſun is vertical on a given day.—Bring the ſun's place in the ecliptic to the meridian; then turning the globe round, note all the places which paſs through that point of the meridian: thoſe are the places required.

After the ſame manner may be found what people are aſcii for any given day.

The day and hour at any place being given, to find where the ſun is vertical at that hour.—Bring the ſun's place to the meridian, and the degree over it is the ſun's declination at that time; then bring the given place to the meridian, and ſet the index to the given hour; turn the globe till the index points to twelve at noon, and the place on the globe which lies under the degree of the ſun's declination has the ſun then vertical.

A place being given in the frigid zone, to find the time when the ſun begins to appear above the horizon, and when it begins to diſappear; and alſo the length of the longeſt day or night in that place.—Rectiſy for the latitude; bring the aſcending part of the ecliptic, *i. e.* for latitudes north of the tropic of Cancer the ſemicircle intercepted between Capricorn and Cancer, to the ſouth point of the horizon; obſerve the degree of the ecliptic which cuts that point, and find when the ſun enters that degree, and this will give the time when the ſun begins to appear in that latitude. Bring the deſcending part of the ecliptic to the ſame point of the horizon, and the calendar will ſhew when the ſun leaves that latitude and diſappears. Again, bring the aſcending part of the ecliptic to the north point of the horizon, and the degree, as before, will ſhew in the calendar when the longeſt day begins; and by bringing the deſcending part of the ecliptic to the ſame north point, we ſhall find, in the ſame manner, when the longeſt day ends.

To find the latitude of the places wherein any given day is of any given length.—1. Bring the ſun's place for the given day to the ecliptic, and ſet the index to the hour of twelve. 2. Turn the globe, till the index points at the hour of riſing or ſetting. 3. Raiſe and depreſs the pole till the ſun's place appear in the eaſtern and weſtern ſide of the horizon: then will the pole be duly elevated, and, conſequently, the latitude given.

To find the latitude of thoſe places in the frigid zone where the ſun does not ſet for a given number of days.—1. Count ſo many degrees from the next tropic, towards the equinoctial point, as there are units in half the number of the given days; becauſe the ſun, in its proper motion, goes nearly a degree every day. 2. Bring the point of the ecliptic, thus found, to the meridian; and its diſtance from the pole will be equal to the elevation of the pole, or latitude of the places required.

Any hour of the day or night being given, to ſhew all thoſe places to which the ſun riſes and ſets; where it is noon or midnight; and where day or night.—1. Find what place the ſun is at that time vertical to, as already taught. 2. Let this place be brought to the zenith of the wooden horizon, *i. e.* elevate the pole as the latitude of that place requires; then will the places on the eaſtern ſide of the horizon be thoſe the ſun is ſetting to; and on the weſtern ſide, thoſe he riſes to: thoſe under the upper ſemi-circle of the meridian have it noon; and thoſe under the lower, midnight. Laſtly, to thoſe of the upper hemiſphere it is day; and to thoſe in the lower, night.

Hence, as in the middle of an eclipſe, the moon is in that degree of the ecliptic oppoſite to the ſun's place; by the preſent problem it may be ſhewn what places of the earth then ſee the middle of the eclipſe, and what the beginning or ending.

To find what places of the earth a planet, e. gr. *the moon, is vertical to any day of the year.*—1. Mark the planet's place on the globe, as above taught. 2. Bring this place to the meridian, and note the degree over it. 3. Turn the globe round, and the places which paſs under the point are thoſe required.

The declination of a ſtar, or any other phenomenon, given, to find what parts of the earth the ſame is vertical to.—Count as many degrees in the meridian, from the equator towards one pole, as are equal to the given declination; *viz.* towards the north, if the declination be to the northward; and towards the ſouth, if the declination be ſouth. Then turning it round, the places that paſs through the extremity of this arch in the meridian are the places required.

To determine the place of the earth where any ſtar, or other celeſtial phenomenon, will be vertical at a given hour.—1. Elevate the pole according to the latitude of the place, from whoſe noon or midnight the hours are numbered. 2. Bring the ſun's place for that day to the meridian, and ſet the index at twelve o'clock. 3. Determine the place of the ſtar on the ſurface of the globe, and bring it to the meridian; the index will ſhew the difference of time between the impulſe of the ſun and ſtar to the meridian of the place: note the point of the meridian over the place of the ſtar. 4. Find in what places of the earth it is then noon, and ſet the index to twelve o'clock. 5. Turn the globe towards the weſt, till the index has paſſed over the interval of time between the culmination of the ſun and ſtar. Then, under the point of the meridian, before obſerved, will the place required be found. And hence may always be found what place a ſtar, or other phenomenon, riſes or ſets to at any given time.

To place the globe in ſuch manner, under any given latitude, as that the ſun ſhall illuminate all thoſe regions which he actually illumines on earth.—1. Rectify the globe, *i. e.* elevate the pole according to the latitude of the place; bring the place to the meridian, and ſet the globe north and ſouth by the compaſſes; thus, the globe having the ſame ſituation with regard to the ſun as the earth has, that part thereof will be illuminated which is illuminated on earth. Hence alſo the globe being ſituate in the ſame manner, when the moon ſhines, it will ſhew what parts are then illuminated by the moon.

And in the like manner, we may find when the ſun and moon riſe and ſet at any given time.

To find the diſtance of two places on the globe.—Take the given places in the compaſſes, and apply them to the equator: the degrees which there ſubtend being reduced into miles, leagues, or the like, give the diſtances required.

The ſame may be done, and that more commodiouſly, by laying the graduated edge of the quadrant of altitude over the two places, and noting the degree intercepted.

To find how any one place bears from another.—Bring one place to the meridian, and lay the quadrant of altitude over the other, and it will ſhew on the horizon the point of the compaſs on which the latter bears from the former.

Problems on the terreſtrial globe may ſometimes be advantageouſly ſolved, by conſidering the horizon as the circle of illumination, and bringing the ſun's place to the zenith.

To find for any given day and hour thoſe places where the ſun is then riſing or ſetting, thoſe places where it is noon, and in particular that place where the ſun is vertical; thoſe places that have morning or evening twilight; and thoſe places where it was midnight.—Find the ſun's place in the ecliptic for the given day, bring it to the brazen meridian, and mark its declination.

Elevate the (north or ſouth) pole as many degrees above the horizon as are equal to the ſun's declination (north or ſouth). Bring the given place to the meridian, and ſet the index to the given hour, then turn the globe on its axis, till the index comes to the upper twelve, and fix the globe in that poſition. All theſe places along the weſtern edge of the horizon have the ſun riſing, thoſe along the eaſtern edge have the ſun ſetting: it is noon to the places under the brazen meridian, and amongſt them the ſun is vertical to that place, which ſtands under the degree of the ſun's declination.

Thoſe places that are within 18° of the weſtern ſemi-circle of the horizon have morning twilight, and thoſe within 18° of the eaſtern ſemi-circle have evening twilight: and it is midnight at all thoſe places under that part of the brazen meridian which is below the horizon. In ſhort, it is day to all places above the horizon, and either twilight or dark night to all thoſe which are below it.

The day and hour of a lunar eclipſe being given, to find thoſe places where it will be viſible.—Find the place where the ſun will be vertical when the eclipſe begins, and rectify the globe, in reſpect to latitude, for the antipodes of that place. Then bring the antipodes to the upper part of the brazen meridian, and fix the globe in that poſition, and the beginning of the eclipſe will be viſible to all places which are then above the horizon.

To find the proportion which the land bears to the ſea.—For this purpoſe Dr. Long propoſes to take the papers of a large terreſtrial globe, and after ſeparating the land from the ſea with a pair of ſciſſars, to weigh them carefully in ſcales. This method ſuppoſes the globe to be exactly delineated, and all the papers of equal thickneſs. By an experiment on the papers of Mr. Senex's ſeventeen inch globe, he found that thoſe comprehending the ſea weighed 349 grains, and the others only 124; whence he infers, that almoſt three-fourth parts of the ſurface of our earth between the polar circles are covered with water, and that little more than one-fourth is dry land. Dr. Long omitted weighing the papers within the polar circles, becauſe the proportion which the land bears to the ſea within them is not aſcertained. Long's Aſtron. vol. i. p. 168. See *Magnitude of the* EARTH.

GLOBE, *To conſtruct a dial by the.* See DIAL.

The celeſtial globe has been improved by Mr. Ferguſon: in this globe, (*Plate* XV. *Aſtronomy, fig.* 122.) an arch MKH, of 23½°, is fixed on the north pole of the axis, above the hour circle; and at the end is fixed an upright pin HG, ſtanding directly over the north pole of the ecliptic, and perpendicular to that part of the ſurface of the globe. On this pin are two moveable collets at D and H, to which are annexed the quadrantal wires N and O, carrying two little balls repreſenting the ſun and moon. The collet D is fixed to the circular plate F, on which are engraven the $29\frac{1}{2}$ days of the moon's age, beginning under the wire N, which wire, as it turns round, carries with it the plate F. Theſe wires are fixed or ſlackened by the ſcrew G, and the two little balls are made to riſe and ſet at the ſame time and on the ſame point of the horizon, for the day to which they are rectified, as the ſun and moon do in the heavens. The ball repreſenting the moon may be ſcrewed as many degrees to either ſide of the ecliptic, as her latitude amounts to at any given time; and for this purpoſe, S is a ſmall piece of paſteboard, the curved edge of which at S is to be ſet upon the globe at right angles to the ecliptic, and the dark line over S to ſtand upright upon it: from this line, on the convex edge, are drawn the $5\frac{1}{3}$ degrees of the moon's latitude on both ſides of the ecliptic; and when this piece is ſet upright on the globe, its graduated edge reaches to the moon on the wire O, by which means ſhe is eaſily adjuſted to her latitude found by an ephemeris. The horizon of this globe is ſupported by two ſemi-circular arches, becauſe pillars would ſtop the progreſs of the balls, when they go below the horizon in an oblique ſphere. This globe is rectified by elevating the pole to the latitude of the place, bringing the ſun's place in the ecliptic for the given day to the brazen meridian, and ſetting the hour-index to twelve at noon; then, ſetting the ſun directly over his place in the meridian, and the moon over her place in the ecliptic, by fixing her wire under the number that expreſſes her age for that day on the plate F; and, laſtly, laying the curved edge of the paſteboard S over the ecliptic below the moon, and adjuſting the moon to her latitude over the graduated edge of the paſteboard. Having thus rectified the globe, turn it round, and obſerve on what point of the horizon the ſun and moon balls riſe and ſet; for theſe agree with the points of the compaſs on which the ſun and moon riſe and ſet in the heavens on the given day: and the hour-index ſhews the times of their riſing and ſetting, and alſo the time of the moon's paſſing over the meridian. This globe is alſo contrived for exhibiting the phenomena of the harveſt-moon, &c. Phil. Tranſ. Nº 483. art. 21. in vol. xliv. p. 535, or Ferguſon's Aſtron. p. 291.

Globe, *Dialling*. See Dialling.

Globes, *Patent*, are thoſe with the improvements of Mr. Neale, for which he obtained his majeſty's letters patent; by means of which he ſolves ſeveral aſtronomical problems, which do not admit of ſolution by the common globes.

Globe, *Planetary*, is a machine contrived and deſcribed by Mr. Ferguſon; in which T (*Plate* XV. *Aſtronomy*, *fig.* 123) is a terreſtrial globe fixed on its axis ſtanding upright on the pedeſtal C D E, on which is an hour circle, having its index fixed on the axis, which turns ſomewhat tightly in the pedeſtal, ſo that the globe may not be liable to ſhake: to prevent which, the pedeſtal is about two inches thick and the axis goes quite through it, bearing on a ſhoulder. The globe is hung in a graduated brazen meridian, much in the uſual way; and the thin plate N, N E, E, is a moveable horizon graduated round the outer edge, for ſhewing the bearings and amplitudes of the ſun, moon, and planets. The brazen meridian is grooved round the outer edge; and in this groove is a ſlender ſemi-circle of braſs, the ends of which are fixed to the horizon in its north and ſouth points: this ſemi-circle ſlides in the groove as the horizon is moved in rectifying it for different latitudes. To the middle of the ſemi-circle is fixed a pin, which always keeps in the zenith of the horizon, and on this pin the quadrant of altitude q turns; the lower end of which, in all poſitions, touches the horizon as it is moved round the ſame. This quadrant is divided into 90 degrees from the horizon to the zenithal pin on which it is turned, at 90. The great flat circle or plate A B is the ecliptic, on the outer edge of which the ſigns and degrees are laid down; and every fifth degree is drawn through the reſt of the ſurface of this plate towards its centre. On this plate are ſeven grooves, to which ſeven little balls are adjuſted by ſliding wires, ſo that they are eaſily moved in the grooves, without danger of ſtarting out of them. The ball next the terreſtrial globe is the Moon, the next without it is Mercury, the next Venus, the next the Sun, then Mars, then Jupiter, and laſtly Saturn; and in order to know them, they are ſeparately ſtampt with the following characters: ☽, ☿, ♀, ☉, ♂, ♃, ♄. This plate or ecliptic is ſupported by four ſtrong wires, having the lower ends fixed into the pedeſtal at C, D, and E, the fourth being hid by the globe. The ecliptic is inclined $23\frac{1}{2}$ degrees to the pedeſtal, and is therefore properly inclined to the axis of the globe which ſtands upright on the pedeſtal.

To rectify this machine.—Set the Sun, and all the planetary balls, to their geocentric places in the ecliptic for any given time, by an ephemeris; then ſet the north point of the horizon to the latitude of your place on the brazen meridian, and the quadrant of altitude to the ſouth point of the horizon; which done, turn the globe with its furniture till the quadrant of altitude comes right againſt the Sun, *viz.* to his place in the ecliptic; and keeping it there, ſet the hour index to the XII. next the letter C.

By this machine the following problems, as well as many others, may be reſolved.

To find the amplitude, meridian altitudes, and times of riſing, culminating, and ſetting of the ſun, moon, and planets.—Turn the globe round eaſtward, or according to the order of the ſigns; and as the eaſtern edge of the horizon comes right againſt the ſun, moon, or any planet, the hour-index will ſhew the time of its riſing; and the inner edge of the ecliptic will cut its riſing amplitude in the horizon. Turn on, and as the quadrant of altitude comes right againſt the ſun, moon, or planets, the ecliptic cuts the meridian altitudes in the quadrant, and the hour-index ſhews the times of their coming to the meridian. Continue turning, and as the weſtern edge of the horizon comes right againſt the ſun, moon, or planets, their ſetting amplitudes are cut in the horizon by the ecliptic; and the times of their ſetting are ſhewn by the index on the hour-circle.

To find the altitude and azimuth of the ſun, moon, and planets, at any time of their being above the horizon.—Turn the globe till the index comes to the given time in the hour-circle; and keep the globe ſteady, and moving the quadrant of altitude to each planet reſpectively, the edge of the ecliptic will cut the planet's mean altitude on the quadrant, and the quadrant will cut the planet's azimuth, or point of bearing on the horizon.

The ſun's altitude being given at any time either before or after noon, to find the hour of the day, and the variation of the compaſs, in any known latitude.—With one hand hold the edge of the quadrant right againſt the ſun; and, with the other hand, turn the globe weſtward, if it be in the forenoon, or eaſtward if it be in the afternoon, until the ſun's place at the inner edge of the ecliptic cuts the quadrant in the ſun's obſerved altitude; and then the hour-index will point out the

the time of the day, and the quadrant will cut the true azimuth, or bearing of the ſun for that time: the difference between which, and the bearing ſhewn by the azimuth compaſs, ſhews the variation of the compaſs in that place of the earth. Ferguſon's Aſtron. p. 292, &c.

Globe *Amaranth.* See Gomphræna.

Globe *Animalcule*, in *Natural Hiſtory*, is a ſingular, minute, aquatic animal, whoſe form ſeems exactly globular, without either head, tail, or fins. It moves in all directions, either rolling like a bowl, or gliding along ſmoothly without turning itſelf at all. Its whole body is tranſparent, except where it is covered with circular black ſpots; ſome of which have ſix or ſeven, ſome one, two, three, four or five, and others none at all. Theſe ſpots are probably the eggs or young ones of the animal. The general appearance of the body exhibited a kind of ſhort moveable hairs or briſtles, by means of which it is conjectured the motions of the animal may be performed. Baker's Microſ. 1753, p. 322, &c.

Globe, *Daiſy.* See Globularia.

Globe *Fiſh*, in *Ichthyology*, a name by which ſome ſpecies of the oſtracion are called. See Ostracion.

Globe *Flower*, in *Botany*. See Sphæranthus.

Globe *Ranunculus*. See Trollius.

Globe *Thiſtle.* See Echinops.

GLOBULAR Chart, a repreſentation of the ſurface, or ſome part of the ſurface, of the terraqueous globe upon a plane; wherein the parallels of latitude are circles nearly concentric: the meridians, curves, bending towards the poles; and the rhumb-lines alſo curves.

The merits of this chart conſiſt in this, that the diſtances between places on the ſame rhumb are all meaſured by the ſame ſcale of equal parts; and the diſtance of any two places in the arch of a great circle, is nearly repreſented in this chart by a ſtraight line. Hence land-maps, made according to this projection, would indiſputably have great advantages above thoſe made any other way. See Map.

But for ſea charts, and the uſe of navigation, it is yet controverted, whether the globular chart be preferable to Mercator's, where the meridians, parallels, and particularly the rhumb-lines, are all ſtraight lines; inaſmuch as ſtraight lines are found more eaſy to draw and manage than curves, eſpecially ſuch as rhumb-lines on the globular chart are. This projection is not new, though not much taken notice of till of late. It is mentioned by Ptolemy in his Geography; as alſo by Blundeville, in his Exerciſes. See Chart.

Globular *Projection.* See Projection.

Globular *Sailing.* See *Great-circle* Sailing.

GLOBULARIA, in *Botany*, was ſo called by Tournefort, becauſe its flowers grow in the ſhape of a little globe or ball.—Linn. Gen. 47. Schreb. 63. Willd. Sp. Pl. v. 1. 539. Ait. Hort. Kew. ed. 2. v. 1. 222. Mart. Mill. Dict. v. 2. Lamarck Dict. v. 2. 730. Illuſtr. t. 56. Tourn. t. 265. Gærtn. t. 44. Juſſ. 97.—Claſs and order, *Tetrandria Monogynia.* Nat. Ord. *Aggregatæ*, Linn. *Lyſimachiæ*, Juſſ.

Gen. Ch. *Cal.* Common perianth imbricated, with equal ſcales, the length of the diſk; proper perianth of one leaf, tubular, five-cleft, acute, permanent. *Cor.* General one nearly equal; proper one of a ſingle petal, tubular at the baſe; limb in five ſegments; the upper lip very narrow, cloven, ſhorteſt; the lower conſiſting of three larger, equal ſegments. *Stam.* Filaments four, ſimple, as long as the proper corolla; anthers diſtinct, incumbent. *Piſt.* Germen ſuperior, ovate; ſtyle ſimple, the length of the ſtamens; ſtigma obtuſe. *Peric.* none; proper calyx ſhutting up and encloſing the ſolitary, ovate *ſeeds.* Common *receptacle* oblong, divided by ſcales.

Eſſ. Ch. Common calyx imbricated; proper one tubular, inferior. Partial corollas with the upper lip cloven; under one three-cleft. Receptacle chaffy.

1. G. *longifolia.* Long-leaved Globularia. Willd. Sp. Pl. v. 1. 539; (Alypum ſive Herba terribilis; Sloan. Jam. v. 1. 19. t. 5. f. 3.)—"Stem ſhrubby. Leaves linear-lanceolate, entire. Heads of flowers axillary."—This green-houſe ſhrub is a native of Madeira, flowering in July and Auguſt. The *wood* of this plant is hard and white, with a very large *pith*, and an unequal light brown or grey *bark*. *Leaves* growing very thick towards the ends of the *branches*. *Flowers* conſiſting of ſeveral ſpherical heads, of a blueiſh colour. *Seed* pappous, all over downy.

2. G. *Alypum.* Herb Terrible. Linn. Sp. Pl. 139. (Alypum montis Ceti; Ger. em. 506.)—"Stem ſhrubby. Leaves obovato-lanceolate, three-toothed or undivided. Heads of flowers terminal."—A green-houſe ſhrub, found in various parts of the ſouth of Europe, flowering from Auguſt to November. *Root* woody. *Leaves* alternate, faſciculated in the lower *axillæ*, near an inch long, glaucous, ſome are undivided, others three-toothed. *Flowers* blue or purple. The whole plant is bitter, and purgative in a violent degree.

3. G. *biſnagarica.* Linn. Sp. Pl. 139. (Scabioſa biſnagarica ſive G. fruteſcens; Pluk. Amalth. t. 58. f. 5.)—"Stem ſhrubby. Radical-leaves wedge-ſhaped, abrupt; ſtem-leaves lanceolate."—Native of the woods of India. *Stem* of many ſtraight, hard, leafy branches, each about five or ſix inches high. *Flowers* in a blue terminal head.

4. G. *vulgaris.* Blue Daiſy. Linn. Sp. Pl. 139. (Aphyllanthes anguillaræ; Camer. Hort. t. 7.)—"Stem herbaceous. Radical-leaves three-toothed. Stem-leaves lanceolate."—A hardy perennial, common in ſome parts of Europe, and flowering in May and June. *Root* woody. *Stem* a ſpan high, terminated by a head of deep blue *flowers*. Willdenow mentions two varieties of this ſpecies, one with a *leafleſs ſtem*, the other with *white flowers*.

5. G. *ſpinoſa.* Linn. Sp. Pl. 139.—"Radical-leaves crenate-prickly; ſtem-leaves entire, pointed."—Native of Spain, Albinus having gathered it in Granada. It flowers in May. —*Radical-leaves* numerous, ſmall, ſtiff and notched, each notch ending in a prickle. *Flowers* compoſing an oblong ſphere, hairy.—We are not acquainted with any figure of this ſpecies.

6. G. *cordifolia.* Linn. Sp. Pl. 139. Jacq. Auſtr. t. 245.—"Stem nearly naked. Leaves wedge-ſhaped, with three points; the middle one very ſmall."—Native both of hills and vales in Hungary, Auſtria, and Switzerland, flowering from April to July. *Root* creeping, each joint throwing out a cluſter of *leaves*, from the centre of which ſprings a ſmooth purpliſh *ſtem* about four inches long, terminated by a head of blue *flowers*.

7. G. *nana.* Willd. Sp. Pl. v. 1. 542.—"Flower-ſtalks naked, very ſhort, leaves ſpatulate, ſomewhat ovate, entire."—Found in the ſouth of France, and on the Pyrenées, where our dried ſpecimen was gathered by Dr. Noehden. —*Root* woody and very thick, bearing numerous tufts of little *leaves*, among which ariſe the ſhort, ſolitary flower-ſtalks. *Flowers* forming a terminal head.—It has never been figured.

8. G. *nudicaulis.* Linn. Sp. Pl. 140. Jacq. Auſtr. t. 230.—"Stem naked, leaves entire lanceolate."—Native of mountainous and ſtony places in Auſtria and Switzerland, flowering in July.—*Root* perennial, fibrous, creeping, throwing out numerous, thickiſh, firm *leaves*, darker on the up-

per ſide. *Flower-ſtalk* about ſix inches long, ſmooth, ſtriated, purpliſh towards the top, bearing a roundiſh head of blue *flowers*.

9. G. *orientalis*. Linn. Sp. Pl. 140.—" Stem nearly naked. Heads of flowers alternate, ſeſſile, leaves ovate, ſomewhat lanceolate, entire."—This ſpecies is a native of Natolia. —*Root* perennial. *Leaves* numerous, obovate, running down into the foot-ſtalks, acute, undivided, naked. *Stem* a foot high, herbaceous, perfectly ſimple. *Leaves* alternate, ſmall, lanceolate, remote. *Heads of flowers* alternate, ſeſſile, from ſeven to ten, at the ſummit of the ſtem.—Linnæus deſcribed G. *orientalis*, having received it from M. Biorling, but it is nowhere figured.

Globularia, in *Gardening*, contains plants of the herbaceous, flowery, perennial kind; of which the ſpecies chiefly cultivated are the three-tooth-leaved globularia (G. alypum); and the common globularia or blue daiſy (G. vulgaris); but others may be eaſily raiſed.

There are two varieties of the laſt ſort, one with a white flower, and another that has a leafleſs ſtem.

Method of Culture.—In the firſt it may be effected by planting cuttings of the young branches in April, juſt before they begin to ſhoot, in pots of light freſh mould, plunging them in a very moderate hot-bed, and giving them due water and ſhade, till they have ſtricken root. After this they ſhould be removed from the bed, and be gradually hardened to the open air, being protected during the winter months.

The ſecond ſort may be readily increaſed by parting the roots, as in the common daiſy, planting them out in the early part of the autumn, in moiſt ſhady ſituations. They ſucceed beſt in ſuch loamy ſoils as are rather moiſt in their quality.

The firſt affords variety among potted plants, and the latter in the fronts of the more moiſt and ſhady borders and clumps of pleaſure-grounds.

GLOBULE, Globulus, a little *globe*; otherwiſe called a *ſpherule*.

Thus the red particles of the blood are called globules of the blood, on account of their redneſs and ſmallneſs. (See Blood.) The Carteſians call the particles broken off the matter of the firſt *element*, *globules of the ſecond element*. See Carteſian, &c.

GLOBULUS Nasi, is uſed for the lower, flexible, cartilaginous part of the noſe.

GLOCHIDION, in *Botany*. See Bradleja.

GLOESZTI, in *Geography*, a town of Walachia; 50 miles N. of Buchareſt. N. lat. 49° 13'. E. long. 26° 16'.

GLOGAU, a principality of Sileſia, on the E. ſide of the Oder, bordering on Poland; producing corn and wine in abundance, in ſome parts affording mines of iron. The paſtures feed many ſheep, and the wool is wrought into different manufactures. It is divided into ſix circles. In the year 1241, it was governed by its own princes; but afterwards it belonged to the king of Poland, to the king of Bohemia, to the emperor, and laſt of all to the king of Pruſſia.

Glogau, *Gros* or *Great*, the capital of the principality of the ſame name, built in 1110 on the S. ſide of the Oder, taken by the Pruſſians in 1741, and ſtrengthened by new fortifications. It is the ſeat of a governor, a commandant, divers tribunals, and a biſhop's court, &c. It contains two Catholic churches, of which one is collegiate, three convents, a Lutheran church and ſchool, and a chapel for Calviniſts; 62 miles N.W. of Breſlau. N. lat. 51° 39'. E. long. 16° 5'.

Glogau, *Ober*, or *Little*, a town of Sileſia, in the principality of Oppeln; 19 miles S. of Oppeln. N. lat. 50° 16'. E. long. 17° 48'.

GLOGNITZ, a town of Auſtria; 28 miles S. of Vienna.

GLOKEN-SPEISSE, in *Mineralogy*, a term uſed by the Germans to expreſs a ſort of impure regulus of biſmuth, obtained by accident, ſometimes in the making of ſmalt. The biſmuth ores are often ſo intimately mixed with the cobalt, that they cannot be ſeparated from them. In this caſe, the arſenic being raiſed in the flowers, there remains at the bottom, inſtead of the fixed vitrifiable earth of the cobalt, a ſort of impure regulus of a reddiſh colour. This is biſmuth, with an admixture of the earth of cobalt, and other extraneous matter. They ſometimes call this whole matter by the common name of ſpeiſſe; but more uſually they ſeparate it into two parts, and call the under part, which is moſt ſolid, gloken-ſpeiſſe, and the upper part they diſtinguiſh by the name of æs caldarium.

GLOMERELLS, in our *Old Writers*, commiſſaries appointed to determine differences between ſcholars of a ſchool or univerſity, and the townſmen of a place. In the edict of the biſhop of Ely, anno 1276, there is mention of the maſter of the glomerells.

GLOMME, or Glomen, in *Geography*, called alſo the *Stor Elv*, or great river, the chief river of Norway, ſprings from the lake of Oreſund on the north of the Fœmund, and after running a courſe nearly ſouth about 300 Britiſh miles, diſcharges itſelf into the Northern Ocean near Frederickſtadt, to which town about 50,000 trees are annually floated upon it. This river, being full of cataracts and ſhoals, is not navigable. Before it receives the Worme, which iſſues from the lake Mioſs, it is about as broad as the Thames at Henley. In its courſe it preſents a broad ſurface, ſometimes watering pleaſant vallies, ſometimes intercepted by ſand-banks, over which it frequently ſhifts its courſe, ſometimes winding between rocky cliffs, and precipitating itſelf in frequent cataracts. Near Kongſwinger it is as broad as the Thames at Putney. Its rugged courſe, however, muſt render it a tremendous torrent.

GLON, a river of Bavaria, which runs into the Ammer, near Crantzberg.

GLONS, a town of France, in the department of the Ourte, and chief place of a canton, in the diſtrict of Liege. The place contains 1,500, and the canton 8,850, inhabitants, on a territory of 107½ kiliometres, in 23 communes.

GLOR-FAT, in *Rural Economy*, a term applied to animals that are extremely fat.

GLORIA Patri, in the *Liturgy*, a formula of words repeated at the end of each Pſalm, and on other occaſions, to give glory to the Trinity; called alſo the *Doxology*. It is thus denominated, becauſe it begins in the Latin office with theſe words; *Gloria Patri*, q. d. *Glory be to the Father*, &c.

Pope Damaſcus is commonly ſaid to have firſt ordered the rehearſal, or rather, ſinging the Gloria Patri at the end of Pſalms. Baronius, indeed, will have it to have been uſed in the times of the apoſtles: but its uſe, then, he allows to have been more obſcure, and that it did not become popular till after the riſe of Arianiſm, when it was made a kind of ſymbol of orthodoxy.

The fifth canon of the council of Vaiſon, held in 529, decrees, " that the name of the pope ſhall always be rehearſed in the churches of France, and after the Gloria Patri ſhall be added *ſicut erat in principio*, as is done at Rome, in Africa, &c. on account of the heretics, who ſay, that the Son of God had his beginning in time." Fleury.

Gloria *in excelſis* is alſo a kind of hymn rehearſed in divine ſervice, beginning with the words *Gloria in excelſis Deo, & in terra pax hominibus*, &c. *Glory be to God on high, on earth peace*, &c.

GLORIOSA, in *Botany*, ſo named on account of the ſplendour and magnificence of its flowers. Tournefort, objecting to the name given by Linnæus becauſe it is an adjective, called this genus *Methonica*, in which he has been followed by Juſſieu, and indeed by all French botaniſts, though the Linnæan ſchool have refuſed to adopt this barbarous name.—Linn. Gen. 164. Schreb. 220. Willd. Sp. Pl. v. 2. 95. Ait. Hort. Kew. v. 1. 434. Mart. Mill. Dict. v. 2. Gærtn. t. 18. Juſſ. 48.—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Sarmentaceæ*, Linn. *Lilia*, Juſſ.

Gen. Ch. *Cal.* none. *Cor.* Petals ſix, oblong-lanceolate, waved, very long, entirely bent back, furniſhed at the baſe of their inſide with a honey-bearing furrow, between two ridges. *Stam.* Filaments ſix, awl-ſhaped, ſhorter than the corolla, horizontal; anthers incumbent. *Piſt.* Germen globoſe; ſtyle thread-ſhaped, longer than the ſtamens, horizontal; ſtigmas three, thread-ſhaped. *Peric.* Capſule ſuperior, oval, with three lobes, three cells, and three valves. *Seeds* numerous, globular, covered with pulp, and diſpoſed in two rows.

Eſſ. Ch. Corolla of ſix waved and reflexed petals. Style oblique.

1. G. *ſuperba*. Superb Lily. Linn. Sp. Pl. 437. Redout. Liliac. t. 26.—"Leaves furniſhed with tendrils."—Native of Malabar and Guinea. It was introduced into Kew Garden in 1690 by the firſt earl of Portland. A tender ſtove plant, flowering in July and Auguſt. The *ſtem* is herbaceous, about a fathom high, round, having two oppoſite lateral *branches*, and putting forth a flower-ſtalk from the boſom of each leaf. *Leaves* alternate, ſmooth, each ending in a *tendril*. *Flowers* pendent, of a moſt beautiful red and yellow colour. *Petals* lanceolate, long, waved at the edge, reflexed near the baſe. This remarkably handſome plant requires exceſſive heat to make it flower.

2. G. *ſimplex*. Linn. Mant. 62. Willd. Sp. Pl. v. 2. 96.—"Leaves pointed."—Native of Senegal. The *leaves* are not furniſhed with tendrils. *Flowers* blue.—There is no figure of this ſpecies known. It was merely taken up from Miller, nor has any thing been found which anſwers to the deſcription.

Obſ. This very beautiful genus is nearly allied to *Erythronium*.

Gloriosa, in *Gardening*, compriſes a plant of the herbaceous, flowering, perennial kind; of which the ſpecies cultivated is the ſuperb-lily (G. ſuperba.)

Method of Culture.—It is capable of being increaſed by planting the offſets from the old roots, either in the autumn after the ſtems decay, or in the early ſpring before they ſhoot, in pots filled with light earth, plunging them in the bark-bed of the ſtove. The old roots, when taken out of the ground, ſhould be preſerved in dry ſand during the winter in the ſtove, or in a dry warm room. It is the practice of ſome to let the roots remain during the winter in the mould, keeping the pots in the tan-bed; planting out the offſets early in the ſpring. In either way they ſhould have very little water given them.

When the ſtems appear they ſhould be ſupported by ſticks, and in hot dry weather a little water ſhould be ſparingly given, as there may be occaſion. And the pots in which they are planted ſhould be ſmall, that they may be confined, and put forth ſtronger ſtems. Two-penny pots will be large enough for the roots of the greateſt ſized plants of this nature.

The plants afford much effect by their beautiful flowers among thoſe of the ſtove kind, when properly intermixed with them.

GLORIOUS Islands, in *Geography*, two ſmall iſlands in the Indian ſea. S. lat. 11° 32′. E. long. 47° 15′.

GLOSKAR, a ſmall iſland in the Baltic, E. of Aland. N. lat. 60° 20′. E. long. 20° 13′.

GLOSS, Glossa, a comment on the text of any author, to explain his ſenſe more fully and at large, whether in the ſame language, or in any other. See Commentary.

The word, according to ſome, comes from γλωσσα, *tongue*; the office of a gloſs being to explain the text, as that of the tongue is to diſcover the mind. Others derive it from the Latin *gloſs*, of γαλως, *a ſiſter-in-law*, which among lawyers ſometimes ſtands for ſiſter; the gloſs being, as it were, ſiſter to the text.

Nic. de Lyra compoſed a poſtil or gloſs on the Bible, in ſix volumes folio. The French ſay, proverbially of an ill comment, that it is *gloſs d'Orleans, plus obſcure que le texte.*

Gloss is alſo uſed for a literal tranſlation, or an interpretation of an author in another language, word for word. Young ſcholars need an interlineary gloſs for the underſtanding of Juvenal, Horace, Salluſt, Perſius, &c.

Gloss is alſo uſed in matters of *Commerce*, &c. for the luſtre of ſilk, ſtuff, or the like.

GLOSSARY, Glossarium, a kind of dictionary for explaining the obſcure, ancient, and barbarous words and phraſes of an altered, corrupted, or refined language.

Spelman's gloſſary, entitled Archaiologicum, is an excellent work; though that author did not begin to ſtudy in this way till fifty years of age. M. Du Cange's Latin Gloſſary in ſix volumes, Paris, fol. 1733, Baſil, fol. 1762, is a work in high eſtimation, and containing a fund of the moſt curious and amuſing intelligence. Charpentier's ſupplement to this work, in 4 volumes, fol. Paris, 1766, is neceſſary to render this ſet of books complete. Du Cange's Greek Gloſſary in two volumes, fol. Lugd. 1688, is an excellent performance, full of uncommon erudition.

The Greek, Latin, and French gloſſaries of Du Cange form a ſeries of the moſt inſtructive articles in the ſtudy of juriſprudence and belles lettres. There is an abridgment of this work in 6 vols. 8vo.; which, however, contains ſome matter not common to either of the preceding. This abridgment is exceedingly rare. As a caution to the purchaſers of the Greek Gloſſary, we inform them that in the article "Moneta" (Coins, vol. iv. p. 904.) there ſhould be 10 plates of engravings of coins, and monograms of various princes and ſovereigns of Europe, which are ſometimes wanting, and thus the value of the edition is materially depretiated.

Lindenbroek has a Gloſſary on the laws of Charlemagne, &c.

GLOSSOCATOCHOS, in *Surgery*, an inſtrument for depreſſing the tongue. It is deſcribed by Paulus Ægineta, and the term is derived from γλωσσα, *the tongue*, and κατεχω, *to repreſs.*

GLOSSOCELE, denoting a ſwelling and protruſion of the tongue. The word comes from γλωσσα, *the tongue*, and κηλη, *a tumour.*

GLOSSOCOMA, a retraction of the tongue.

GLOSSOCOME, *in the Inſtrumental Muſic of the Greeks*, a name given by the ancients to a kind of caſe for the glottis, or tongues of their flutes, which probably were hautboys, and, conſequently, their glottis was a reed. See Glottis.

GLOSSOCOMON, in *Mechanics*, is a name given by Hi-ero, to a machine compoſed of divers dented wheels, with pinions ſerving to raiſe huge burdens.

Glossocomon, a term in *Surgery*, derived from γλωσσα, *the tongue*, and κομεω, *to guard*; originally a caſe for the reed of a hautboy, but uſed metaphorically to ſignify a caſe for a fractured limb.

GLOSSODIA, in *Botany*, (γλωσσοειδης, having the form or appearance of a tongue; in alluſion to the peculiar appendage to the internal part of the flower, which reſembles the tongue of a ſerpent, and affords the eſſential character. Brown Prod. Nov. Holl. v. 1. 325.—Claſs and order, *Gynandria Monogynia*. Nat. Ord. *Orchideæ*.

Gen. Ch. *Cal.* Perianth ſuperior, of three equal ſpreading leaves. *Cor.* Petals two, equal to and reſembling the calyx. Nectary of a different form, ſhorter, undivided, not glandular, accompanied, at its baſe above, by a cloven tongue-ſhaped appendage, between it and the ſtyle. *Stam.* Anther terminal, its cells cloſe together; maſſes of pollen two in each cell, compreſſed, powdery. *Piſt.* Germen inferior: ſtyle columnar, with a dilated membranous border at each ſide. *Peric.* Capſule. *Seeds* numerous.

Eſſ. Ch. Calyx and Corolla equal. Lip ſhorter, undivided, without glands, with an appendage at its baſe. Style dilated at each ſide. Anther vertical.

1. G. *major*. Brown 326.—“ Appendage cloven half way down; its lobes ſpreading, acute.”

2. G. *minor*. Ibid.—“ Appendage cloven to the baſe; its lobes parallel, obtuſe.”

Both ſpecies are natives of the country near Port Jackſon, New South Wales. Their *bulbs* are undivided, with a laminated coat, and grow in the earth, not paraſitically. *Herb* hairy. *Leaf* ſolitary, radical, its baſe encloſed in a membranous ſheath. *Stalk* radical, bearing generally one blue flower, rarely two, and furniſhed with one *bractea* beſides what accompanies each flower. *Brown.*

GLOSSOIDES, in *Natural Hiſtory*, a name given by ſome authors to a ſpecies of ſtone, reſembling the figure of the human tongue. This is a mere accidental configuration of a common flint or pebble, perfectly indeterminate in ſize and colour, and owing its form to no animal mould, as the ſtones found in ſhells uſually do, but is a mere luſus naturæ in the concretion of the ſtone.

GLOSSOMA, in *Botany*, ſo named by Schreber, from γλωσσα, *the tongue*, and ωμος, *the ſhoulder*, alluding to the tongue-ſhaped appendages borne by the anthers. Schreb. 792. Willd. Sp. Pl. v. 1. 664. Mart. Mill. Dict. v. 2. (Votomita; Aubl. Guian. v. 1. 90. Juſſ. 382.) Claſs and order, *Tetrandria Monogynia*. Nat. Ord. *Rhamnis affine*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, turbinate, four-toothed, permanent. *Cor.* Petals four, equal, lanceolate, acute, much longer than the calyx, recurved. Nectary a ring round the baſe of the ſtyle. *Stam.* Filaments four, very ſhort; anthers oblong, nearly united into a cylinder, elongated at the top into a membranous lanceolate expanſion of two cells, opening inwardly. *Piſt.* Germen inferior, obovate; ſtyle thread-ſhaped, as tall as the ſtamens; ſtigmas four, acute. *Peric.* Drupa pear-ſhaped, of one cell, crowned by the calyx. *Seed* ſolitary, ovate, ſtriated.

Eſſ. Ch. Calyx ſuperior, four-toothed. Petals four. Anthers cohering, each crowned with a lanceolate membrane. Stigmas four. Drupa with one furrowed nut.

Obſ. The above characters appear to be taken by Schreber from Aublet, nor have we any better materials. The only ſpecies known is,

1. G. *arboreſcens*; Willdenow. (Votomita guianenſis; Aubl. v. 1. 91. t. 35.)—A *ſhrub* of a middling ſize, whoſe trunk is five or ſix feet high, and five or ſix inches thick; the wood yellow, hard and compact. *Branches* knotty, ſpreading variouſly, leafy. *Leaves* oppoſite, elliptical, pointed, entire, ſix inches long, thick and firm, of a ſhining green, placed on ſhort ſtalks, with a deciduous ſtipula at each ſide of their baſe. *Flowers* white, on ſhort, umbellate, axillary ſtalks, their petals about half an inch long. This plant is found in the extenſive foreſts of Guiana, about the habitations of the natives. Nothing is recorded reſpecting its qualities or uſes.

GLOSSOPETALUM, ſo denominated by Schreber from the tongue-like appendages to the petals. Schreb. 205. Willd. Sp. Pl. v. 1. 1521. Mart. Mill. Dict. v. 2. (Goupia; Aubl. v. 1. 295. Juſſ. 378. Lamarck. Illuſtr. t. 217.)—Claſs and order, *Pentandria Pentagynia*. Nat. Ord. *Dumoſæ*, Linn. *Rhamni*, Juſſ.

Gen. Ch. *Cal.* Perianth half inferior, of one leaf, minute, five-toothed, permanent. *Cor.* Petals five, lanceolate, ſpreading, acute, much longer than the calyx, each bearing at its point a linear-lanceolate, abrupt appendage, almoſt of the length of the petal, bent back and lying upon it. *Stam.* Filaments five, very ſhort; anthers roundiſh. *Piſt.* Germen roundiſh, encircled by a glandular ring, which bears the petals and ſtamens; ſtyle none; ſtigmas five, acute. *Peric.* Berry roundiſh, with five furrows, of one cell. *Seeds* five, angular.

Eſſ. Ch. Calyx half inferior, with five teeth. Petals five, each bearing an inflexed longitudinal appendage. Berry with five ſeeds.

Obſ. Schreber, p. 826, ſuſpects this genus not to be diſtinct from *Aralia*, but the habit confirms Juſſieu's opinion, who ſeparates them widely. Two ſpecies are deſcribed by Aublet.

1. G. *glabrum*. (Goupia glabra; Aubl. v. 1. 296. t. 116.)—“ Leaves ſmooth.”—Native of the foreſts of Guiana, 30 leagues from the ſea, bearing flowers and fruit in November. The *trunk* is 60 feet or more in height, and two or three feet in diameter, ſerving to make canoes; the bark ſmooth and grey; the wood white and light. *Branches* drooping, furniſhed with alternate *leaves* of an ovate, pointed, ſomewhat unequal figure, entire, rigid, ſhining, and ſmooth, with a branching rib, and fine tranſverſe veins at the back. *Flowers* yellow, ſmall, many together in ſolitary axillary umbels. *Berry* black, globular.

2. G. *tomentoſum*. Willd. Sp. Pl. v. 1. 1522.—“ Leaves downy.”—Native of the foreſts of Cayenne and Guiana. Not half ſo lofty as the former. The *bark* is wrinkled and dark-coloured. *Leaves* clothed on both ſides with ſome ſhort hairs. Their juice, which, as well as the bark, is bitter, is uſed to cure inflammations of the eyes.

GLOSSOPETRA, or Glottopetra, in *Natural Hiſtory*, called alſo *ichthyodontes*, *ſhark's teeth*, *dog-fiſh's teeth*, &c. a kind of extraneous foſſil, ſomewhat in form of a ſerpent's tongue; frequently found in the iſland of Malta and divers other parts. Some of them are in a high ſtate of preſervation, having their enamel and points perfect, and their ſharp edges finely ſerrated as in the recent teeth.

Naturaliſts have been much divided as to the nature and origin of theſe bodies. Steno, De Corpore ſolido intra ſolidum contento; Ol. Wormius, Diſſert. de Gloſſopetra; and Reyſchius, De Gloſſopetris Lunebergenſibus, treat of them at large.

The vulgar notion is, that they are the tongues of ſerpents petrified; and hence their name, which is a compound of γλωσσα, *tongue*, and πετρα, *ſtone*. Hence, alſo, their traditionary virtue in curing the bites of ſerpents.

The general opinion of naturaliſts is, that they are the teeth of fiſhes, left on land by the waters of the deluge, and ſince petrified.

They even ſpecify the very kind of fiſh, and take it to be that which Theophraſtus and the Greek writers call καρχαρίας, and the moderns the *ſhark* or *ſea-dog*.

Camerarius cannot perſuade himſelf that the gloſſopetræ found in England, Malta, and round Montpelier, were ever the teeth of a ſea-dog, or any other fiſh. The chief difficulty, he ſuggeſts, is the ſmall quantity of volatile ſalt and oil which they afford by diſtillation. To which Dr. Woodward anſwers, in defence of the common ſyſtem, that having lain ſo long buried under ground, it is no wonder they ſhould have loſt the beſt part of their volatile principles. It is certain, that human bones and ſkulls, long interred, do not afford nearly the quantity of thoſe principles that they would have done immediately after the perſon's death.

Another ſcruple, propoſed by Camerarius is, that the gloſſopetræ, when expoſed to the naked fire, turn to a coal; and not to a calx; contrary to what is aſſerted by Fabius Columna. Dr. Woodward anſwers, that it is likely enough the gloſſopetræ, in burning, may aſſume the form of a coal, before it arrive to that of a calx.

The ſeveral ſizes of the teeth of the ſame ſpecies, and thoſe of the ſeveral different ſpecies of ſharks, afford a vaſt variety of theſe foſſil ſubſtances. Their uſual colours are black, blueiſh, whitiſh, yellowiſh, or brown; and in ſhape they uſually approach to a triangular figure. Some of them are ſimple; others are tricuſpidate, having a ſmall point on each ſide of the large one; many of them are quite ſtraight, but they are frequently found crooked, and bent in all directions; many of them are ſerrated on their edges, and others have them plain: ſome are undulated on their edges, and ſlightly ſerrated on theſe undulations. They differ alſo in ſize as much as in figure; the larger being four or five inches long, and the ſmaller of leſs than a quarter of an inch.

They are moſt uſually found with us in the ſtrata of blue clay, though ſometimes alſo in other ſubſtances, and are frequent in the clay-pits of Richmond and of Sheppy iſland, and in other places. They are very frequent alſo in Germany, but nowhere ſo plentiful as in the iſland of Malta. In the Britiſh ſtrata they rarely occur. Mr. Farey has found them in theſe ſtrata only in five places, *viz.* in the London clay, probably obtained from the clay-pits above-mentioned; in a bed of the ſoft or upper chalk in Kent, at Harefield, near New Malton, &c.; in a green ſandy ſtratum below the chalk, N. of Dunſtable, &c.; in the Stonesfield and Collyweſton ſlate ſeries, above the Bath free-ſtone rocks, at Enſtone in Oxfordſhire, where Woodward procured ſpecimens of theſe teeth in the jaw, &c.; and in the thick grey lime-rock which lies under and ſurrounds the South-Wales coal baſons (Phil. Tranſ. N° 334.) Gloſſopetræ are ſometimes found in gravel-pits and other collections of alluvial matters. It is ſeldom poſſible to determine to what place in the ſeries of ſtrata theſe belong, and they ſhould therefore be carefully diſtinguiſhed from ſuch as are actually found in the ſtrata.

The Germans attribute many virtues to theſe foſſil teeth; they call them cordials, ſudorifics, and alexipharmics: and the people of Malta, where they are extremely plentiful, hang them about their children's necks to promote dentition. They may poſſibly be of as much ſervice this way as an anodyne necklace; and if ſuſpended in ſuch a manner that the child can get them to its mouth, may, by their hardneſs and ſmoothneſs, be of the ſame uſe as a piece of coral. See Serpent's *Tongues*.

GLOSSO-PHARYNGEUS, in *Anatomy*, from γλωσσα, *the tongue*, and φαρυγξ, a name given to thoſe fibres of the conſtrictor pharyngis ſuperior, which ariſe from the ſide of the tongue.

GLOSSO-SPATHA, in *Surgery*, an inſtrument, called by ſome *ſpeculum linguæ*, and uſed to depreſs the tongue, in order to look into the fauces.

There are many inflammatory diſorders of the mouth, fauces, and palate, which require a depreſſion of the tongue, while they are inſpected and treated with proper remedies. The handle of a ſilver ſpoon is made to ſupply the place of this inſtrument in moſt caſes, and anſwers the purpoſe very well. Whichever is uſed, care ſhould be taken to depreſs very gently, to avoid giving the patient pain, as alſo to avoid irritating the mouth and inflamed parts.

When injections are to be made into the mouth, this inſtrument or the ſpoon ſhould alſo be applied, and the ſyringe ſhould be conveyed into the mouth over it.

GLOSSO-STAPHYLINUS, in *Anatomy*, from γλωσσα, *the tongue*, and σταφυλη, *the uvula*, another name for the conſtrictor iſthmi faucium. See Deglutition.

GLOTTIDIS Rima, the ſame opening as the glottis. The term rima particularly denotes its ſlit-like form.

GLOTTIS, from γλωττα, *the tongue*, is the opening through which the air paſſes to and from the lungs in reſpiration. In this paſſage the voice is formed. See Deglutition and Larynx.

Julius Pollux makes the glottis a joint or part of a flute, and Heſychius ſays that the glott were little tongues, acted upon by the breath of the player. This deſcription of Heſychius ſeems to confirm the idea of the ancient nominal flutes being a kind of hautboys.

Glottis, in *Ornithology*, a name given by many authors to a bird of the long-legged kind, approaching to the nature of our red-ſhank, but larger and longer legged, and generally known by the name *limoſa*. See Scolopax *Glottis*.

GLOUCESTER, in *Geography*, a city in Glouceſterſhire, England, is ſituated in a vale, on a gentle eminence, riſing, on the eaſt ſide, from the river Severn. This opulent city appears to have originated in a Roman ſtation which was ſituated at King's Holm, near the north-eaſtern extremity of the preſent city. The Romans continued to occupy this ſpot till the diſtractions of their own empire occaſioned them to quit the iſland. Its government then reverted to the Britiſh princes, under whoſe domination it continued till about the year 577, when, according to the Saxon Chronicle, it was ſurrendered to the Weſt Saxons, and was reputed one of their principal cities: it was afterwards ſubjugated by the Mercians, who alſo obtained poſſeſſion of the other parts of the county. Under the Saxons it acquired the appellation of Gleau-ceſtre. The ſtrength and conſequence of the city rendering it an object of frequent enterpriſe, its vicinity was ſeveral times the ſcene of action between the Britons and Saxons. By theſe conflicts, its buildings were nearly ruined; and the whole place might have ſunk into complete decay, if Wolphere, ſon of king Penda, had not enlarged and adorned it, about the year 679. This reſtoration was ſo perfect, that Bede informs us, it was eſteemed, about the commencement of the 8th century, as one of the nobleſt cities in the kingdom. Its early importance is evinced by its having been the reſidence of various Saxon monarchs; and hence it was denominated a royal city, as it is expreſsly termed in a grant made by king Edgar to the monks of Worceſter, dated at Glouceſter in the year 964. By this monarch a battle was fought here with the Danes, who had twice plundered the city in the preceding reigns, and who again ravaged, and partly conſumed it by fire, in that of his ſon Ethelred. Several of the Norman and Engliſh kings alſo occaſionally reſided and tranſacted public buſineſs in this city. A memorable era in the eventful hiſtory of Glouceſter originated in a conteſt between Henry III. and the barons. That monarch, in 1263, appointed ſir Maci de Beſile, a French knight, ſheriff of the county, and conſtable of the caſtle within the city. The preference thus given to a foreigner was violently reſented by the indignant nobles, who immediately made choice of ſir William Tracy, a native of the ſhire. He accordingly proceeded to exerciſe the duties of his office in holding a county court, but was ſuddenly interrupted by De Beſile, who, entering with a party of the king's troops, ſeized the knight, and, with circumſtances of peculiar cruelty, hurried him to the caſtle, where he was committed to cloſe confinement. After this outrage, the barons deputed ſir Roger de Clifford, and ſir John Giffard, with their dependants, to beſiege the caſtle, for the double purpoſes of reſcue and revenge; in a few days they obtained an entrance, and compelled De Beſile to retire to the keep; he afterwards ſurrendered, and was ſent as a priſoner to Erdeſley caſtle, in the marches of Wales. In the year 1278 Edward I. aſſembled a parliament here, and ſeveral laws, connected with the ſtatute of Quo Warranto, were enacted, and have, from that period, been known under the general appellation of the Statutes of Glouceſter. In the courſe of the two next centuries, four parliaments were held here. The oppoſition of the Glouceſtrians to the royal cauſe, during the reign of Charles I., is generally ſuppoſed to have operated fatally againſt his intereſt throughout the kingdom: ſo early as the year 1641, they declared for the parliament; raiſed a company of volunteers, which they added to their trained bands; procured cannon from London and Briſtol, and repaired and ſtrengthened the fortifications: though frequently beſieged by the royaliſts, they ſucceſsfully reſiſted every attack.

The eccleſiaſtical ſtate of Glouceſter, during the Roman and former part of the Saxon period of its hiſtory, is involved in much obſcurity: but in the year 657, Edwy, king of Northumberland, having ſubdued Mercia, erected Litchfield into a biſhop's ſee, and included Glouceſterſhire within its dioceſe. This biſhopric was ſoon afterwards divided into the five ſmaller of Litchfield, Dorcheſter, Leiceſter, Hereford, and Worceſter; to the laſt of which this diſtrict was annexed, and continued ſubject, till the reign of Henry VIII., who, by letters patent, dated September 3d, 1541, and afterwards confirmed by act of parliament, erected "the city of Glouceſter, the county of that city, and all the county of Glouceſter, into a biſhopric, with a dean and chapter, by the name of the dioceſe of Glouceſter; and ordained that ſuch part of the then vill and county of Briſtol, as formerly was in the dioceſe of Worceſter, ſhould be from thenceforward in the dioceſe of Glouceſter for ever." The church appointed for the cathedral of the new ſee, was that belonging to the abbey, founded by Wolphere, firſt Chriſtian king of Mercia, and Ethelred, his brother and ſucceſſor, in the year 681. The New Minſter, as it is termed in the records, was burnt, with the monaſtery, in 1087 or 1088; probably at the ſame time that the city was partly deſtroyed by the adherents of Robert, brother to William Rufus. Serlo, then abbot, began a new church in June, 1089; the firſt ſtone was laid by Robert, biſhop of Hereford; and on the completion of the edifice, in the following year, it was dedicated to St. Peter, by the biſhops of Worceſter, Rocheſter, and Bangor. The abbey was again deſtroyed by fire in 1101 or 1102, but the church was ſaved. The preſent magnificent and intereſting edifice has been erected at different periods, and conſequently diſplays various ſpecimens of ancient eccleſiaſtical architecture, in the Saxon, Norman, and Engliſh ſtyles. The converſion of the abbey church into a cathedral was the chief cauſe of its preſervation at the reformation; and, to the honour of the inhabitants of Glouceſter, it became the object of their peculiar care during the civil wars, after which they obtained a grant of it from Oliver Cromwell. Hence the cathedral has been transferred to the preſent age, as nearly perfect in all its parts, with regard to its general conſtruction, as it was left by the moſt favoured of its architects. The eras of erection of the principal parts are known; and hence the characteriſtic ſtyles of each can be ſatisfactorily aſcertained. The lower part of the nave, the chapels that ſurround the choir, and the crypt, are preſumed to have belonged to the building erected by biſhop Aldred, before 1089: the roof of the nave obtained its finiſhing and form in 1248. In 1310 the ſouth aiſle was begun; and part of the ſouth tranſept was added in 1330. The building of the north tranſept and choir commenced about the ſame year; the latter was completed in 1457. Between the years 1351 and 1390, the elaborate cloiſters were finiſhed. The chapel of our Lady was built between the years 1457 and 1498; and the centre tower between 1457 and 1518. The interior of this ſplendid fabric conſiſts of a nave, choir, ſide aiſles, and tranſepts, with a chapel of our Lady, and ſeveral ſmaller chapels or oratories. From the interſection of the nave and tranſepts riſes a high tower, and on the ſouth ſide is a handſome projecting porch. The roof is ſuſtained on twenty-eight columns, which extend in two rows from the weſt end to the high altar, where the preſbytery forms nearly a ſemi-circular ſweep: the tranſepts have no iſolated pillars. The chapel of our Lady is, as uſual, attached to the preſbytery; and there are chapels in the north-eaſt and ſouth-eaſt angles of the tranſepts and choir, with two others projecting in the ſweep between thoſe and the chapel of our Lady. The outline, or ground plan of the cathedral, is probably the ſame at preſent as deſigned by biſhop Aldred previous to the year 1089; and the crypt remains almoſt as perfect as the maſons left it. The architecture of this ſubterraneous and gloomy place is maſſy, and ſuited to the immenſe weight reſting on the arches, which are turned upon huge ſhort pillars, and ſtrengthened by groins of proportionate ſolidity. The nave is an intereſting ſpecimen of the ſtyle which continued to prevail for nearly two centuries after the Norman conqueſt. The arcade of ponderous round columns, and the rows of ſemi-circular arches above, impreſs the mind with ideas of the ſtrength, ſolidity, and profound ſolemnity which muſt have accompanied its original ſtate. The architecture of the weſt end is very different from the other parts of the nave; and the vault is covered by interſecting ribs, and ornamented key-ſtones; but the remainder is of the plaineſt deſcription, with three ribs only to each pillar; yet the key-ſtones are carved. On each ſide are eight maſſive columns; the arches between them are bounded by large mouldings, carved into zig-zags, and other ornaments. Directly over each column, and at ſome diſtance, is a range of heads of various characters; ſome ſerene, and others terrific. Theſe ſerve as brackets to cluſters of ſhort pillars, whoſe capitals diſplay the moſt beautiful variety of foliage, on which zig-zag ſtrings extend, ſerving as a baſe to other cluſtered pillars with equally elegant capitals: from thoſe the ribs of the vault commence. The gallery windows, pierced through the wall above the arches, are divided by ſhort thick pillars, and bounded by others, with zig-zag arches: a twiſted ſtring ſeparates them from the clereſtory windows. The north and ſouth aiſles of the nave are nearly in the ſtyle of the weſt end, with pointed windows, rich ramifications in the arches from the mullions, and fillet-ed vaults. The arch of entrance to the cloiſters from the north aiſle is moſt elaborately and exquiſitely adorned by pillars, buttreſſes, niches, pinnacles, foliage, and pannels, and the ſingular ornament of twiſted pinnacles under the arch. In the ſouth aiſle, nail-headed mouldings are introduced as embelliſhments on each ſide of the windows. An advanced gradation of ſtyle is exhibited in the interior of the ſouth tranſept; but the moſt perfect and ornamental degree is diſplayed in the chapel of our Lady. The choir is divided from the nave by a ſkreen, deſigned by Kent.

The dimenſions of the cathedral and its ſeveral parts are as follow: entire length, inſide, four hundred and twenty-three feet: length of the nave, one hundred and ſeventy-one feet; breadth, forty-one feet two inches; height, ſixty-ſeven feet ſeven inches: breadth of the north aiſle, twenty feet ten inches; height, forty feet ſix inches: breadth of the ſouth aiſle, twenty-two feet; height, forty feet: length of the ſouth tranſept, ſixty-ſix feet; breadth, forty-three feet ſix inches; height, eighty-ſix feet: length of the north tranſept, ſixty-ſix feet; breadth, forty-three feet ſix inches; height, ſeventy-eight feet: length of the choir, one hundred and forty feet; breadth, thirty-four feet ſix inches; height, eighty-ſix feet: length of our Lady's chapel, ninety-two feet; breadth, twenty-four feet four inches; height, forty-ſix feet ſix inches: height of the tower, including the pinnacles, two hundred and twenty-five feet. The great cloiſters, which were completed by abbot Frouceſter, are the moſt elegant and perfect of the kind: the ſides and roof are profuſely embelliſhed, and the windows are filled with mullions and tracery.

This cathedral contains ſeveral curious ſpecimens of monumental ſculpture. On the tomb of Edward II., which was erected by his ſon and ſucceſſor, and exhibits great perfection of art, is a recumbent figure, in alabaſter, of the deceaſed monarch, regally robed and crowned. Another monument, worthy of notice, is that to the memory of alderman Blackleach, and his wife, whoſe figures, in white marble, lie on a table tomb, dated 1639, and ſeem accurate copies of the portraits by Vandyck: they are evidently the work of a ſkilful artiſt. A third, deſerving obſervation for its deſign and claſſic ſtyle, diſplays a group by Flaxman, erected to commemorate Mrs. Morley, who died at ſea, in childbed: ſhe is repreſented as riſing from the waves with her infant in her arms, and conducted by two angels. Between the north aiſle and the choir is a monument, erected by abbot Parker to perpetuate the memory of king Oſric: and in a chapel nearly oppoſite, is a figure, ſuppoſed to repreſent the unfortunate Robert Curtois, duke of Normandy, and eldeſt ſon of William the Conqueror.

The walls that ſurrounded Glouceſter are mentioned in an ancient prophecy, attributed to Merlin; and tradition aſcribes them to Ciſſa, the ſecond king of the ſouth Saxons. The Norman conqueror cauſed them to be ſtrengthened and embattled: and they were again repaired in the nineteenth of Edward III. Leland deſcribes Glouceſter as "well-builded of tymbre, and ſtrongly defended with walles, where it is not fortified with the deepe ſtreame of Severn water." The walls were completely demoliſhed after the Reſtoration; and the only memorial of their former ſtrength now remaining is the Weſt Gate: this is embattled; and was erected in the time of Henry VIII. The caſtle, was probably built about the period of the Norman invaſion; the remains were lately deſtroyed; and on its ſcite was built the county gaol, which was completed in 1791: it conſiſts of three diviſions, reſpectively named the Penitentiary Houſe, the Bridewell, and the Sheriff's Priſon: theſe all have their diſtinct and appropriate regulations. The gaol contains 203 ſeparate cells; 164 for ſleep, and 39 for employment.

In this city and its ſuburbs were formerly eleven parochial churches: but only ſix are now ſtanding; thoſe of St. Michael, St. Mary de Crypt, St. Nicholas, St. Mary de Lode, St. John, and St. Aldate; the others having been either deſtroyed at the ſiege in 1643, or ſince taken down. In St. Michael's pariſh is a Blue Coat hoſpital, ſo called from the ſimilarity of its regulations to thoſe of Chriſt Church, London, founded and endowed in 1666 by ſir Thomas Rich, bart. Among other benevolent eſtabliſhments that confer honour on the inhabitants of Glouceſter, may be mentioned the county infirmary, erected by voluntary contributions, and opened in the year 1755. Its annual receipts, ariſing from donations and the intereſt of funded property, amount to between two and three thouſand pounds.

The principal trade of Glouceſter reſults from the navigation of the Severn, from the hemp and flax-dreſſing buſineſs, and from the pin manufacture. The latter, which is the principal ſource of labour to the inhabitants, appears to have been introduced into this city by John Tilſby, in the year 1626, and is now carried on to a far greater extent than at any other place in England; there being nine manufactories, which furniſh employment to about 1500 perſons. The pins conveyed annually to the metropolis, are ſaid to amount to the value of 20,000*l.*; but the principal demand is from Spain and America. A bell-foundry has been eſtabliſhed here above three hundred years. The clothing trade, formerly the chief ſupport of the inhabitants, is now nearly loſt: one fulling mill only remains.

Various and important privileges have been granted to Glouceſter by ſeveral monarchs: it was erected into a borough by charter from king John; Henry II. granted the burgeſſes the ſame liberties and cuſtoms as had been enjoyed by the citizens of London; by the act 33 Hen. VIII., which eſtabliſhed the biſhopric of Glouceſter, it is ordered that the town ſhould thenceforth be termed a city. It is alſo privileged as a county within itſelf. The corporation, acting under a charter of Charles II., conſiſts of a mayor, twelve aldermen, a high ſteward, recorder, town clerk, two ſheriffs, common-council, &c. The title of mayor firſt occurs in the year 1483. The high ſtewards have generally been perſons of great eminence. Two repreſentatives to parliament are elected by the inhabitants and freemen; the number of voters is about 3,000; the earlieſt return was made in the twenty-third year of Edward I. The elections are carried on in an ancient ſtructure, called the Booth-hall, which is alſo appropriated to the aſſizes and other county buſineſs. The public affairs of the city are tranſacted at the Tholſey, a building ſuppoſed to have derived its name from the toll formerly received in it by the lords of the manor. Very conſiderable improvements have been made, within the laſt ſeventy years, in the appearance and buildings of this city. It conſiſts, principally, of four ſpacious ſtreets, meeting each other at right angles, and taking their names from the ſituation of the gate which originally ſtood at the bottom of each, as Eaſt Gate ſtreet, Weſt Gate ſtreet, North Gate ſtreet, and South Gate ſtreet. At the interſection of the ſtreets, formerly ſtood a large and beautiful croſs; but falling to decay, and impeding the paſſage of carriages, it was removed in 1750: its ſcite ſtill retains the name. The city is well paved and lighted: and its elevated ſituation, with a gradual deſcent on every ſide, greatly contributes to health and cleanlineſs. The markets had long been eſtabliſhed by preſcriptive right; but thoſe now held, on Wedneſdays and Saturdays, were chartered by Henry III. Three fairs are held annually and much frequented. The houſes and population have varied conſiderably in different ages, according to the degree of ſecurity or danger which the inhabitants experienced: the progreſs has been ſeveral times interrupted by fires and civil commotions. Since the ſiege in 1643, the increaſe has been regular. On the laſt enumeration, under the act of 1801, the houſes, in the city alone, amounted to 1368, the population to 7265: the inhabitants of the ſuburbs being 1500 more. Glouceſter is ſituated 106 miles W. from London.

Among the more eminent natives of this city is Robert of Glouceſter, who wrote a chronicle of Britain in verſe, from the age of Brutus to his own time, the reign of Henry III.

On the north-weſt ſide of Glouceſter is the celebrated iſle of Alney, a ſmall tract, formed by the ſeparation of the ſtream of the Severn into two channels. This was the ſcene of a combat between Edmund Ironſide and Canute the Dane, in the year 1016.

In the ſouthern ſuburbs of Glouceſter are the remains of Lanthony priory, founded in 1187. After the diſſolution, the monaſtic buildings were converted into the offices of a farm. The only parts now left are a large barn, and the principal entrance, or gateway; on which are the arms, among others, of the Bohuns, earls of Hereford, who were great benefactors to the priory. Rudder's Hiſtory, &c. of Glouceſter. Beauties of England and Wales, vol. v.

Gloucester *and Berkley Canal*, is the parliamentary name of a canal of very large dimenſions, following the E. ſide of the Severn river between Berkley and Glouceſter, of which Mr. Robert Mylne and Thomas Dadford were the engineers; the other particulars will be found in our article Canal.

Gloucester, or *Cape Ann*, a townſhip of America, in Eſſex county, Maſſachuſetts, whoſe eaſt point forms the N. ſide of the bay of Maſſachuſetts. It contains 5313 inhabitants, and is divided into five pariſhes, beſides a ſociety of Univerſaliſts. It is a poſt-town and a town of entry. The harbour is open and acceſſible to large ſhips, and it is one of the moſt conſiderable fiſhing towns in the commonwealth. At the harbour, properly ſo called, are fitted out annually from 60 to 70 bankers, and from Squam and Sandy bay, two ſmall out-ports, the bay fiſhery is carried on with great ſpirit, and to a large amount. Thatcher's iſland, on which are two lights, lies cloſe to the S.E. ſide of the townſhip, which is itſelf joined to the continent by a bank of ſand, that is rarely overflowed with the water. Here is a fine white ſand, fit for the manufacture of glaſs. The harbour is defended by a battery and citadel erected in 1795:—16 miles N.E. by E. of Salem, and 34 N.E. of Boſton.

Gloucester, the N. weſternmoſt townſhip, and the largeſt, in Providence county, Rhode iſland, being 11½ miles ſquare, containing 4009 inhabitants.

Gloucester, the name of a county in New Jerſey, bounded N. by Burlington county, S. by Salem, Cumberland, and Cape May counties, E. by the Atlantic ocean, and W. by Delaware river. Its length on the Delaware is about thirty miles, and on the ſea it is about 22 miles. Great and Little Egg harbour rivers are both navigable for veſſels of about 200 tons about 20 miles from their mouths. The ſtreams which fall into Delaware river are navigable for ſmall veſſels, a few miles up from their mouths, and afford ſome ſhad, roach, herrings, and perch. Its adjacent iſlands are Red Bank, Pett, and Old Man's creek. The ſoil of the county is a mixture of ſand and loam, and the tract bordering on the Delaware is in a high ſtate of cultivation. The chief productions are beef, pork, fiſh, hay, corn, lumber, butter, cheeſe, &c. It is divided into ten townſhips, *viz.* Woodbury, Waterford, Newtown, Glouceſter townſhip, Glouceſter town, Deptford, Greenwich, Woolwich, Egg harbour, and Galloway. Mulicus river divides the county from Burlington, and is navigable 20 miles for veſſels of 60 tons. Maurice river runs ſoutherly about 40 miles through Cumberland county into Delaware bay, and is navigable for veſſels of 100 tons 15 miles, and for ſhallops 10 miles further. It contains 16,115 inhabitants, of whom 61 are ſlaves. In this county are found quantities of bog-iron ore, which is manufactured into pig and bar iron, and hollow ware. Here is alſo a glaſshouſe. The chief town is Woodbury, nine miles S. of Philadelphia.

Gloucester, a ſmall town in the above-mentioned county, on the E. ſide of Delaware river, three miles below Philadelphia.—Alſo, a poſt-town in Virginia, in the county of its own name, on a point of land on the N. ſide of York river, 17 miles diſtant from York town.

Gloucester, a county in Virginia, fertile and well cultivated, bounded N. by Piankitank river, which ſeparates it from Middleſex, E. by Matthews county and Cheſapeak bay, N.W. by King and Queen, S. and S.W. by York river, which divides it from York county. It is about 55 miles long and 30 broad, and contains 3272 free inhabitants, and 4909 ſlaves. The low lands produce excellent barley, and Indian corn, the ſtaple produce of the county.

Gloucester *Houſe*, a ſtation belonging to the Hudſon-bay company, ſituated in New South Wales, on the N. ſide of the waters which form a communication through a chain of ſmall lakes, between Winnipeg lake and Albany river. Henley houſe lies N.E. of this, nearer the mouth of Albany river in James's bay. N. lat. 54°. W. long 87° 30′.

Gloucester, a townſhip in the county of Dundas in Upper Canada, which is the ſeventh in aſcending the Ottawa river; E. of, and contiguous to, the river Rondeau.

Gloucester, *Cape*, a cape on the S. coaſt of Terra del Fuego.—Alſo, a high promontory on the E. coaſt of New Holland. S. lat. 19° 59′. E. long. 148° 11′.—Alſo, a cape on the coaſt of New Britain. S. lat 5° 54′. E. long. 148° 15′.

Gloucester *Iſland*, an iſland in the S. Pacific ocean, about ſix miles long, and from one to a quarter of a mile broad, diſcovered and ſo called by captain Wallis in 1767. It is ſurrounded by rocks, full of trees, and inhabited by perſons who appeared armed with long pikes or poles, but deſtitute of canoes. S. lat 19° 11′. W. long. 140° 4′.

Gloucester, *Duke of*, *Iſlands*, two iſlands in the S. Pacific ocean, diſcovered and ſo called by Captain Carteret in 1767, which were covered with trees, but appeared to be uninhabited. The ſouthernmoſt of them was a ſlip of land in the form of a half-moon, low, flat, and ſandy; the appearance of it was pleaſant, but it had neither vegetables nor water; but it abounded with birds, ſo tame that they might be taken by the hand. The other iſland very much reſembled this, and is diſtant from it about five or ſix leagues; they lie W.N.W. and E. S. E. of each other. One of them is in S. lat. 20° 38′. W. long. 146°: the other in S. lat. 20° 34′. W. long. 146° 15; the variation 5° E. Theſe iſlands are probably the land ſeen by Quiros, as the ſituation is nearly the ſame.

GLOUCESTERSHIRE, one of the weſtern counties of England, is ſurrounded by Herefordſhire, Oxfordſhire, Berkſhire, Wiltſhire, Somerſetſhire, and Monmouthſhire. It comprehends an area of nearly ſeventy miles in one direction, by forty in a tranſverſe line. This diſtrict, during the Roman domination in Britain, was much occupied by the Romans. Mr. Foſbrooke (one of the hiſtorians of the county) obſerves, "from the ruins which have at various times been excavated, it is evident that this county, from Cirenceſter to Painſwick, Biſley, Sapperton, Woodcheſter, Uley, Kingſcote, and other adjoining places, was much peopled with Romans, or Romanized Britons; that Cirenceſter was the great metropolis, or reſort of pleaſure and amuſement; while Glouceſter, and the hills about the Severn, were the great military poſitions; the city, on account of the river, having peculiar advantages with reſpect to commerce." The principal Roman roads which paſſed through this county, were the Ikenild ſtreet, the Irming or Erming ſtreet, the Foſs-way, and the Via Julia. Under the dominion of the Saxons, Glouceſterſhire formed part of the Mercian kingdom, and Winchcombe and Kingſtanley are mentioned as reſidences of the Anglo-Saxon monarchs. On the diviſion of Mercia into five biſhoprics, after the converſion of the Saxons, the greateſt part of this county was included under that named Wiccia, and from this appellation the Dobuni, the early inhabitants of this part of Britain, were afterwards termed Wiccii. Glouceſterſhire is ſeparated into four diviſions; theſe are ſubdivided into twenty-eight hundreds, containing 320 pariſhes, one city, and twenty-eight market towns. The number of houſes, as returned under the population act, amounted to 37,176; of inhabitants, 187,164; of which 90,237 were males, and 96,927 females. The whole county, with the exception of the chapelries of Icomb, and Cowhonyborn, is included within the dioceſe of Glouceſter; which comprehends one arch-deaconry, and ten deaneries. The number of repreſentatives returned to parliament are eight; two for the ſhire, two for the city, two for Tewkſbury, and two for Cirenceſter. The general aſpect of Glouceſterſhire is greatly diverſified; nature having divided it into three diſtricts of very diſſimilar character, reſpectively named the Hill, the Vale, and the Foreſt. The Hill diſtrict, including the Cotſwolds, and the Stroudwater hills, may be regarded as a continuation of the central chain proceeding ſouth from Derbyſhire, and paſſing through this county with a ſmaller elevation into Wiltſhire; there ſwelling into the Saliſbury Downs, and afterwards running weſt towards the Land's End in Cornwall. The extent of the Cotswold hills, from Broadway hill to near Tetbury, is thirty miles; and from Birdlip hill to Burford, about twenty miles: the area they include is eſtimated, by Mr. Marſhall, to contain nearly 200,000 acres. The ſurface is billowy; and the climature, conſidering the natural elevation of the land, unuſually mild. The ſides of the hills abound with ſprings; and almoſt every dip has its rill, and every valley its brook. The primary object of the Cotſwold huſbandry is ſheep; theſe have been long famous; and it is a prevailing tradition, that the Spaniards originally procured their breed of fine woolled ſheep from theſe hills, though this aſſertion is contradicted by ſeveral modern writers. The incloſures are chiefly ſtone walls, about four feet and a half high, excluſive of a coping of flat ſtones. The Vale diſtrict includes the entire tract bounded on the eaſt by the Cotſwold hills, and by the river Severn on the weſt; and is uſually ſubdivided into the Vales of Eveſham and Glouceſter, and the Vale of Berkeley; the latter of which is ſeparated from the former by a natural interſection, and is very different in produce and rural management. The Foreſt diſtrict is ſeparated from the reſt of the county by the river Severn; and is principally comprehended by the Foreſt of Dean, which was formerly of particular value, for the goodneſs and ſtrength of its timber. Its oaks were ſo greatly renowned that Evelyn obſerves, that in Elizabeth's reign, an ambaſſador was purpoſely ſent from Spain to procure its deſtruction, either by negociation or treachery. It alſo abounds in beech; and the ſoil is conſidered as peculiarly favourable for the growth of the Stire apple. Its principal minerals are iron, ore, and coal: iron appears to have been wrought here even in the time of the Romans; and ſo early as the reign of Edward I. ſeventy-two furnaces, for melting iron, are recorded to have been built here. In a ſurvey made in the ſeventeenth year of Charles I. the foreſt is eſtimated as originally containing upwards of 43,000 acres, of which above 14,000 were woodland. Several thouſand acres have, however, been granted away, by different ſovereigns, and diſafforeſted. The miners have diſtinct courts, and, like thoſe of Derbyſhire and Devonſhire, are governed by their own cuſtoms.

The principal rivers connected with Glouceſterſhire, are the Severn, the Frome, the Wye, and the Iſis or Thames. The canals that interſect the county are diſtinguiſhed by the names of the Thames and Severn, the Stroudwater, the Berkeley, and the Hereford and Glouceſter. The Severn, the ſecond commercial river in England, renders eſſential ſervice to a large portion of this county. It enters Glouceſterſhire near the ancient town of Tewkeſbury, where, uniting its waters with the Upper Avon, and purſuing a ſouth-weſterly courſe, it traverſes a wide vale, which is rich in paſturage, and in ſome places abundantly wooded. About one mile above Glouceſter, it divides into two ſtreams: theſe again unite a little below the city, forming the tract of land called Alney iſland. In the courſe of its paſſage through the county, it receives the ſtreams of the Upper Avon, the Chelt near Wainlode, the Leden near Over's-bridge, the Frome at Framilode, the Avon at Berkeley, and the Lower Avon below Briſtol. The Wye ſeparates part of this county from Monmouthſhire and Herefordſhire, and forms the grand natural weſtern boundary to the foreſt of Dean, whoſe noble wooded eminences conſtitute many fine features on its meandering banks. The Thames, the moſt important of the Britiſh rivers, has its ſource in this county, at a place called the Thames-head, near the village of Cotes, about two miles ſouth-weſt of Cirenceſter. Near this place the Thames and Severn canal emerges from under ground, and receives a conſiderable quantity of water, occaſionally from this ſpring. The junction of the Thames and Severn was an object of favourite ſpeculation with the London and Briſtol merchants for many generations; but was not completed till near the cloſe of the laſt century, an act for that purpoſe was obtained in 1783, and the deſign was brought to perfection in 1792, when the firſt veſſel paſſed from the Severn into the Thames. This canal begins at Wallbridge, near Stroud, (at the place where the Stroud navigation ends,) and proceeds in a devious courſe through the county to Lechlade, where it joins the Thames. This courſe includes a diſtance of thirty miles, ſeven chains and a half. The water, in its progreſs from Stroud to Sapperton, (ſeven miles three furlongs), is raiſed by means of locks 241 feet 3 inches: between Sapperton and Lechlade it falls 130 feet 6 inches. The Stroudwater canal encounters many obſtacles; yet in defiance of all oppoſition, an act was obtained in 1775, under the operation of which it was finiſhed.

The manufactures of Glouceſterſhire are numerous: clothing ſtuffs, blankets, rugs, carpets, ſtockings, &c. are made in different parts of the county. Bar iron, edge tools, wire, nails, and many other articles, are alſo manufactured in large quantities. Near Briſtol are ſome extenſive founderies; as well as different works for making braſs and wire, vitriol, red-lead, ſal-ammoniac, &c. At Glouceſter, vaſt quantities of pins are made; and at Frampton-Cotterel is a conſiderable manufactory of felt-hats. Several authors have employed their pens in deſcribing the topography and antiquities of this county: the principal of theſe are ſir Robert Atkins's "Ancient and preſent State of Glouceſterſhire," fol. 1712, ſecond edit. 1768. Rudder's "New Hiſtory of Glouceſterſhire," fol. 1779: Bigland's "Hiſtorical, Monumental, and Genealogical Collections," &c. folio, one volume and part of a ſecond, 1791: Lyſons's "Collection of Glouceſterſhire Antiquities," folio, 1801: Rudge's "Hiſtory of the County of Glouceſter, compreſſed and brought down to the Year 1803," 2 vols. 8vo. Foſbrooke and Yates's "Hiſtory of Glouceſterſhire," 2 vols. 4to. 1805. "Beauties of England and Wales," vol. v. contains a conciſe and general account of the county.

GLOVE, CHIROTHECA, a habit or covering for the hand and wriſt, uſed both for warmth, decency, and as a ſhelter from the weather.

Gloves are diſtinguiſhed, with reſpect to commerce, into leather gloves, ſilk gloves, thread gloves, cotton gloves, worſted gloves, &c.

There are alſo gloves of velvet, ſattin, taffety, &c. Leather gloves are made of ſhamoy, kid, lamb, doe, elk, buff, &c. There are alſo perfumed gloves; waſhed, glazed, waxed gloves; and white, black, ſnuff-colour, &c. gloves; ſingle, lined, topped, laced, fringed with gold, ſilver, ſilk, fur, &c.

It is a proverb for a glove to be good and well made, three kingdoms muſt contribute to it; Spain to dreſs the leather, France to cut it, and England to ſew it. But, of late, the French ſeem to have appropriated the functions of the other two; the gloves of the French manufacture being now ſaid to have the advantage, in point of dreſſing and ſewing, as much as of cutting.

By 34 Geo. III. c. 10. the Britiſh duty on gloves and mittens impoſed by 25 Geo. III. c. 55. is repealed, except the duty on licenſes; and by 36 Geo. III. c. 80. the ſaid duty on licences is alſo repealed. By 6 Geo. III. c. 19. and 25 Geo. III. c. 55. foreign manufactured leather gloves or mitts ſhall not be imported, under the penalty of forfeiture; and the importer or ſeller incurs, beſides forfeiture, a penalty of 200*l.* with double coſts.

GLOVE, *to throw the*, was a practice or ceremony very uſual among our forefathers, being the challenge whereby another was defied to ſingle combat. It is ſtill retained at the coronation of our kings; when the king's champion caſts his glove in Weſtminſter-hall.

Favyn ſuppoſes the cuſtom to have ariſen from the eaſtern nations, who, in all their ſales and deliveries of lands, goods, &c. uſed to give the purchaſer their glove by way of livery or inveſtiture. To this effect he quotes Ruth iv. 7. where the Chaldee paraphraſe calls glove what the common verſion renders by ſhoe. He adds, that the rabbins interpret by glove, that paſſage in the cviiith Pſalm, "In Idumeam extendam calceamentum meum, Over Edom will I caſt out my ſhoe." Accordingly, among us, he who took up the glove, declared thereby his acceptance of the challenge; and as part of the ceremony, continues Favyn, took the glove off his own right hand, and caſt it upon the ground, to be taken up by the challenger. This had the force of a mutual engagement on each ſide to meet at the time and place which ſhould be appointed by the king, parliament, or judges.

The ſame author aſſerts, that the cuſtom which obtained of bleſſing gloves, in the coronation of the kings of France, is a remain of the eaſtern practice of giving poſſeſſion with the glove. Lib. xvi. p. 1017, &c.

The delivery of a glove was in frequent uſe formerly, as a ſymbol of inveſtiture. See Du Cange, Gloſſ. Lat.

Gloves were alſo uſed to ſignify the ſteward's or bailiff's fee, or part of the price of the inveſtiture or purchaſe-money of the land. "Si aliquam territorii partem venundari contigerit, domini venditiones habebunt; ſcilicet, tot denarios quot venditor inde habuerit ſolidos. Major vero terræ illius pro *wantis* accipient duos donarios." Where *wanti* ſignifies *gloves*, or, in French, *gants*.

Hence the common cuſtom, in many bargains, of giving ſervants money for a pair of gloves.

Anciently it was prohibited the judges to wear gloves on the bench; and at preſent, in the ſtables of moſt princes, it is not ſafe going in without pulling off the gloves.

GLOVER, RICHARD, in *Biography*, was born at London in 1712. He received the elementary inſtructions in claſſical learning at Cheam, and exhibited a conſiderable taſte for the claſſics, and an attachment to ſcience. When he was only 16 years old, he wrote a copy of verſes "To the memory of ſir Iſaac Newton," which is prefixed to Dr. Pemberton's view of the Newtonian philoſophy. He engaged in commercial purſuits, and became eminent in the mercantile world, to which he was introduced by his father. In 1737, he married a lady with a handſome fortune; and in the ſame year he publiſhed his epic poem of Leonidas. Glover had joined the oppoſition of the day, at the head of which was Frederic prince of Wales, and his poem, founded on the ſtruggles of free Greece againſt Aſiatic deſpotiſm, was calculated in a high degree to ſerve a generous cauſe. It abounds in noble ſentiments, and is conſiderably varied by incident and deſcription. Its plan is admirably adapted for poetical effect: it was received by Lyttleton and others with high applauſe, and very ſoon paſſed through three editions. "But it labours," ſays the critic, "under that want of intereſt which attends all modern epics, eſpecially ſuch as are built upon ſome of the ſubaltern events of ancient hiſtory; and its poetry is not of a character ſufficiently elevated to engage the reader by the beauty of detached paſſages." The reputation which it firſt acquired ſoon ſubſided, and it now lives rather in memory than in the actual acquaintance of readers. He publiſhed in 1739, his poem, entitled "London, or the Progreſs of Commerce:" and the ballad of "Hoſier's Ghoſt." Mr. Glover was not only a poet but an ardent politician, and was diſtinguiſhed in various inſtances for his eloquence in the cauſe of freedom. His talents gained him great credit, and he was appointed by the merchants of London to conduct an application to parliament, complaining of the neglect with which their trade had been treated. The ſpeech which he pronounced at the bar of the houſe of commons on this ſubject, in January 1742, was greatly admired, and was publiſhed. His celebrity as a public character, did not favour his progreſs in commerce; his affairs became embarraſſed; he was, to uſe a modern faſhionable phraſe, obliged to ſuſpend his payments, and at length retreated from active life, to practiſe economy in an obſcure ſituation. The ducheſs of Marlborough bequeathed him, and Mallet, five hundred pounds each on condition of their joining to write the hiſtory of the great duke. Glover renounced the taſk, and Mallet never executed it. He now wrote ſeveral pieces for the ſtage, which being ſucceſsful to a conſiderable degree his circumſtances became ſo much improved, that he ventured to return to public life, and ſat as member for Weymouth, in the parliament of 1761. His commercial knowledge made him extremely uſeful on ſeveral important occaſions. In the year 1775, he took an active part in an application to parliament on behalf of the Weſt India merchants, and for his zeal and aſſiduity he was complimented with a valuable preſent of plate. He died in

November 1785, and left behind him another poem, entitled the "Athenaid," relating, in thirty books, the wars between the Greeks and Perſians. This was publiſhed in 1788, in three volumes 12mo., but it failed completely in attracting public attention.

GLOVER, in *Geography*, a townſhip of America, in the ſtate of Vermont and county of Orleans, N. E. of Craftsborough, adjoining. It has 36 inhabitants.

GLOVER'S *Reef*, rocks on the bay of Honduras. N. lat. 16°. W. long. 88° 20'.

GLOW-WORM, in *Entomology*. See CICINDELA. *Cantharis* and *Cicindela* have been often uſed, indiſcriminately, for the glow-worm; but they form two diſtinct genera of the ſame order in the Linnæan ſyſtem. See CANTHARIS. The glow-worm is often ſeen in the day time.

The male and female differ greatly in this ſpecies of inſect. The male has wings, and is a ſmall fly; the female has no wings, but is a large crawling worm.

The body of the male is oblong, and ſomewhat flatted; the wings are ſhorter than the body; the head is broad, dun, and flat; the eyes are large and black. This has no light iſſuing from it, and is not commonly ſuppoſed to be at all of kin to the glow-worm.

The female is what we expreſsly call by this name; this is a very ſlow-paced animal, without wings, and ſomewhat reſembling a caterpillar; the head is ſmall, flat, hard, and black, and ſharp towards the mouth: it has ſhort antennæ, and ſix moderately long legs; the body is flat, and is compoſed of twelve rings, whereas the body of the male conſiſts only of five; it is of a duſky colour, with a ſtreak of white down the back. It is often ſeen in the day-time, but it is not known except in the dark; at which time it is eaſily diſtinguiſhed by the glowing light, or lambent flame, that is ſeen near the tail, iſſuing from the under part of the body.

The common glow-worm is frequently met with under our hedges, and, if carefully taken up, may be kept alive many days on freſh turfs of graſs; all which time it will continue to ſhine in the dark.

The light of this little inſect is ſo ſtrong, that it will ſhew itſelf through ſeveral ſubſtances, in which the creature may be put up; a thin pill-box eaſily ſhews it through, and even though lined with paper, the light is not impeded in its paſſage by both. The creature is ſluggiſh, and appears dead in the day-time, and its light is not diſtinguiſhable, even if carried into a darkened room, unleſs the creature be turned upon its back, and diſturbed, ſo as to be put in motion, and then it is but very faint; after ſun-ſet the light begins to return, and with it the life and motion of the animal. The motion and light of this creature ſeem, in ſome meaſure, to depend upon one another: it never ſhines but when the body is in ſome ſort of motion; and when it ſhines moſt, the body is extended to one-third more than its length in the day-time. In the time of brighteſt ſhining, it will ſometimes on a ſudden turn its body about, and the light will not be larger than the head of a pin; and, on being touched, it will then immediately extend itſelf, and the light will become as large and bright as ever. Phil. Tranſ. N° 71.

Two points ſeem to be agreed upon by naturaliſts, with regard to the light iſſuing from the tail of a glow-worm; firſt, that it is phoſphoric, and ſecondly, that its uſe is to attract the male inſect. Should the ſingularity, if any ſuch there be, in the natural hiſtory of this animal, which ſhould render a proviſion of this kind more neceſſary for the glow-worm, than for other inſects, be a ſubject of inquiry; it may be obſerved that this ſingularity ſeems to be the difference, which ſubſiſts between the male and the female, which difference is greater than what is found in any other ſpecies of animal whatever. The glow-worm, as we have obſerved, is a female caterpillar, the male of which is a fly; lively, comparatively ſmall, diſſimilar to the female in appearance, probably alſo as diſtinguiſhed from her in habits, purſuits, and manners, as he is unlike in form and external conſtitution. Hence it appears, that the caterpillar cannot meet her companion in the air. The winged rover diſdains the ground. They might never therefore be brought together, did not this radiant torch direct the volatile mate to his ſedentary female.

"In this example," ſays the ingenious author now cited, "we ſee the reſources of art anticipated. One grand operation of chemiſtry is the making of phoſphorus; and it was thought an ingenious device, to make phoſphoric matches ſupply the place of lighted tapers. Now this very thing is done in the body of the glow-worm. The phoſphorus is not only made, but kindled; and cauſed to emit a ſteady and genial beam, for the purpoſe which is here ſtated, and which I believe to be the true one." Paley's Natural Theology, p. 363.

GLOW-*worm, Flying, cicindela volans*. In the warmer months of the year, this creature is ſometimes caught in our houſes flying to the flame of a candle, and when examined in the dark, it is found luminous at theſe times, though perhaps leſs, or not at all ſo, at others; which may be a reaſon of its not being known, though caught in the fields; and to this it may be owing, that many who have deſcribed it have thought it not a native of England. Without wings it is frequently enough found in form of the common glow-worm, and then always ſhines. Aldrovand has very well deſcribed the *cicindela volans*, and ſays, that it lays eggs which hatch into ſmall worms, and that theſe after a time become flies, by the ſame ſort of change which happens to caterpillars and other reptiles which become butterflies, and other ſpecies of winged inſects. Mouffett, and Thomas Bartholine, both deſcribe the animal much as Aldrovand has done, but they allow the male only to have wings; but Julius Scaliger contradicts this, and ſays, that he has caught them both winged in the act of generation: this is a plain proof that both ſexes are winged; yet it has not happened that both ſexes have been acknowledged to be ſo, even by thoſe who have quoted this paſſage. And Mr. Waller, who gives an account of them in the Philoſophical Tranſactions, obſerved them in the ſame manner in the act of copulation both winged, and with no other difference between them but that the female was the larger of the two, which is the caſe in regard to many inſects. Julius Scalig. Exerc. 191. Phil. Tranſ. N° 167, p. 841.

The male and female in this winged ſtate both ſhine in hot weather, and their light is ſo vivid as to be eaſily ſeen even while there is a candle in the room; the vibrations of it are irregular and its colour greeniſh. The luminous parts are two ſmall ſpecks under the tail at the end, and the light continues in theſe ſome time after the tail is cut off, but then gradually goes out.

The parts of inſects continue alive in ſome degree for a conſiderable time after they are cut off, and probably the light in the tail of this animal continues juſt as long as that ſort of life remains in it. Mouffett, cap. 15.

The uſe of this light ſeems to be to direct the animal in its courſe, and in the taking of its prey, and to this purpoſe it is admirably placed. The tail is eaſily bent under the belly, and then throws the light full upon any object about or under the head of the animal, and the eyes are placed not on the upper part but on the under ſide of the head; ſo that they have all the advantages of it, while the light in this part is not offenſive to the eyes, as it naturally would have been if carried before the head. The creature can, upon occaſion, cover this light, ſo as not to be known, or purſued by it, by its enemies. Thomas Barthol. de Luce Anim. lib. ii. cap. 12.

This inſect is of the beetle kind, of a brown and duſky colour. It has hard caſe or ſhell wings, as the other beetles have, and when theſe are expanded, there appear a pair of very large membranous ones; its head is covered with a ſort of ſhield or broad-brimmed hat: under this hat are placed the eyes, which are black and large, and are moveable, ſo that the creature can, upon occaſion, thruſt them forward: it has two hairy antennæ, and its legs are like thoſe of the common fly, hard, ſhelly, and hairy. Its eyes afford an elegant object for the microſcope, being compoſed of an infinite number of lenſes, as thoſe of the libellæ and other inſects. Aldrovand. de Inſect. lib. i. cap. 8.

GLOXINIA, in *Botany*, named by the late M. L'Heritier in honour of Dr. Benjamin Peter Gloxin, a native of Colmar, in whoſe inaugural diſſertation, publiſhed at Straſburg in 1785, are given the characters of *Martynia* and ſome neighbouring genera, among which the plant now under our conſideration is comprehended. The ſame work alſo contains the firſt deſcription and figure of the *Salvia leonuroides*, unneceſſarily changed by L'Heritier afterwards to *S. formoſa*; and one of *Cyperus ægyptiacus*, which proved the *Schœnus mucronatus* of Linnæus. L'Herit. Stirp. Nov. 149. Ait. Hort. Kew. v. 2. 331. Willd. Sp. Pl. v. 3. 229. Mart. Mill. Dict. v. 2. Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Campanulaceæ*, Juſſ.? or rather a new order, diſtinguiſhed by lateral, not marginal, receptacles of the ſeeds. *Juſſ.*

Gen. Ch. *Cal.* Perianth ſuperior, of five oblong, ſpreading, nearly equal leaves. *Cor.* of one petal, obliquely bell-ſhaped; gibbous at the baſe; its border in five rounded obtuſe lobes, the four uppermoſt recurved, the lower one prominent, concave and inflexed. *Stam.* Filaments four, much ſhorter than the corolla, with the rudiment of a fifth; inſerted into the receptacle, connected with the baſe of the corolla, incurved, downy, converging laterally in the upper part, two of them rather the ſhorteſt; anthers ovate, peltate, two-celled, cohering together, their lobes diverging. *Piſt.* Germen inferior, turbinate, furrowed; ſtyle cylindrical, as long as the ſtamens; ſtigma capitate. *Peric.* Capſule imperfectly two-celled, with two valves, and two lateral divided receptacles. *Seeds* numerous.

Eſſ. Ch. Calyx ſuperior, of five leaves. Corolla bell-ſhaped, with an oblique irregular border. Filaments, with the rudiment of a fifth, inſerted into the receptacle. Capſule with many ſeeds, inſerted into lateral receptacles.

1. G. *maculata.* Curt. Mag. t. 1191. (Martynia perennis; Linn. Sp. Pl. 862. Hort. Cliff. t. 18. Ehret. Pict. t. 9. f. 2. Mart. Mill. Dict. v. 3.—Native of South America; the ſeeds having been ſent from Carthagena by Mr. Robert Millar, before 1739. It requires with us the conſtant heat of a bark ſtove, by means of which it flowers late in autumn. It is propagated abundantly by the little tuberous *roots*, which are perennial. The *ſtem* is herbaceous, ſimple, leafy, round, very ſmooth, ſpotted with purple. *Leaves* large, oppoſite, recurved, ſtalked, broad-ovate, acute, ſerrated, ſmooth and ſhining, pale at the back, with prominent veins. *Flowers* axillary from the diminiſhed leaves, or bracteas, at the upper part of the ſtem, ſolitary, ſtalked, large, drooping, of a fine blue with a dark ſpot at the bottom within. Their ſcent is very peculiar, reſembling mint, which no writer ſeems to have noticed.

GLUBOKAIA, in *Geography*, a town of Ruſſia, in the government of Kolyvan; 72 miles E. of Semipolatnoi.

GLUCHOV, or GLUKHOF, a town and diſtrict of Novogorod Severſkoi, ſituated on the river Yeſma, falling into the Seim; 40 miles E.S.E. of Novogorod Severſkoi.

GLUCK, *le Chevalier* CHRISTOPHER, in *Biography*, a muſical compoſer of great fire and originality, who, during the laſt 30 or 40 years of the preceding century, acquired great renown, but chiefly in France, by a ſpecies of compoſition, congenial to the national taſte, which Lulli and Rameau had formed, and in which the ſhort and ſimple airs required no great abilities in the ſingers; but the dramas being written in the language of the country, and the poet being regarded as a much more important perſonage than the compoſer of the muſic, the ſeveral characters required great actors rather than great ſingers.

This eminent compoſer was born in the Palatinate, of a poor family, about the year 1716. His father, during the infancy of his ſon, removed into Bohemia, where he died, leaving his offspring in early youth, without any proviſion, ſo that his education was totally neglected; but nature had given him an inſtinctive love for muſic, which is taught to all children, with reading and writing, in the Bohemian ſchools, whether of charity or ſuperior foundations, in all the towns and villages; in churches and in the ſtreets, men, women, and children ſing in parts, and play upon ſome inſtrument, and often on many inſtruments. This was the caſe with the young Chriſtopher, who travelled about from town to town, ſupporting himſelf by his talents till he had worked his way to Vienna, where he met with a nobleman who became his patron, took him into his ſervice, carried him into Italy, where he procured him leſſons in counterpoint, at Naples, by which he profited ſo well, that before he left Italy he compoſed ſeveral dramas for different theatres, which acquired him reputation ſufficient to be recommended to lord Middleſex as a compoſer to our lyric theatre in the Haymarket, then under his lordſhip's direction. But, unluckily, arriving in England in 1745, after his firſt opera of "Artamene" had been performed ten nights, in which the famous air "Raſſerena il meſto ciglio," ſung by Monticelli, was conſtantly encored, the rebellion broke out, and the great Opera-houſe was ſhut up, on account of the popular prejudice againſt the performers, who, being foreigners, were chiefly Roman Catholics. Nor was the Opera-houſe allowed to be opened again, till January 7th, 1746, when "la Caduta de' Giganti," ſet by Gluck, was performed before the duke of Cumberland, in compliment to whom the whole was written and compoſed. The ſingers were Monticelli, Jozzi, and Ciacchi; with ſignora Imer, Pompeati, afterwards better known by the name of madame Cornelie, and Fraſi. The firſt woman, Imer, never ſurpaſſed mediocrity in voice, taſte, or action; and the Pompeati, though nominally ſecond woman, had ſuch a maſculine and violent manner of ſinging, that few female ſymptoms were perceptible. The new dances by Auretti, and the charming Violetta, afterwards Mrs. Garrick, were much more applauded than the ſongs, which, however, for the time, had conſiderable merit. The firſt air in G. minor is of an original caſt. but monotonous. The ſecond air has genius and deſign in it. Then a duet, in which he hazarded many new paſſages and effects. The following air, for Monticelli, is very original in ſymphony and accompaniments which a little diſturbed the voice-part in performance, we well remember, and Monticelli called it *aria tedeſca.* His contemporaries in Italy, at this time, ſeemed too much filed down; and he wanted the file, which, when uſed afterwards in that country, made him one of the greateſt compoſers of his time. The next air printed, is in a very peculiar meaſure, and like no other that we recollect: it has great merit of novelty and accompaniment; the voice-part wants only a little more grace and quiet. The following ſong, ſet for Jozzi, a good muſician with little voice, is full of new and ingenious paſſages and effects; we ſhould like much to hear this air well performed at the opera; it is kept alive from beginning to end. Something might be expected from a young man able to produce this opera, imperfect as it was. It had, however, but five repreſentations.

From London he returned to Italy, and compoſed ſeveral operas in the ſtyle of the times, ſuch as that of Terradeglas, Galuppi, and Jomelli; and we heard little of him till he enliſted with the Italian poet Calſabigi, with whom he joined in a conſpiracy againſt the poetry and muſic of the melo-drama then in vogue in Italy and all over Europe.

It is extraordinary that Calſabigi, editor of the beautiful Paris edition of the works of Metaſtaſio in 1755, in the preface to which there is the higheſt and ſeemingly moſt cordial praiſe of the works of the imperial laureate, ſhould be the firſt, ten years after, to find them ſo defective; writing his "Orfeo" in a different ſtyle, and joining with Gluck in decrying the lyric ſtyle both of the muſic and poetry of the Italian opera.

In 1764, the year in which the late emperor Joſeph was crowned king of the Romans, Gluck was the compoſer, and Guadagni the principal ſinger. It was in this year that a ſpecies of dramatic muſic, different from that which then reigned in Italy, was attempted by Gluck in his famous opera of "Orfeo," which, with Guadagni's admirable action, ſucceeded ſo well, that it was ſoon after attempted in other parts of Europe, particularly at Parma and Paris. This is not the place to diſcuſs its merit; we ſhall here only obſerve, that the ſimplifying dramatic muſic in Gluck's manner, in favour of the poet, at the expence of the compoſer and ſinger, is certainly very rational, where an opera is performed in the language of the country, and the ſingers have no great abilities to diſplay, as in France; but in England, where we have frequently ſingers of uncommon talents, and where ſo ſmall a part of an opera audience underſtands Italian, by abridging the ſymphonies, and prohibiting diviſions and final cadences, in favour of an unintelligible drama, we ſhould loſe more than we ſhould gain.

After its ſucceſs at Parma and Paris, "Orfeo" was exhibited at Bologna, Naples, and in 1770 in London; when the principal parts were filled by Guadagni and Graſſi, afterwards Mrs. Bach.

The unity, ſimplicity, and new dramatic excellence, which at Vienna, and afterwards at Paris, rendered this drama ſo intereſting as to make the audience think more of the poet than the compoſer, were greatly diminiſhed here, by the heterogeneous mixture of muſic of other compoſers in a totally different ſtyle.

In 1769, Calſabigi and Gluck, encouraged by the ſucceſs of "Orfeo," produced "Alceſte," a ſecond opera, on the reformed plan, at Vienna, which received even more applauſe than the firſt. In 1771, the ſame poet and muſician brought a third opera, "Paride ed Helena," on the ſtage at Vienna, written and compoſed in the ſame new, or rather old, French ſtyle, with better muſic, in which Millico was the principal ſinger, and which afforded the audience ſuch pleaſure as ſeemed to have impreſſed the lovers of muſic in the imperial capital with a partiality for that ſpecies of dramatic muſic, which was not likely to be ſoon obliterated.

In 1772, Gluck ſet to muſic an opera taken from Racine's "Iphigenie," in which he ſo far accommodated himſelf to the national taſte and ſtyle of France, as frequently to imitate and adopt them. And as this opera was intended for Paris, his friends feared for its ſucceſs, as there was frequently *melody*, and always *meaſure*, in his muſic, though ſet to *French words*, and for a *ſerious French* opera.

But the year 1774 was rendered a remarkable era in the annals of French muſic, by the arrival of the chevalier Gluck at Paris, whoſe operas, by his conforming to the genius of the French language, and flattering the ancient national taſte, were received with acclamation. He began his career in this capital by his celebrated opera of "Orphée," of which the reputation was already eſtabliſhed; and this was followed by "Iphigenie," taken from one of Racine's beſt tragedies, which had all the ſucceſs that may be imagined from the force of his genius applied to a favourite drama, ſet in the ſtyle of their favourite compoſers, Lulli and Rameau.

In his opera of "Cythere Aſſiegée," 1775, where more delicacy and tenderneſs, than force, were required in the compoſition, he was not ſo ſucceſsful. Nor was his "Alceſte," the year following, received with the ſame rapture as at Vienna. Indeed his "Armide," in 1777, did not quite fulfil the ideas of grace, tenderneſs, and pathos, which ſome of the ſcenes required, and auditors accuſtomed to Italian muſic expected: however, his operas were excellent preparations for a better ſtyle of compoſition than the French had been uſed to; as the recitative was more rapid and the airs more marked, than in Lulli and Rameau: there were likewiſe more energy, fire, and variety of movement, in his airs in general, and infinitely more force and effect in his expreſſion of grief, fear, remorſe, vengeance, and all the violent paſſions.

Gluck's muſic is ſo truly dramatic, that the airs and ſcenes, which have the greateſt effect on the ſtage, are cold, or rude, in a concert. The ſituation, context, and intereſt, gradually excited in the audience, give them their force and energy.

Indeed, he ſeems ſo much the national muſician of France, that ſince the beſt days of Rameau, no dramatic compoſer has excited ſo much enthuſiaſm, or had his pieces ſo frequently performed. It has been ſaid in the "Journal de Paris," that each of his pieces had ſupported two or three hundred repreſentations. The French, who feel very enthuſiaſtically whatever muſic they like, heard with great rapture the operas of Gluck, which even the enemies of his *genre* allowed to have great merit of a certain kind; but though there is much real genius and intrinſic worth in the dramatic compoſitions of this maſter, the congeniality of his ſtyle with that of their old national favourites, Lulli and Rameau, was no ſmall merit with the friends of that muſic. The almoſt univerſal cry at Paris was now, that he had recovered the dramatic muſic of the ancient Greeks; that there was no other worth hearing; that he was the only muſician in Europe who knew how to expreſs the paſſions; theſe and other encomiums preparatory to his apotheoſis, were uttered and publiſhed in the journals and newſpapers of Paris, accompanied with conſtant and contemptuous cenſures of Italian muſic, when Piccini arrived. This admirable compoſer, the delight and pride of Naples, as Gluck of Vienna, had no ſooner erected his ſtandard in France, than all the friends of Italian muſic, of Rouſſeau's doctrines, and of the plan, if not the language, of Metaſtaſio's dramas, enliſted in his ſervice. A furious war broke out, all Paris was on the *qui vive?* No door was opened to a viſitor, without this queſtion being aſked previous to his admiſſion: "Monſieur! eſtes vous Picciniſte ou Gluckiſte?" Theſe diſputes, and thoſe of muſical critics, and rival artiſts throughout the kingdom, ſeem to us to have ſoured and diminiſhed the pleaſure ariſing from muſic in proportion as the art has advanced to perfection. When every phraſe or paſſage in a muſical compoſition is to be analyſed and diſſected during performance, all delight and enthuſiaſm vaniſh, and the whole becomes a piece of cold mechaniſm. It is certainly neceſſary for profeſſors to ſtudy cauſe and effect, and to make themſelves well acquainted with the fundamental rules of their art; but we would adviſe true lovers of muſic to *liſten* more than talk, and give way to their feelings, nor loſe the pleaſure which melody, harmony, and expreſſion ought to give, in idle enquiries into the nature and accuracy of their auricular ſenſation.

The chevalier Gluck, after returning to Vienna from Paris, and being rendered incapable of writing by a paralytic ſtroke in 1784, only lingered in a debilitated ſtate till the autumn of 1787, when he died at the age of ſeventy-three.

Gluck had great merit as a bold, daring, nervous compoſer; and as ſuch, in his French operas, he was unrivalled. But he was not ſo univerſal as to be excluſively admired and praiſed at the expence of all other compoſers ancient and modern. His ſtyle was peculiarly convenient to France, where there were no good ſingers, and where no good ſinging was expected or underſtood by the public in general; and where the poetry was ſet up againſt muſic, without allowing equality, or even an opportunity of manifeſting her moſt captivating vocal powers.

It is, however, allowed by an excluſive admirer of Gluck, in the Encycl. Meth., that "the Italians have the glory of having furniſhed examples of almoſt every kind of beauty of which muſic is ſuſceptible, and of having diſſeminated their taſte in every part of Europe;" but adds, that "France will owe to the celebrated Gluck the having firſt conceived the ſyſtem of a muſic truly dramatic, and our theatre will furniſh true models of it to other nations, and to poſterity. Let us haſten to ſteal from the Italians and the Germans the glory of laying the true foundation of a muſical ſyſtem and of transforming the moſt amiable and touching of arts, into a ſcience as intereſting as it is fertile."

Gluck, in a moment of *franchiſe*, over a bottle, ſaid "the French are a very good ſort of people, who love muſic, and want *ſongs* in their operas; but they have no ſingers." And Sacchini, being aſked how his operas were executed at Paris, ſaid, "God forbid I ſhould ever go to hear them performed!" And theſe are the people who are to furniſh models of dramatic muſic to Italy, and to all the reſt of Europe!

GLUCKSBURG, in *Geography*, a town of Denmark, with a fortreſs, in the duchy of Sleſwick; nine miles E. of Flenſburg.

GLUCKSTADT, a ſea-port town of Germany, in the duchy of Holſtein, belonging to Denmark, ſituated on the Elbe. This town is regular and well-built, and its market place commands the chief ſtreets. Several canals run through it, and the principal one croſſes near the market place, and is here connected with another, which divides the town into two nearly equal parts. On the land ſide it may be laid under water. Gluckſtadt is the ſeat of the king's regency, and of the offices and courts connected with it. Here is alſo a grammar-ſchool. The Calviniſts are permitted to have a church, the Roman Catholics a chapel, and the Jews a ſynagogue. In 1738 a commercial college was inſtituted here by king Chriſtian VI., as it was a place of ſome trade; and in 1750, king Frederic V. eſtabliſhed an office for keeping the harbour, adjoining to which is a baſin for the reception of veſſels, in good condition. Gluckſtadt was built in 1620 by permiſſion of Chriſtian IV. in a waſte called the Wilderneſs, and in the patent granted to it, he ordered that it ſhould be called Gluckſtadt, or the Fortunate Town; he alſo conferred upon it many cuſtoms, rights and privileges, ſuch as were enjoyed by the town of Wilſter; and it was ſoon after inveſted with the Lubeck and Hamburgh rights. It is diſtant 28 miles N.W. from Hamburgh. N. lat. 53° 51'. E. long. 9° 20'.

GLUE, GLUTEN, a viſcid, tenacious matter, ſerving as a cement to bind or connect divers things together.

There are divers kinds of glues made uſe of in the divers arts; as the common glue, glove glue, parchment glue: but the two laſt are more properly called *ſize*.

The common or ſtrong glue is a commodity uſed by numerous kinds of artificers; as joiners, cabinet-makers, caſe-makers, hatters, book-binders, &c. and the conſumption thereof is very conſiderable. The beſt is that made in England, in ſquare pieces of a ruddy brown colour: Flanders glue, which is whitiſh and tranſparent, is held the next after the Engliſh. The moſt ordinary glue of France is black and opaque.

Glue is made of the ſkins of all kinds of beaſts; as oxen, cows, calves, ſheep, &c. The older the beaſt is, the better is the glue that is made of its hide. Indeed, it is rare they uſe whole ſkins for this purpoſe; thoſe being capable of being applied to better purpoſe: but they make uſe of the ſhavings, parings, or ſcraps of the hides, and alſo horns; and ſometimes they make it of the feet, ſinews, nerves, &c. of beaſts; and alſo of the pelts obtained from furriers.

That made of whole ſkins is the beſt, and that of ſinews, &c. the worſt: and hence, chiefly, ariſes the difference of glues, and the advantage of Engliſh and Flemiſh glues.

GLUE, *method of making*.—Mr. Clennell, in the Monthly Magazine for 1802, gives the following ſtatement of the general mode of its manufacture. The materials above enumerated are "firſt digeſted in lime-water, to cleanſe them from greaſe or dirt; they are then ſteeped in clean water with frequent ſtirring, and afterwards laid in a heap and the water preſſed out. They are then boiled in a large braſs cauldron with clean water, ſcumming off the dirt as it riſes, and it is further cleanſed by putting in, after the whole is diſſolved, a little melted alum or lime finely powdered. The ſcumming is continued for ſome time, after which the maſs is ſtrained through baſkets, and ſuffered to ſettle, that the remaining impurities may ſubſide. It is then poured gradually into the kettle again, and further evaporated by boiling and ſcumming, till it becomes of a clear dark browniſh colour. When it is thought to be ſtrong enough, it is poured into frames or moulds about ſix feet long, one broad, and two deep, where it gradually hardens as it cools, and is cut out when cold by a ſpade into ſquare cakes. Each of theſe is placed in a ſort of wooden box open in three diviſions to the back; in this the glue, while yet ſoft, is cut into three ſlices, by an inſtrument like a bow, with a braſs wire for its ſtring. The ſlices are then taken out into the open air, and dried on a kind of coarſe net-work, faſtened in moveable ſheds four feet ſquare, which are placed in rows in the glue maker's field. When perfectly dry and hard it is fit for ſale. That is thought to be the beſt glue which ſwells conſiderably without melting by three or four days' immerſion in cold water, and recovers its former dimenſions and properties by drying. Glue that has got froſt, or that looks thick and black, ſhould be melted over again. To know good from bad glue, the purchaſer ſhould hold it between his eye and the light, and if it appears of a ſtrong dark colour, and free from cloudy and black ſpots, the article is good." When glue is uſed by the carpenters, they break it and ſoak it for about 24 hours in cold water; and then melt the ſoaked pieces, cauſing it to ſimmer for a quarter of an hour over a ſlow fire and frequently ſtirring it. When cooled it becomes a firm gelly, which may be cut by any inſtrument. It is merely warmed for uſe, and in this ſtate ſpread over the ſurface of the wood with a ſtiff bruſh. In an interval from

One to three days the pieces of wood will be ſo perfectly cemented, that boards, thus cohering, will as readily break in any part as ſeparate at the junction. Glued boards will not ſet in a freezing temperature; the ſtiffening being occaſioned by the evaporation of the ſuperfluous matter of the glue, which is prevented by a conſiderable degree of cold.

Glue, *Bees*. See Wax.

Glue, *Fiſh*, is a ſort of glue made of the nervous and mucilaginous parts of a large fiſh, found chiefly in the Ruſſian ſeas.

Theſe parts, being boiled, bear a near reſemblance to that viſcid matter found on the ſkins of cod-fiſh. When boiled to the conſiſtence of a jelly, they ſpread it on a leaf of paper, and form it into cakes; in which ſtate it is ſent to us.

Fiſh-glue is of conſiderable uſe in medicine, and divers others arts; where it is better known under the name of iſinglaſs and ichthyocolla. See Isinglass.

A ſtrong and fine glue may be prepared with iſinglaſs and ſpirit of wine thus: ſteep the iſinglaſs for twenty-four hours in ſpirit of wine or common brandy. When the menſtruum has opened and mollified the iſinglaſs, they muſt be gently boiled together, and kept ſtirring till they appear well mixed, and till a drop thereof, ſuffered to cool, preſently turns to a ſtrong jelly. Then ſtrain it, while hot, through a clean linen cloth, into a veſſel to be kept cloſe ſtopped. A gentle heat ſuffices to diſſolve this glue into a tranſparent and almoſt colourleſs fluid, but very ſtrong; ſo that pieces of wood, glued together with it, will ſeparate elſewhere than in the parts joined. Boyle's Works abridg. vol. i. p. 130.

A ſtrong compound glue may be made by infuſing a mixture of common glue, in ſmall pieces, with iſinglaſs glue, in as much ſpirit of wine as will cover them, for about twenty-four hours: then melt the whole together, and add as much powdered chalk as will make it an opaque white.

A ſtrong glue, that will reſiſt moiſture, may be obtained by diſſolving gum ſandarac and maſtic, of each two ounces, in a pint of ſpirit of wine, and adding about an ounce of clear turpentine: then take equal parts of iſinglaſs and parchment glue, and having pounded them into ſmall pieces, pour the ſolution of the gums upon them, and melt the mixture in a covered veſſel, with a heat leſs than that of boiling water: then ſtrain the glue through a coarſe linen cloth, and putting it again over the fire, add about an ounce of powdered glaſs.

Or, a ſtrong glue, that will reſiſt water, may be made by adding half a pound of common iſinglaſs glue to two quarts of ſkimmed milk, and evaporating the mixture to a due conſiſtence.

A glue, that will hold againſt fire and water, may be made by mixing a handful of quick-lime with four ounces of linſeed oil, boiling them to a good thickneſs, and ſpreading the mixture on tin plates in the ſhade: it will thus become exceeding hard, but will eaſily be diſſolved over a fire, and be fit for uſe. See Cæment.

GLUMA, a *Huſk*, in *Botany*, is the peculiar calyx of graſſes and graſs-like plants, and indeed their corolla, at leaſt what is ſo termed by Linnæus, is of the ſame chaffy nature. Huſks or Glumes are uſually compreſſed, embracing each other at the baſe; more rarely they are depreſſed, flattened vertically, as in Quaking-graſs or *Briza*. To the huſk belongs the *ariſta* or awn, (ſee Arista,) which is a briſtle-ſhaped appendage, uſually ſpiral, and poſſeſſing the properties of an hygrometer. It originates from the midrib or keel of the huſk, and is either terminal or dorſal, being in the latter caſe placed ſometimes very far down the back of the huſk, as in many ſpecies of *Avena*, and in theſe inſtances it belongs to the glumes that conſtitute the corolla, not the calyx. The *ariſta*, though ſo remarkable, is by no means always conſtant in the ſame ſpecies, though nearly invariably ſo in the flowers of the ſame individual plant.

Huſks are moſtly furniſhed with one central longitudinal rib, though the inner *glumæ* of the corolla in graſſes have two nearly marginal ones. They have in moſt inſtances, beſides the central rib, a greater or leſs number of lateral ones, all likewiſe longitudinal, of great uſe in diſtinguiſhing ſpecies of *Poa* and other difficult genera. Their margin is commonly thin and more or leſs membranous or ſcarioſe. Some *glumæ* always remain ſeparate and diſtinct from the ſeed which they commonly enfold; others are cloſely incorporated with that part as it ripens, of which a curious example may be ſeen in *Briza*.

Some ſorts of viviparous graſſes exemplify the transformation of glumes into leaves in a remarkable manner, the awn remaining at the ſummit being perhaps the only indication of their original nature. See *Aira lævigata*, *Engl. Bot. t.* 2102. The ſame metamorphoſis of a petal into a leaf is indeed not rarely ſeen in a Tulip and other cultivated flowers. We have a wild ſpecimen of a ſimilar change in the *Anemone alpina*, part of whoſe leafy involucrum is become a perfect petal.

Glumes are, we believe, invariably permanent, never deciduous, till the ſeed ripens, when thoſe of the corolla fall off along with the ſeed, ſerving the purpoſe of a *pericarpium*.

GLUMACEOUS Flowers, a term applied by ſome botaniſts to the flowers of the natural order of graſſes, expreſſive of their chaffy nature.

GLUMMEN, in *Geography*, a town of Pruſſia, in the province of Natangen; 24 miles S. of Konigſberg.

GLURANTZ, or Glurs, a town of the county of Tyrol, ſituated on the river Adige, built in 1362, and ſurrounded with walls in 1530. It was taken by the French in 1799; 36 miles W. of Brixen. N. lat. 46° 38'. E. long. 10 26'.

GLUS, in *Surgery*, a ſpecies of dyſury, attended with a copious quantity of mucus in the bladder. Hence, the malady has been named *dyſuria mucoſa*.

GLUT, among *Falconers*, the ſlimy ſubſtance that lies in a hawk's paunch.

Glut, in *Rural Economy*, a term ſometimes provincially applied to a large wooden wedge.

GLUTA, in *Botany*, ſo called by Linnæus, from the Latin word *glutus*, thruſt cloſe together, in alluſion to the cloſe application of the claws of the petals to the ſtalk which elevates the organs of fructification. Profeſſor Martyn ſeems not to have been aware of this derivation. We are led to it by the repeated indication of the circumſtance in Linnæus, and his uſe of the word *adglutinata*, even in the generic character, as well as in his ſubſequent obſervations. Linn. Mant. 2. 160. Syſt. Veg. Ed. 14. 821. Schreb. 146. Willd. Sp. Pl. v. 1. 1120. Mart. Mill. Dict. v. 2. Juſſ. 427. Claſs and order, *Pentandria Monogynia*. (Linnæus refers it to *Gynandria Pentandria*.) Nat. Ord. *Capparides*, Juſſ.?

Gen. Ch. *Cal.* Perianth inferior, of one leaf, membranous, bell-ſhaped, obtuſe at the baſe, cloven half way down into two lobes, deciduous. *Cor.* Petals five, equal, lanceolate, bluntiſh, ſomewhat oblique, four times the length of the calyx; their upper part ſpreading horizontally; their claws cohering round the ſtalk of the germen, and attached to it. *Stam.* Filaments five, briſtle-ſhaped, rather ſhorter than the petals, inſerted into the ſummit of the ſtalk of the germen; anthers verſatile, rather oblong. *Piſt.* Germen obovate, ſtanding on a cylindrical ſtalk, which is rather longer than the calyx; ſtyle thread-ſhaped, equal to the filaments; ſtigma ſimple, obtuſe. *Peric.* and *Seeds* unknown.

Eſſ. Ch. Calyx bell-ſhaped, cloven, deciduous. Petals five; their claws cohering round the ſtalk of the germen. Stamens inſerted into the top of that ſtalk, below the germen.

1. G. *Benghas.* Linn. Mant. 2. 293. Native of Java, where it is called *Benghas*, and, if we miſtake not, in the Malay language *Dodec.* This plant is unknown to all botaniſts except Linnæus, by whoſe herbarium alone it can be determined. His remarks have led the ſtudents of natural orders wide of the truth concerning it, for nothing can be more unlike *Paſſiflora.* To *Sterculia* it has ſome reſemblance, and we have been much inclined to refer it to Juſſieu's *Malvaceæ*, eſpecially from its likeneſs in ſome reſpects to the *Aſſonia* of that author and of Cavanilles; but on examination this likeneſs proves fallacious. The moſt probable place for it is amongſt or near the *Capparides*, but the fruit being unknown, leaves this matter in great doubt. After all, it may be thought to belong to ſome new order, which the ſtudents of natural arrangement are but too prone to make on every emergency, and the French in particular ſeem to think they ſhew their ſkill by their refinements on this head; whereas it is but an eaſier fault, though a more fatal one, than that of making too many genera, and ought to be watched with tenfold care.

The *Gluta Benghas* appears to be a *ſhrub* or *tree*, with ſlightly pubeſcent branches and buds. *Leaves* ſcattered, moſt numerous about the ends of the branches, from three to ten inches long, elliptic-lanceolate, bluntiſh, entire, tapering down at the baſe into a ſhort footſtalk; they are ſmooth on both ſides, furniſhed with one rib and many tranſverſe veins connected by innumerable reticulations. *Stipulas* none. *Flowers* nearly the ſize of *Clematis Flammula*, or, as Linnæus ſays, of a cabbage bloſſom, in a corymboſe panicle; whether terminal or axillary cannot be determined from the ſpecimen, though he aſſerts the former. There is ſome appearance of a glandular depreſſion at the back of the footſtalk where it joins the leaf. S.

GLUTEA, Arteria, in *Anatomy*, a large artery diſtributed chiefly among the glutei muſcles. See Artery.

GLUTEN, Animal, in *Chemiſtry.* See *Animal* Fibre and Blood.

Gluten, *Vegetable*, a ſubſtance reſembling the former, and found in ſeveral vegetables. (See *Vegetable* Fibre.) Beccari firſt found that wheat-flower contained gluten in conſiderable quantity, and from this it is obtained by the following proceſs. (Aikin's Dict.) "Moiſten any quantity of wheat-flour with a little water, and knead it with the hand into a tough ductile paſte, then let a very ſlender ſtream of water keep dropping on the paſte, while it is inceſſantly worked about with the hands, and the water will run off white and turbid, owing to the fecula or ſtarch which it carries off. The paſte in the mean time gradually becomes more of a grey and almoſt ſemi-tranſparent appearance; and when the water runs off quite clear, nothing is left in the hands but pure gluten. No other precaution is required in this preparation but that of not drenching the flour at firſt with water, but only uſing a very ſmall quantity with much kneading, that the gluten may not be carried off along with the ſtarch. Good wheat-flour will yield in this way about a fourth of its weight of gluten, and no other flour but that of wheat will yield it, except in a very ſmall proportion, and hence probably the peculiar property of wheat-flour to make bread without any other addition than a ferment." See Bread.

Gluten is contained in ſmall quantity in ſeveral vegetable juices and other parts, and may be ſeparated from them. Bird-lime is ſuppoſed to be chiefly gluten, and the green fecula of plants abounds with it. See Bird-lime and Fecula.

GLUTEUS, in *Anatomy*, a name given to three large muſcles, concerned in the motions of the pelvis and thigh, and diſtinguiſhed from each other by the epithets magnus, medius, and minor. They occupy the outer and poſterior part of the pelvis, from which they ariſe, and form the large fleſhy prominences named the buttocks.

The *gluteus magnus*, or maximus, le grand feſſier, ilii-ſacro-femoral, is a very broad, thick, and bulky muſcle, compoſed of large faſciculi looſely connected together, and ſeparated to a conſiderable depth by adipoſe and cellular ſubſtance, of an irregularly quadrilateral figure, and ſituated obliquely at the outer and back part of the hip. The rounded ſwelling, which forms the outline of the buttock at its back part, and the projection of which hides the termination of the large inteſtine, is formed entirely by this muſcle. Its external ſurface has the ſame degree of convexity as that of the buttock; the internal, which covers the tuberoſity of the iſchium, and the great trochanter, is proportionally concave. It ariſes, 1ſt. By ſhort aponeurotic fibres, from about one inch of the poſterior extremity of the criſta ilii, where the bone extends beyond the ſacrum, and from the neighbouring part of the immediately ſubjacent notch. At this origin an aponeuroſis may be obſerved, continuous with that of the thigh, and of the vertebral muſcles. 2dly. From the ligament connecting the poſterior end of the iliac criſta, to the back of the ſacrum; and here it is continuous with the tendinous origin of the latiſſimus dorſi, longiſſimus dorſi, and ſacro-lumbalis. 3dly. From the external margin of the ſacrum, near its laſt foramen, from the tubercle at the ſide of the termination of the canal containing the medulla ſpinalis, and from the articulation between the ſacrum and coccyx. 4thly. From the poſterior ſurface of the coccyx. 5thly. From the ſurface of the great ſacro-ſciatic ligament. From theſe points the fibres all proceed obliquely downwards and outwards, nearly parallel to each other; the muſcle is at firſt rather thinner and narrower, and grows broader and thicker as it proceeds. Its upper margin is cloſely attached to that part of the femoral faſcia which covers the gluteus medius. The ſuperior fibres, having turned over the great trochanter, join the upper part of the common tendon. The latter is moſt intimately connected to the faſcia lata, ſo that, on the firſt inſpection, the gluteus magnus appears to be inſerted into this faſcia, throughout the whole line of its front edge: we cannot, however, eaſily diſtinguiſh theſe parts by cutting through the muſcle, and turning it aſide. The common tendon receives the muſcular fibres from above the trochanter, to below the quadratus femoris, where it begins to be attached to the bone. It is very firmly attached to the rough line, which commences at the root of the trochanter, and joins the linea aſpera, occupying by its inſertion a ſpace of about three inches; it is ſituated here between the vaſtus externus and adductor magnus, to the former of which it is connected by tendinous and muſcular fibres.

The exterior convex ſurface of this muſcle is covered for a ſmall ſpace towards its upper part by a thin plate of the faſcia lata, and is every where elſe immediately ſubjacent to the integuments. The inner ſurface covers the os innominatum, the ſacrum and coccyx, the origin of the vertebral muſcles, the gluteus medius, the pyramidales, the gemini, the obturator internus, the quadratus femoris, the tuberoſity of the iſchium, the origins of the ſemitendinoſus and biceps, the adductor magnus, the ſciatic nerve, and the great trochanter. A large ſynovial membrane, placed between this muſcle and the laſt-named eminence, favours their reciprocal motions. The cavity does not in general contain much fluid; and it ſometimes exhibits internal folds.

The *gluteus medius*, le moyen feſſier, ilio-trochanterien, is a thick and broad muſcle, flattened and triangular, partly covered by the preceding, but placed more at the ſide of the pelvis. It ariſes by very ſhort aponeurotic fibres from the external ſurface of the os innominatum, immediately under the criſta ilii, running forwards to the front as far as the anterior ſuperior ſpine, and backwards to the ſacro-ſciatic notch: downwards it is bounded by the curved line, which marks the circumference of the gluteus minimus. Another origin of this muſcle is from the faſcia lata, where that aponeuroſis is fixed to the criſta ilii, and where it ſeparates this muſcle from the tenſor vaginæ. From this double origin the fibres all take their courſe downwards, the anterior or ſhorteſt being at the ſame time directed obliquely backwards; the middle, which are longer, paſſing perpendicularly, and the poſterior or longeſt, coming obliquely forwards. In this way they all converge to meet in a broad aponeuroſis in the radiate fibres, beginning in the ſubſtance of the muſcle, higher behind than before, and deſcending, as it receives the muſcular fibres ſucceſſively, to the great trochanter, to be fixed to the upper and anterior part of that eminence. Many of the anterior fibres are mixed with thoſe of the gluteus minor; ſo that the two cannot be completely ſeparated without dividing ſome of the muſcular ſubſtance.

Its external ſurface is covered behind by the gluteus magnus, in front by the faſcia lata. The inner ſurface covers the gluteus minor, the gluteal artery, and the ſurface of the bone. Its front edge is in contact with the tenſor vaginæ; the poſterior with the pyramidalis.

Gluteus minor, or minimus, le petit feſſier, ilio-iſchii-trochanterien. This is the ſmalleſt of the three glutei, and covers the os innominatum by its whole inner ſurface, being equally covered on the outſide by the preceding muſcle. It is thick and flattened, and has a triangular figure. It ariſes from the ſurface of the os innominatum by very ſhort aponeurotic fibres; beginning at the anterior ſuperior ſpine, and following a curved line, which extends from the latter proceſs to the ſacro-ſciatic notch. From this line, of which the convexity is turned upwards, it covers the bone as far as the edge of the acetabulum. The muſcular fibres all deſcend in a converging manner; the middle taking a perpendicular courſe, while the anterior are directed backwards, and the poſterior forwards. They are all implanted in a broad radiated aponeuroſis, which lies on the external ſurface of the muſcle, except towards the front, where it is covered by a few fibres of the preceding muſcle. This aponeuroſis, as it deſcends, forms a ſtrong tendon implanted immediately within the former, in the upper and anterior portion of the great trochanter. It has ſome connection to the capſular ligament of the hip; and a ſmall ſynovial membrane is interpoſed between it and the trochanter. It is covered by the gluteus medius, and very ſlightly by the pyramidalis: it lies on the bone, on the capſular ligament of the hip, and the origin of the rectus cruris.

Motions produced by the glutei.—The muſcles, which we have juſt deſcribed, move the thigh and pelvis reciprocally on each other. Their action on the pelvis may be obſerved both in ſtanding and walking. When we ſupport the trunk in the erect attitude on both feet, the glutei magni fix the pelvis firmly behind, and counteract that tendency which the body naturally has to fall forwards. Hence the bulk and power of theſe very muſcles in the human ſubject afford a clear proof that man was deſigned for the attitude on two feet; this gives to the human frame the buttocks, which are ſeen in no other animal, becauſe man is the only biped among the mammalia. In the caſe now under conſideration the glutei magni are aſſiſted by the ſemi-tendinoſi, ſemi-membranoſi and bicipites; and antagonized by the pſoæ and iliaci, which poſſeſs a force much inferior to that which oppoſes them behind, becauſe they are aided by the weight of the trunk. When the pelvis has been bent forwards, the gluteus magnus will reſtore it; and if the circumſtances admitted of this part being carried backwards, the ſame muſcle would produce that motion. The other two glutei are not eſſentially concerned in the attitude of ſtanding on both feet; but they are the principal agents in ſupporting and balancing the trunk on one foot, by inclining the pelvis over the head of that thigh bone on which the body reſts, ſo that the centre of gravity of the trunk may be in a line drawn through that lower extremity. In this caſe their exertion counteracts the tendency of the trunk to fall on that ſide which is not ſupported. Theſe muſcles are further employed in the ſame kind of way in progreſſion: the gluteus magnus balances the pelvis while one leg is carried before the other, and brought to the ground; and the two others ſupport the trunk laterally, while the limb of the oppoſite ſide is in the air. In the attitude on one leg, the gluteus magnus can rotate the pelvis on the thigh-bone of its own ſide, ſo as to turn the ſymphyſis pubis towards the oppoſite ſide. When the glutei move the thigh on the pelvis, the magnus reſtores the bone to its former poſition, where it had been previouſly bent: and, if the pelvis be carried forwards, it may move the former ſtill farther in the direction of extenſion; the medius and ſemi-medius move the thigh away from the oppoſite limb. The g. magnus has the effect alſo of rotating the thigh outwards; while the anterior fibres of the two ſmaller muſcles will rotate it inwards. The former is a tenſor of the faſcia lata.

GLUTTON, in *Zoology.* See Ursus *Gula.*

GLYCAS, Michael, in *Biography*, a Greek hiſtorian, who is ſuppoſed to have flouriſhed in the 12th or 13th century, though by ſome others he is referred to the 15th. He was a native of Byzantium, but ſpent a great part of his life in the iſland of Sicily. He is principally known by his "Annals," in four parts, containing the hiſtory of the world, from the creation to the birth of Chriſt, and that of the Byzantine emperors down to the death of Alexius Comnenus in 1118, interſperſed with a number of theological, philoſophical, and phyſical diſcuſſions. An edition of the "Annals" in Greek and Latin was given to the public by father Labbe, in 1660. The third part has been publiſhed ſeparately by Meurſius, with a verſion and ſcholia. Several letters of Glycas have been publiſhed in different collections. He was undoubtedly a very learned man, and the correſpondence which he maintained with the literati of his age ſhew that he ſtood in very high reputation. Moreri.

GLYCERIA, in *Botany*, from γλυκερος, *ſweet*, the ſeeds being eaten in Germany, and called Manna-ſeeds, on account of their ſweet taſte. Brown Prod. Nov. Holl. v. 1. 179.—Claſs and order, *Triandria Digynia.* Nat. Ord. *Gramina.* This new genus of graſſes is founded by Mr. Brown on the *Feſtuca fluitans* of Linnæus, *Poa fluitans*, Sm. Fl. Brit. 95, with the following characters.

"*Glume* (Calyx) of two valves, containing many flowers. *Spikelet* cylindrical, awnleſs. *Perianth* (Corolla) beardleſs, its valves of equal length. *Scale* under the germen ſolitary, fleſhy, like a half ſhield. *Stigmas* doubly compound. *Seed* uncomunconnected, oblong, with a furrow at one ſide. *Flowers* ſomewhat panicled."

We cannot but aſſent to the propriety of ſeparating the graſs in queſtion from *Poa* and *Feſtuca*, as far as habit is concerned, but we are very certain that *Poa diſtans*, *maritima*, *procumbens*, and *rigida* of Fl. Brit. and *Cynoſurus durus* of Linnæus cannot fail to go along with it, though we fear the characters given by the ſagacious writer above quoted will not be found to hold good in all, if in any, of theſe. Perhaps the following definition of *Glyceria*, formed on ſimple and obvious Linnæan principles, may be unexceptionable, as embracing them all, and preſerving an analogy with genera already eſtabliſhed.

Calyx of two valves, containing many florets. Spikelet linear. Corolla of two oblong, obtuſe, beardleſs valves. S.

GLYCINE, from γλυκυς, *ſweet*, the particular application of which is not very obvious, having originated merely from the ſweet taſte noticed by Cornuti in the leaves and tuberous roots of G. *Apios*. This indeed is the original, and perhaps the only true *Glycine*, the numerous aſſemblage of ſpecies ranged under this genus, by recent writers, being very anomalous in fructiſication, eſpecially thoſe of New Holland, as will appear by Mr. Brown's definitions when the ſecond part of his valuable work appears.—Linn. Gen. 373. Schreb. 495. Willd. Sp. Pl. v. 3. 1053. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 34. Juſſ. 357. Lamarck Illuſtr. t. 609. Gærtn. t. 154. Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, compreſſed, two-lipped; upper lip notched, obtuſe; lower longer, three-cleft, acute, its middle tooth longeſt. *Cor.* papilionaceous. Standard inverſely heart-ſhaped, deflexed at the ſides, gibbous at the back, emarginate at the top, and ſtraight, till driven back by the keel. Wings ſmall, oblong, ovate towards the extremity, bent downwards. Keel linear, falcate, curved upwards, preſſing the ſtandard upward by its obtuſe and dilated extremity. *Stam.* Filaments in two ſets, (one ſimple, the other in nine diviſions,) ſlightly ſeparated at the top, revolute; anthers ſimple. *Piſt.* Germen oblong; ſtyle cylindrical, rolled ſpirally; ſtigma obtuſe. *Peric.* Legume oblong. *Seeds* kidney-ſhaped.

Eſſ. Ch. Calyx two-tipped. Stamens in diſtinct ſets. Keel of the corolla forcing back the ſtandard with its point.

Obſ. *Glycine Apios* and *fruteſcens* have a two-celled legume. G. *monoica* is a ſingular inſtance of a ſeparation of ſexes in flowers of this tribe.

This genus has accumulated from two ſpecies (G. *Apios* and *fruteſcens*) in the *Hortus Cliffortianus*, to eight in the firſt edition of *Species Plantarum*, nine in the ſecond, fifteen in the fourteenth and laſt edition of *Syſtema Vegetabilium*, and finally to forty-four in Willdenow. Theſe now form a very heterogeneous aſſemblage, and the New Holland ones conſtitute a diſtinct genus, the *Kennedia* of Ventenat, diſtinguiſhed by its ſpontaneouſly reflexed ſtandard, and legume of many cells. The whole requires a thorough reviſal. Some are of opinion that G. *Apios* is generically diſtinct from all the others, and if ſo it would be moſt convenient, though this is one of the original ſpecies, to give it the generic name of *Apios*, retaining *Glycine* for ſuch more common and more numerous ones as may anſwer to the uſual idea of the genus, an eſſential character being ſelected to combine them together.

Glycine, in *Gardening*, contains plants of the ſhrubby climbing kind; of which the ſpecies cultivated are the ſhrubby glycine, or Carolina kidney-bean tree (G. fruteſcens); the two-ſpotted glycine (G. bimaculata); the reddiſh-flowered glycine (G. rubicunda); and the ſcarlet glycine (G. coccinea.)

Method of Culture.—In the firſt it may be effected by laying down the young branches in the early autumnal ſeaſon. When well-rooted in the following autumn, they may be taken off and planted where they are to remain, or in nurſery-rows, being watered when the weather is hot, and the roots protected in the winter by ſome ſort of ſtrawy material. They are found to ſucceed beſt in dry, warm, light ſorts of ground.

And the other kinds may be raiſed by ſowing the ſeeds when they can be obtained from abroad, or produced here in pots of light earth, in the early ſpring, being afterwards removed into other pots, and placed in the green-houſe, or Cape ſtove. It has been ſuppoſed by Mr. Curtis, that the two laſt may ſucceed in the open air, when planted out in warm ſheltered ſituations, and protected during the winter ſeaſon by ſome convenient matting or other means.

All the ſorts are ornamental in their flowery climbing growth; the firſt in the open ground, and the latter in the green-houſe and ſtove collections.

Glycine, *Glucine*, Fr. in *Chemiſtry*. This earth was firſt diſcovered by M. Vauquelin in 1798. He detected it in the analyſis of the beryl, undertaken at the deſire of Haüy, who wiſhed to have it aſcertained by a ſtrict chemical inquiry, whether the beryl and emerald were as ſimilar in their compoſition as in the form of their cryſtallizations. The reſults of this inquiry were conformable to the expectations which gave riſe to it, and the exiſtence of a new earth in the beryl and emerald was confirmed by the experiments of Klaproth. Vauquelin, in the memoir in which he announced his diſcovery, called the new ſubſtance merely the earth of the beryl: afterwards, with his aſſociates, Guyton, Fourcroy, and Chaptal, he determined on the name *glucine*, derived from the Greek γλυκος, *ſweet*, becauſe all the ſoluble ſalts of this earth have the property of producing a certain ſweet aſtringent taſte. When the name was ſelected, the character on which it was founded was peculiar; but though it ceaſed to be ſo on the diſcovery of yttria, yet as the name conveys no erroneous ideas of the body, to which it is applied, there is no impropriety in adhering to it: beſides, the taſte ſtill ſerves as a phyſical characteriſtic; for, according to Vauquelin, the ſweetneſs of the ſalts of glycine has a ſenſible difference from that of the ſalts of yttria, particularly of the ſulphat.

Glycine, in its pure ſtate, has not yet been diſcovered in nature: indeed, its occurrence in compound minerals is exceedingly rare, for it has only been found in the beryl, or ultramarine, the emerald and the gadolinite; and it enters but ſparingly into the compoſition of theſe bodies; the beryl, in which it is moſt abundant, containing, according to the analyſis of Vauquelin and Roſe, no more than 14 *per cent.* From the analogy which exiſts between glycine and alumine, the former is very liable to be taken for the latter by chemiſts who do not pay particular attention to accuracy in their analytical inquiries. The firſt analyſes of the emerald made by Klaproth and Vauquelin afford an inſtance of this kind: and M. Bindheim committed a ſimilar error in his analyſis of the beryl.

To obtain glycine in a ſtate of chemical purity, finely powdered beryl is to be fuſed with three times its weight of cauſtic potaſh in a ſilver or platina crucible; the crucible is to be expoſed for two hours to a ſtrong red heat, and the mixture in fuſion is to be frequently ſtirred with an iron rod, in order to keep the earth as much as poſſible ſuſpended and expoſed by an extent of ſurface to the action of the alkali. If the treatment deſcribed is properly conducted, the fuſed maſs, when ſoftened with water, will be entirely diſſolved by muriatic acid, aſſiſted by a ſlight digeſting heat: the muriatic ſolution thus procured muſt be evaporated to dryneſs. A large quantity of water will diſſolve the ſoluble ſalts, and leave the principal part of the ſilex, which is to be ſeparated and well waſhed on a filter. The filtered ſolution is to be precipitated by carbonat of potaſh. The precipitate, conſiſting principally of alumine and the earth in queſtion, is to be diſſolved in dilute ſulphuric acid, and evaporated to the proper conſiſtence to afford cryſtals of alum. If the precipitate produced by carbonat of potaſh has been well waſhed, it is neceſſary to add a little potaſh to the ſulphuric ſolution. When the ſolution, on a ſecond or third evaporation, and addition of potaſh, ceaſes to yield any more cryſtals of alum, the mother liquor is to be mixed with a ſolution of carbonat of ammonia, greatly exceeding the quantity neceſſary to ſaturate the acid, and to be transferred to a bottle having a ground ſtopple: the mixture is to be well agitated, and carbonat of ammonia is to be added till the precipitate which firſt appeared is re-diſſolved, or no longer diminiſhed by freſh portions of the carbonated alkali. The ſolution of the triple compound of glycine carbonic acid and ammonia is to be filtered in order to ſeparate the ſmall remaining quantity of alumine, and then boiled till the vapour ceaſes to change the colour of turmeric paper, or till it no longer has an ammoniacal ſmell; when all the carbonat of ammonia being driven off, the whole of the glycine will be found precipitated in the form of a white granular powder combined with carbonic acid. This powder is to be waſhed in a filter, till the water ceaſes to afford a precipitate with muriat of barytes and lime-water; it is then to be dried, and heated to redneſs: by this means, the water and carbonic acid, amounting to about half the weight of the whole, will be expelled, and the glycine, if it does not effervеſce with acids, will be left in a perfectly pure ſtate.

Glycine thus procured, is a ſnow-white powder, ſoft and ſomewhat unctuous between the fingers, very adheſive to the tongue, and deſtitute both of ſmell and taſte. Its ſpecific gravity is 2.976. It produces no change in the colour of vegetable blues. Neither oxygen nor nitrogen has any action on it, nor does it ſuffer any change by expoſure to the atmoſphere; as carbonic acid and moiſture do not appear to be abſorbed by it. It forms, with a ſmall quantity of water, a ſlightly ductile paſte, that poſſeſſes much leſs tenacity than that of alumine. Glycine has not yet been fuſed; it neither contracts nor hardens when heated, nor is it altered by expoſure to the moſt intenſe fire. With borax it forms a white tranſparent glaſs, which does not become opaque on cooling. It refuſes to combine directly with ſulphur or phoſphorus, but it appears from Fourcroy that a ſulphuret may be formed by decompoſing the ſulphat of glycine by charcoal. Glycine is ſoluble in a ſaturated ſolution of ſulphuretted hydrogen. A hydro-ſulphuret of this earth, it is likewiſe ſaid, may be obtained by diſſolving the ſulphuret in water. In theſe properties it approaches the alkaline earths, and conſtitutes apparently the link of union between them and the claſs to which it belongs. It is diſſolved by both the fixed alkalies in their liquid ſtate, but in a leſs degree than alumine, and, like alumine, it is not taken up by ammonia. It is diſſolved in a ſolution of carbonat of ammonia, as has already been mentioned. It very readily unites with acids. All its ſoluble ſalts produce, when firſt taſted, the ſenſation of ſweetneſs, which gradually becomes aſtringent.

In relation to its affinity for acids, glycine appears to be intermediate between alumine and magneſia, for it decompoſes only the ſalts of alumine, yttria, and zircon. And the order of its affinities is much the ſame, according to Fourcroy, as that of the other earths, ſulphuric acid holding the firſt place, and nitric, muriatic, phoſphoric, fluoric, boracic, and carbonic following. No experiments have been undertaken yet, to aſcertain what combinations glycine is capable of forming with the earths and metallic oxyds.

Yttria and alumine are the only earths for which glycine is liable to be miſtaken: the properties in which it reſembles them are, rather unfortunately, of a moſt ſtriking kind, but it has a number of other characters which are very diſtinct, and fully demonſtrative of its peculiar nature. Glycine is ſimilar to alumine, in being ſoluble in cauſtic ſolutions of the fixed alkalies, and in ſome of its phyſical qualities; but it differs from alumine in affording with acids ſweet aſtringent ſalts; in not yielding alum with ſulphuric acid and potaſh; in poſſeſſing a greater affinity for acids; in being entirely ſoluble in carbonat of ammonia; and laſtly, in not being precipitated from its ſolutions by oxalat, tartrat, or pruſſiat of potaſh. It is to be diſtinguiſhed from yttria, by its greater ſolubility in carbonat of ammonia, the latter requiring for its ſolution five times as much carbonated alkali as glycine, by its ſalts occaſioning a precipitate, when added to any of the ſuccinats, by the inſolubility of yttria in fixed alkaline ſolutions, and by the precipitate which the ſalts of yttria afford with pruſſiat of pot-aſh.

Glycine was conſidered as a ſimple body till the important diſcoveries of Mr. Davy gave riſe to new analogies; and though the compound nature of this earth is not yet fully demonſtrated, yet there is every reaſon to believe that glycine, like the alkalies and alkaline earths, is a metallic oxyd: and the reſults of the experiments which Mr. Davy made on this body are explained beſt on ſuch a ſuppoſition. This gentleman negatively electrified glycine, ſlightly moiſtened in contact with an amalgam of potaſſium, under naphtha, by a battery of 500 plates. After an hour the amalgam was thrown into water, and an alkaline ſolution was produced, which became cloudy when neutralized by acid, thus indicating the preſence of the earth. Mr. Davy, following the nomenclature which he has adopted in reſpect to the new metals, has propoſed glucium for the name of the metal of glycine, when its exiſtence is no longer doubtful.

Carbonat of glycine, as well as all the other ſalts of this earth, has not yet been diſcovered ready formed in nature. It is procured by precipitating the ſulphat, nitrat, or muriat of glycine, by either of the carbonated fixed alkalies. The precipitate, which is the ſalt ſought after, being well waſhed and dried, appears in the form of ſoft white powder, having a greaſy feel and great lightneſs. Carbonat of glycine is inſoluble in water, and it is unaltered by expoſure to the air. It is decompoſed by all the acids, and by the action of a red heat: moſt probably all the alkaline earths deprive it of carbonic acid in the moiſt way. According to Klaproth it is compoſed of

Glycine	53
Carbonic acid and water	47
	100

Phoſphat of Glycine.—Phoſphat of ſoda, added to a neutral ſolution of nitrat of glycine, throws down this ſalt either in a white pulverulent form, or in a mucilaginous ſtate. It is inſoluble in water, inſipid and uncryſtallizable.

It is not decompoſed by a violent heat, but it fuſes into a white tranſparent glaſs, that does not become opaque on cooling. Phoſphat of glycine is ſoluble in phoſphoric acid. The ſulphuric and nitric acids firſt diſſolve this ſalt, and afterwards decompoſe it. Muriatic acid produces a ſimilar effect, but in a leſs degree. It is likewiſe readily decompoſed by the carbonated alkalies and by all the carbonated earths, except carbonat of magneſia. With the ſulphat, nitrat, and muriat of alumine, it ſuffers decompoſition, a mutual exchange of acids taking place between the two earths.

Sulphat of Glycine.—Glycine, both in its pure and carbonated ſtate, diſſolves very readily in dilute ſulphuric acid. The ſolution by ſpontaneous evaporation affords octahedral cryſtals, compoſed of two oblique four-ſided pyramids joined baſe to baſe, with their edges and ſolid angles truncated. It alſo, but with difficulty, yields when evaporated on a ſand bath ſmall needle-form cryſtals. The ſolution, when evaporated nearly to dryneſs, aſſumes a ſyrupy conſiſtence. Sulphat of glycine, has a remarkable ſweet and aſtringent taſte. It is very ſoluble in water. Heated, it intumeſces, ſuffers the watery fuſion, and becomes pulverulent from the diſſipation of its water. It is completely decompoſed by a ſtrong red heat, the acid being expelled and the earth left in its pure ſtate. It has been already obſerved that ſulphat of glycine is converted, when heated with charcoal, into a ſulphuret: but this ſulphuret, according to Fourcroy, does not become a pyrophorus, like alum thus treated, though ſulphat of potaſh be preſent. A ſolution of nut-galls, added to this ſalt diſſolved in water, produces immediately a white precipitate. Previous to the knowledge of this fact, ſuch a property was conceived to be peculiar to metallic ſalts.

Sulphat of glycine, ſlowly evaporated with a ſmall quantity of ſulphat of potaſh, forms minute cryſtalline grains, which diſſolve with eaſe in ſeven or eight times their weight of cold water. Glycine, added to a ſolution of alum, precipitates the alumine, and moſt probably produces a compound, ſimilar to the preceding one. Sulphat of glycine is decompoſed by all the alkalies and earths, excepting alumine, yttria, zircon, and ſilex.

Nitrat of glycine is procured by ſaturating nitric acid with glycine. The ſolution of this ſalt does not afford cryſtals by evaporation, but produces a ductile and adheſive maſs, which, when further dried, falls into powder. It is very ſoluble in water and deliqueſcent in the air. It attracts moiſture ſo ſtrongly, that it might, if eaſily procured, be advantageouſly employed for abſorbing the hygrometrical water of gaſes. Its taſte is ſaccharine and aſtringent. Tincture of galls dropt into a ſolution of this ſalt produces a yellowiſh brown precipitate. Nitrat of glycine fuſes at a low heat, but if the heat is increaſed, the acid is expelled. It is decompoſed in the moiſt way by ſulphuric acid, and by the ſame alkalies and earths as the ſulphat. The proportions of its component parts are not known; but Vauquelin has obſerved that a given quantity of nitric acid requires rather more glycine than alumine for its complete ſaturation; yet the former earth, though in combination with nitric acid more ſoluble than the latter, decompoſes, with the aſſiſtance of heat, nitrat of alumine, precipitating the alumine, and forming nitrat of glycine.

Muriat of glycine is procured by diſſolving glycine in muriatic acid. It is in ſome reſpects ſimilar to the nitrat, but differs in its ſolution, affording by careful management ſmall cryſtals, the form of which, on account of their ſize, have not yet been determined; and in not being ſubject to deliqueſce on expoſure to the atmoſphere. Its taſte is ſimilar. A ſolution of this ſalt in dilute alcohol is ſaid to be an agreeable ſweet liquid. When diſtilled *per ſe*, the acid flies off, and leaves the earth in a ſtate of purity. It is alſo decompoſed when heated with phoſphoric acid. The ſame effect is produced by ſulphuric and nitric acids, and by the alkalies, and all the earths that decompoſe the nitrat.

Acetat of glycine, which is prepared by diſſolving the earth in acetic acid, has not yet been procured in a cryſtalline form. Its ſolution, when evaporated, acquires a glutinous conſiſtence, and the ſalt becomes brittle as it ſlowly dries.

Succinat of Glycine.—Any of the ſuccinats added to the nitrat, muriat, or ſulphat of glycine, precipitate the ſalt in queſtion. Its properties have not yet been enquired into.

We are indebted for the imperfect knowledge we have of the combinations of glycine, with the ſeveral acids above-mentioned, principally to the celebrated diſcoverer of this earth. Glycine, in no form as yet, has been uſefully employed; yet Vauquelin conceives that the earth itſelf and ſome of its ſalts, when they can be procured with facility, may admit of ſuch an application in chemiſtry, in medicine, and the arts. Its marked attraction for animal and vegetable colouring ſubſtances induced him to think that there was a probability of its being ſerviceable as a mordant; and the peculiar taſte of ſome of its ſalts gave riſe to the hope that theſe combinations might produce ſalutary effects on the animal ſyſtem. If his expectations ſhould be realized, we muſt agree with Vauquelin, that theſe ſalts will be ſome of the moſt agreeable medicines that exiſt. Ann. de Chem. vol. xxvi. 155. xlii. 277. Fourcroy Connaiſſance Chem. vols. ii. iii. Aikin's Chem. Dict. vol. ii. Philoſoph. Tranſ. part. ii. 1808. p. 352.

GLYCONIAN, Glyconius, in the Greek and Latin poetry.

A Glyconian verſe is that conſiſting of two feet and a ſyllable; at leaſt this is Scaliger's opinion: who adds, that the Glyconian verſe was alſo called the Euripidean verſe. See Verse.

Others hold, that the Glyconian verſe conſiſted of three feet, a ſpondee and two dactyls; or rather a ſpondee, choriambus, and an iambus or a pyrrhic: which opinion is the moſt followed.

"Sic te diva potens Cypri," is a Glyconian verſe.

GLYCYRRHIZA, in *Botany*, Liquorice, γλυκυῤῥιζα of Dioſcorides, who deſcribes the plant very faithfully and accurately; but it is remarkable that he ſays the flower is like a hyacinth, which can allude to the colour only, whether his ὑακινθος be the *Delphinium* or *Hyacinthus* of modern botaniſts. The word is compoſed of γλυκυς, *ſweet*, and ῥιζα, *a root*; and the name in apothecaries' Latin, *liquiritia*, as well as the Engliſh one, liquorice, the French *regliſſe*, the Italian *regalizza*, &c. with all their corruptions, originate from it.—Linn. Gen. 380. Schreb. 502. Willd. Sp. Pl. v. 3. 1143. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 56. Juſſ. 359. Tourn. t. 210. Lamarck. Illuſtr. t. 625. Gærtn. t. 148.—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, two-lipped, permanent; upper lip in three deep ſegments, of which the lateral ones are linear, the central one broadeſt and cloven; lower perfectly ſimple, linear. *Cor.* papilionaceous. Standard ovato-lanceolate, ſtraight, longeſt. *Wings* oblong, very like the keel, but rather larger. Keel of two petals, acute, its claw the length of the calyx. *Stam.* Filaments in two ſets, (one ſimple, the other in nine diviſions,) ſtraight; anthers ſimple, roundiſh. *Piſt.* Germen ſhorter than the calyx; ſtyle awl-ſhaped, as long as the ſtamens; ſtigma obtuſe, aſcending. *Peric.* Legume ovate or oblong, compreſſed, acute, of one cell. *Seeds* very few, kidney-ſhaped.

Eſſ. Ch. Calyx with two lips; the upper three-cleft; lower ſimple. Stamens in diſtinct ſets. Legume ovate, compreſſed, of one cell. Seeds one or two.

1. G. *echinata.* Linn. Sp. Pl. 1046. Jacq. Hort. Vind. v. 1. t. 95. (Dulcis radix; Matth. Valgr. v. 2. 16. Camer. Epit. 423.)—“Legumes prickly. Flowers capitate. Stipulas lanceolate. Leaflets ſmooth; the terminal one nearly ſeſſile.”—Native of Italy, as well as of Tartary and the confines of China; alſo abundantly, according to Dr. Sibthorp, on the ſandy ſhores of Crete, Samos, and other Greek iſlands, where it ſtill retains its ancient name unchanged. The long pliant perennial *roots*, deeply deſcending into the ground in a favourable ſoil, are cultivated for their ſweet taſte and pectoral virtues, and are ſufficiently well known. The *ſtems* are two or three feet high, nearly ſimple, leafy, round and ſtriated. *Leaves* of ſeveral pair of equal, elliptical, entire, acute leaflets, the odd one on a little ſtalk only like the reſt, not on an elongation of the main footſtalk. *Stipulas* lanceolate, acute. *Flowers* ſeveral, in axillary, ſolitary, ſtalked heads; their colour a dull purple. *Legumes* clothed, in their upper part eſpecially, with numerous long rigid prickles, reſembling the fruit of *Xanthium ſtrumarium.* Dioſcorides compares them to that of the Plane-tree. The whole herb is deſtitute of pubeſcence, but ſomewhat clammy to the touch.

2. G. *fœtida.* Desfont. Atlant. v. 2. 170. t. 199.—Legumes prickly. Flowers ſpiked. Stipulas lanceolate. Leaflets ſcaly beneath; the terminal one nearly ſeſſile.—Found by Desfontaines on mount Atlas, and in cultivated fields near Mayane in Africa. We have it from Alcaſſar. Whole plant extremely fœtid. *Leaves* much like the laſt in ſize and ſhape, but the *flowers* are pale yellow, in long ſpikes. *Legumes* crowned with the permanent ſtyle, which is longer in this than in the former. The *ſtem*, as well as both ſides of the leaves, is beſprinkled with minute ſcales.

3. G. *glandulifera.* Waldſt. and Kitaib. Hungar. v. 1. 20. t. 21. Willd. Sp. Pl. v. 3. 1144.—Legumes clothed with glandular briſtles. Flowers ſpiked. Stipulas obſolete. Leaflets emarginate, glutinous and downy beneath.—Native of Hungary. *Flowers* violet-coloured.

4. G. *glabra.* Linn. Sp. Pl. 1046. Woodv. Med. Bot. t. 167. (G. vulgaris; Dod. Pempt. 341. Ger. em. 1302.)—Legumes ſmooth. Flowers ſpiked. Stipulas ſcarcely diſcernible. Leaflets blunt; the terminal one on a long ſtalk.—Native of the ſouth of Europe. Moſt commonly cultivated with us. The *leaflets* are large, glutinous beneath. *Flowers* pale purple, in long-ſtalked axillary ſpikes. *Legumes* oblong, ſmooth.—We have a ſpecimen of this ſpecies gathered in Circaſſia, by the celebrated traveller Dr. Clarke of Cambridge.

5. G. *aſperrima.* Linn. Suppl. 330. Pallas. Reis. v. 3. t. G, g. f. 1, 2. (G. hiſpida; ibid. 754.)—Legumes ſmooth, beaded. Flowers ſpiked. Stipulas lanceolate. Leaflets roundiſh, prickly beneath. Stem and footſtalks prickly.—Found by profeſſor Pallas “in ſandy ground between the river Wolga and the Tanais.” *Pallas MSS.* The *root* is extremely ſweet, eſpecially in the ſpring. *Stems* uſually two, rarely three, aſcending, a ſpan high, nearly ſimple, leafy, rough with numerous little rigid prominent prickles, as are the *footſtalks*, and backs of the *leaflets.* The latter are roundiſh or obovate, obtuſe with a little point, ſmooth and veiny above. *Flowers* longiſh, pale violet, with whitiſh wings and keel, in one or two thick ſpikes about the top of each ſtem. The *legumes* are drawn by Pallas above an inch long, recurved, of a necklace-like form, and ſmooth, containing many ſeeds. The *calyx* is oblong, purpliſh, rather hairy. It has the habit of a *Glycyrrhiza*, flowers of an *Aſtragalus*, and fruit apparently of a *Coronilla*; nor does the calyx anſwer to the generic character, being five-cleft.

6. G. *hirſuta.* Linn. Sp. Pl. 1046. (G. orientalis, ſiliquis hirſutiſſimis; Tourn. Cor. 26.)—“Legumes hairy. Leaflets oblong-lanceolate, the terminal one on a long ſtalk. Flowers ſpiked.”—Found by Tournefort in the Levant. *Root* perennial. Of this we have ſeen neither a ſpecimen, figure, nor any further deſcription.

GLYCYRRHIZA, in *Gardening*, furniſhes a plant of the herbaceous perennial kind, the common liquorice (G. glabra).

It is a plant which has the roots running very deep into the ground, and creeping to a conſiderable diſtance, eſpecially where they ſtand long unremoved.

Method of Culture.—A light ſandy ſoil is the moſt adapted to the growth of this ſort of crop, as its goodneſs conſiſts in the length of the roots. The ground in which it is intended to be planted ſhould be well dug and dunged the year before planting, that it may have become perfectly mellow, and the dung well rotted and mixed with the earth, otherwiſe it will be apt to ſtop the roots from running down and being properly ſupported; and immediately before planting it ſhould be well dug again to the depth of three ſpades, and be laid very light and open.

When the land is thus prepared, freſh plants taken from the ſides or heads of the old roots ſhould be provided, care being taken that they have each a good bud or eye, being about ten inches long and perfectly ſound.

The operation of planting them ſhould be performed about the middle of March, which is done in this manner: a line is firſt ſet acroſs the ground, then, with a long dibble made on purpoſe, the ſhoots or cuttings are put in, ſo that the whole plants may be ſet into the ground, with the heads about an inch under the ſurface, in a ſtraight line about a foot aſunder in the rows, and a foot and a half or two feet row from row.

When the whole ſpot of ground has been thus planted, a thin crop of onions may be ſown over the land. Theſe muſt be kept perfectly clean by the hoe, care being taken not to cut off the top ſhoots of the liquorice plants, as it would greatly injure them. All the onions which grow near the heads of the liquorice ſhould alſo be removed. In October, the ſhoots of the liquorice ſhould be removed, and a little very rotten dung ſpread upon the ſurface.

In the following ſpring, about March, the ground ſhould be ſlightly dug between the rows of liquorice, burying the remaining part of the dung, being very careful not to cut the roots.

During the ſummer they muſt be kept quite clean by occaſional hoeing. The ſame operations muſt be annually performed, ſo as to keep the ground and plants in perfect order.

Theſe plants muſt remain three years from the time of planting, when they will be fit to take up for uſe, which ſhould be done when the ſtalks are perfectly decayed; as, when taken up too ſoon, the roots ſhrink greatly, and loſe in weight.

In taking up the roots the ground is trenched over, row after row, to the full depth, and the young ſhoots taken from the old roots cut into ſets for new plantations; which ſhould be made annually, in order to keep a conſtant ſucceſſion of roots fit for being taken up.

The great art in this culture is to have the earth well trenched to a proper depth, to have good ſets, and to keep the ground afterwards quite clean by hoeing and other proper means.

The liquorice is a native of the ſouth of Europe, but it has been cultivated in Britain ever ſince the time of Turner. (See Tourn. Herb. pt. 2. fol. 12. publiſhed in 1562.) The chief places in which it has been long propagated for ſale are, Pontefract, in Yorkſhire; Workſop, in Nottinghamſhire; and Godalming, in Surry; but it is now planted by many gardeners in the vicinity of London, who ſupply the metropolis with the roots.

Glycyrrhiza, in the *Materia Medica*. The root of the common liquorice, boiled ſlightly in a little water, gives out nearly all its ſweetneſs. The decoction, preſſed through a ſtrainer, and inſpiſſated with a gentle heat, till it will no longer ſtick to the fingers, affords a better extract than that brought from abroad, and particularly from Spain, whence our ſhops are chiefly ſupplied with it, and its quantity amounts to near half the weight of the root. The extract that is prepared here, is made by macerating, for four hours, liquorice root ſliced, a pound, in a gallon of boiling water; then boiling down to four pints, ſtraining the hot liquor, and evaporating it to a proper conſiſtence. A purer extract may be made by a repetition of the proceſſes of ſolution and evaporation; and it is kept in the ſhops under the name of "refined liquorice." Rectified ſpirit takes up the ſweet matter of the liquorice equally with water; and as it diſſolves much leſs of the inſipid mucilaginous ſubſtance of the root, the ſpirituous tinctures and extracts are proportionably ſweeter than the watery. This root contains a great quantity of ſaccharine matter, leſs diſpoſed to run into fermentation than that of other vegetables, which is joined with ſome proportion of mucilage, and hence has a viſcid ſweet taſte. From the time of Theophraſtus it has been a received opinion that it very powerfully extinguiſhes thirſt; accordingly it was named ἄδιψον, and the root directed to be chewed in dropſies and other diſorders where great thirſt prevailed. If this fact be true, it is the more remarkable, as ſweet ſubſtances in general have a contrary effect. Accordingly Dr. Cullen obſerves, that the ſweet of liquorice, ſeparated from the root, does not quench thirſt more than other ſweets: and he aſcribes the error reſpecting it to this circumſtance, that if a piece of the root is chewed till the whole of the ſweetneſs is extracted, farther chewing brings out the acrid and bitteriſh matter, which ſtimulates the mouth and fauces, ſo as to produce an excretion of fluid, and thereby takes off the thirſt which the ſweetneſs had produced. Liquorice is in common uſe as a pectoral or emollient in catarrhal defluxions on the breaſt, coughs, hoarſeneſſes, &c. Infuſions or extracts from it afford likewiſe very commodious vehicles for the exhibition of other medicines. Lewis's M.M. Cullen M.M. Woodv. Med. Bot.

GLYN, in *Geography*, a county in the lower diſtrict of Georgia, in the United States, bounded E. by the ocean, N. by Alatamaha river, which ſeparates it from Liberty county, and S. by Camden county. It contains 1374 inhabitants, including 1092 ſlaves. Its chief town is Brunſwick.

GLYPH, in *Architecture* or *Sculpture*, is any canal or cavity uſed as an ornament.

The Greek word is γλυφη, which literally ſignifies *graving, nitching*.

Γλυφις is properly a nitch or indenture made in graving; or, more properly, it is the notch in the end of an arrow, in which the ſtring goes.

GLYPTIC Art, the art of engraving precious ſtones. See Gems.

GLYSTER. See Clyster.

GMELIN, John George, in *Biography*, a phyſician and eminent botaniſt, was born at Tubingen on the 12th of Auguſt, 1709. He was diſtinguiſhed by his diligence and early attainments at ſchool, and at the age of fourteen was deemed ready for entrance upon the academical ſtudies of his native place. In 1727, he took the degree of doctor of phyſic, and went to Peterſburgh, whither ſome of his teachers had been invited. Here he gained many favours from Blumentooſt, the director of the academy, and was ſo highly eſteemed, that, in 1729, he was elected one of the members of the academy, and in 1731 was appointed profeſſor of chemiſtry and natural hiſtory. In 1733, he was ſelected for the department of natural hiſtory, in a commiſſion formed by the Ruſſian government, for the purpoſe of exploring the boundaries of Siberia; and ſet out on the 19th of Auguſt, with G. F. Muller, and Louis de l'Iſle de la Croyere, and a party of twenty-eight perſons, conſiſting of draughtſmen, miners, hunters, land ſurveyors, and twelve ſoldiers, with a ſerjeant and drummer. In the month of February, 1743, Gmelin returned ſafe to Peterſburgh, after having employed nine years and a half in this long and dangerous journey, which proved highly intereſting to the ſciences, and he reſumed the offices which he had before filled. In the year 1749, he entered upon a new profeſſorſhip, to which he had been appointed, on the death of Bachmeiſter, while on a viſit to Tubingen. He died of a fever in May, 1755, in the forty-ſixth year of his age. The works, which were the reſult of his travels through Siberia, obtained for him a conſiderable celebrity, eſpecially his "Flora Siberica, ſeu Hiſtoria Plantarum Siberiæ," Peterſburgh, 1747, 1749, in two parts, large 4to. with one hundred plates: the third and fourth parts were publiſhed by S. G. Gmelin. He alſo publiſhed his "Reiſe durch Sibirien," &c.; or Travels through Siberia between the Years 1733 and 1743, Göttingen, 1751, 1752, in four parts, 8vo. with plates. Gen. Biog.

Gmelin, Samuel Gottlieb, ſon of Philip Frederick Gmelin, was born at Tubingen in 1743; where he obtained both his ſcholaſtic and academical education, and graduated M. D. in 1763. He gave early proofs of genius, and during his travels in France and Holland diſtinguiſhed himſelf ſo much by his knowledge of natural hiſtory, that he was appointed profeſſor in the Academy of Sciences at Peterſburgh. Like the ſubject of the preceding article, he ſpent ſeveral years in travelling through the diſtant provinces of the Ruſſian empire, for the purpoſes of ſcientific inveſtigation; but ultimately with a leſs fortunate reſult. He was appointed, together with profeſſor Guldenſtadt, to explore the province of Aſtracan, at the time that the tranſit of Venus over the ſun's diſk was expected, and ſet out in June, 1768. Having examined the countries on the weſtern ſide of the Don, the Perſian provinces on the ſouth and ſouth-weſt ſide of the Caſpian ſea, the banks of the Wolga, and, laſtly, the eaſtern ſide of the Caſpian, ſo dangerous to travellers, he was recalled to Peterſburgh. But when he had arrived within three days journey of Kiſlar, a fortreſs on the Ruſſian borders, he was ſeized by the chan of Chaitaks; who plundered him of all his property, treated him with great barbarity, and impriſoned him. The health of Gmelin ſuffered conſiderably at this time, and he laboured under a flux, brought on by improper food and the effects of climate; yet the barbarian chief intercepted the proviſions ſent to him from Kiſlar. The empreſs gave orders that he ſhould be reſcued by force; but this was rendered impoſſible at that time by the rebellion of Pugatchef; and Gmelin died in confinement, on the 27th of

July, 1774. His death was much regretted by Catherine II., who made a liberal proviſion for his widow.

His works are; "Hiſtoria Fucorum," printed at Peterſburgh in 1768, 4to.; a ſubject to which botaniſts had paid little attention before him. "Reiſen durch Ruſsland, &c.;" or, Travels through Ruſſia, for the purpoſe of exploring the three kingdoms of nature. This work was publiſhed in ſeparate parts, as follows:—Part I. Journey from St. Peterſburgh to Tſcherkaſk, in the years 1768 and 1769. Peterſburgh 1771 with thirty-two plates. Part II. Journey from Tſcherkaſk to Aſtracan, from Auguſt 1769 to June 1770; ibid. 1774, with forty plates. Part III. Journey through the northern diſtricts of Perſia, from that period to April 1772; ibid. 1774, with fifty-one plates.—Part IV. edited after the author's death, by profeſſor Pallas, Journey from Aſtracan to Czarizyn: and alſo a ſecond Perſian Journey, 1772-74; ibid. 1786, with eighteen plates. The various and important information, contained in theſe publications, renders the imperfections of the ſtyle of this author of little moment. Gen. Biog.

GMELINA, in *Botany*, received its name from Linnæus, in honour of John George Gmelin, a native of Tubingen, profeſſor of chemiſtry and natural hiſtory at Peterſburg, who ſpent ten years in travelling through Siberia, at the expence of the Ruſſian government, and whoſe *Flora Sibirica*, in four vols. quarto, with plates, is a book of great reputation and merit. The firſt and ſecond volumes were publiſhed in his lifetime; the third and fourth long after his death, which happened in 1755, at the age of 46. He took his arrangement from Van Royen. Haller ſays the plates are unworthy of the beautiful drawings, which he himſelf had ſeen.—This genus alſo ſerves to commemorate four or five more botaniſts of the ſame family, eſpecially Samuel Theophilus Gmelin, nephew of the former, and his ſucceſſor in the profeſſorſhip, who publiſhed a *Hiſtoria Fucorum*, with plates, in 1768, one of the moſt popular books on ſubmarine botany, and who died in 1774, aged 31.—Linn. Gen 315. Schreb. 412. Willd. Sp. Pl. v. 3. 313. Mart. Mill. Dict. v. 2. Juſſ. 108. Lamarck. Illuſtr. t. 542. Gærtn. t. 56. (Michelia; Amman. in Act. Petrop. v. 8. 218. t. 18.)—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Perſonatæ*, Linn. *Vitices*, Juſſ.

Gen. Ch. *Cal.* Perianth very ſmall, inferior, of one leaf, nearly globular, with four ſmall unequal teeth, permanent. *Cor.* of one petal, ringent, inflated; its limb four-cleft; the upper ſegment large and vaulted; lower, and lateral ones, ſmaller, obtuſe, rounded, ſpreading. *Stam.* Filaments four; the two uppermoſt thicker and ſhorter; two lowermoſt curved upwards; anthers two-lobed; two of them ſometimes ſmaller and ſimple. *Piſt.* Germen ſuperior, roundiſh or obovate; ſtyle as long as the longer ſtamens, aſcending; ſtigma acute. *Peric.* Drupa ovate, of one cell. Nut obovate, ſmooth, of three cells, the lowermoſt abortive. *Seeds* ſolitary.

Eſſ. Ch. Calyx with four ſlight teeth. Corolla four-cleft, ringent, bell-ſhaped. Anthers cloven. Drupa ſuperior. Nut of two fertile cells.

1. G. *aſiatica*. Linn. Sp. Pl. 873. Burm. Ind. 132. (Jambuſa ſylveſtris parvifolia; Rumph. Amb. v. 1. 129. t. 40.)—Leaves roundiſh, ſomewhat three-lobed, acute, downy beneath.—Native of Java, Amboina, and other parts of the Eaſt Indies. A *tree*, with ſtraight, roundiſh, ſlightly downy branches. *Leaves* oppoſite, ſcarcely two inches long, of a roundiſh or elliptical form, acute, moſt generally furniſhed with a ſhort broad lobe at each ſide, entire; ſmooth above; pale and downy beneath; the midrib ſending off two principal lateral ones, a little above its baſe, and ſeveral ſmaller ones higher up, all which are branched. *Footſtalks* downy, various in length, often nearly equal to the leaf, each with a ſmall hairy bud above its inſertion, and above that uſually a ſtraight, downy, horizontal ſpine. *Flowers* in a ſhort, ſimple, downy, terminal *racemus*. *Calyx* downy, beſprinkled with ſeveral large, ſhield-like, ſmooth glands. *Corolla* large, yellow.

Rumphius's figure unqueſtionably belongs to this plant, but his deſcription ſeems that of an *Eugenia*. Plukenet's t. 305. f. 3. is certainly *Gardenia dumetorum*, and reſembles our *Gmelina* only in being thorny; his t. 97. f. 2. may poſſibly be intended for *Gmelina parvifolia*, but is of no uſe as to determining it.

2. G. *elliptica*.—Leaves elliptical, undivided, obtuſe, downy beneath. Thorns none.—Native, we preſume, of the Eaſt Indies, confounded in the Linnæan herbarium with the foregoing, from which it differs in having rather larger *leaves*, which are exactly elliptical and blunt, more denſely downy beneath, and not lobed. There are no traces of thorns. The *infloreſcence* is rather more compound, but the remarkable glandular *calyx* is the ſame. If a variety it is a very extraordinary one.

3. G. *parvifolia*. Roxb. Corom. v. 2. 31. t. 162. (G. coromandelica; Burm. Ind. 132.)—Leaves obovate, undivided or three-lobed, ſmooth on both ſides.—Common in every foreſt and uncultivated place on the coaſt of Coromandel, flowering in October and November. *Roxburgh.* It is often intermixed with G. *aſiatica*, from which it differs in its more humble ſize, larger and conſtant *thorns*, and eſpecially in its ſmaller *leaves*, which are ſmooth on both ſides. Their *flowers* and *fruits* are alike, the latter being yellow, obovate, the ſize of a ſmall cherry. We perceive on one calyx in our ſpecimen a ſolitary gland, like thoſe deſcribed in the two former.—Dr. Roxburgh mentions that cold water, ſtirred with a leafy branch of this ſhrub, becomes thick, from the abundant mucilage of the leaves, and is uſed in that ſtate as a remedy for the heat of urine which accompanies gonorrhœa. Water ſtirred with branches and leaves of *Pedalium Murex* becomes in like manner mucilaginous, and is uſed for the ſame purpoſe, but ſoon loſes its conſiſtency, which is not the caſe with ſuch as is prepared with this *Gmelina*. The Telingas call the plant *Shieri goomoodoo*. It may poſſibly be Plukenet's *Lycium Maderaſpatanum*, t. 97. f. 2, as Burmann takes it to be, but Sloane's *Rhamnus*, Hiſt. of Jamaica, v. 2. t. 207. f. 1, cannot be the ſame, though his vile figure affords no diſtinct indication of what he means.

4. G. *arborea*. Roxb. MSS. (Cumbulu; Rheede Hort. Mal. v. 1. 75. t. 41.)—Leaves heart-ſhaped, undivided, pointed, downy beneath; their lateral ribs cloven. Thorns none.—Sent from the coaſt of Coromandel by the Rev. Dr. Rottler, with the above name of Dr. Roxburgh. Gærtner has moſt juſtly pointed out the *Cumbulu* of Rheede as a *Gmelina*, though quoted by Linnæus, doubtingly indeed, for his *Bignonia Catalpa*. This is a tall and upright *tree*, growing in ſandy ground, with downy *branches*, and large, oppoſite, ſtalked, heart-ſhaped, entire *leaves*, downy and veiny beneath. *Thorns* none, as far as we can learn. The *flowers* are numerous and handſome, yellow, growing in compound, hairy, terminal cluſters. *Fruit* yellow, obovate, rather ſmall.

5. G? *indica*. Burm. Ind. 132. t. 39. f. 5. (*Doery Zoekan* of the Malays.) Leaves alternate, heart-ſhaped, crenate, ſmooth on both ſides.—Native of Java. *Herb. Linn.* A *ſhrub* or *tree*, with round, ſomewhat zig-zag, ſlightly downy branches. *Leaves* from half an inch to an inch long, alternate, on ſhort hairy ſtalks, veiny, bluntly crenate. *Thorns*

ſtraight, ſlender, acute, moſtly longer than the leaves. The *flowers* and *fruit* ſeem to be unknown. We have only Burmann's very feeble authority for making this a *Gmelina*, which its alternate crenate leaves ſtrongly diſcountenance, nor did Linnæus ever venture to adopt it. S.

GMUND, in *Geography*. See Gemunden.

GNAA, a town of the duchy of Stiria; 24 miles S.E. of Gratz.

GNADENHUETTEN, a ſettlement of the Moravians in America, ſituated on Muſkingum river, oppoſite to Salem, in the lands which belonged to the Mahikan Indians.—Alſo, the name of a Moravian ſettlement, on the S.W. bank of Lehigh river, in Pennſylvania, about 29 miles N.W. of Bethlehem.—Alſo, a Moravian ſettlement, called *New Gnadenhuetten*, on Huron river, about 22 miles from lake St. Clair, in the county of Wayne, and 28 N.W. of Detroit.

GNAPEEZEIK, a town of Birmah, on the Irawaddy; ſo called from Gnapee, or Napee, a ſort of ſprat, half pickled and half putrid, uſed as a ſauce by the Birmans, and forming an extenſive branch of trade: 110 miles N.N.W. of Rangoon.

GNAPHALIUM, in *Botany*, γναφαλιον, an ancient Greek name, from γναφαλον, *ſoft down* or *wool*, ſuch as is plucked from cloth in dreſſing it, alluding to the woollineſs of the herbage. Many writers have contended that *Santolina maritima* of Linnæus, and Sm. Fl. Brit. 860, is the true γναφαλιον of Dioſcorides, an opinion extremely difficult to eſtabliſh or to contradict, as all he ſays of it is, that "its leaves are white and ſoft, uſeful for ſtuffing." However this may be, Tournefort, and lately Gærtner, have retained that plant, as the true and only ſpecies of *Gnaphalium*. The *Gnaphalium* of Linnæus however is a very extenſive and comprehenſive genus, from which ſome ſpecies have of late been ſeparated. See Elichrysum.—Cud-weed.—Linn. Gen. 419. Schreb. 550. Willd. Sp. Pl. v. 3. 1849. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 173. Sm. Fl. Brit. 867. Juſſ. 179. (Elichryſum; Gærtn. t. 166. Antennaria; Gærtn t. 167. Anaxeton; Gærtn. t. 166? Filago; Gærtn. t. 166. See Filago.) Claſs and order, *Syngeneſia Polygamia-ſuperflua*. Nat. Ord. *Compoſitæ Nucamentaceæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common calyx* imbricated, rounded; ſcales numerous, the marginal ones rounded, ſcarioſe, coloured. *Cor.* compound; *florets* of the diſk perfect, tubular, funnel-ſhaped, in five equal reflexed marginal ſegments; ſome female ones, without a corolla, are often intermixed towards the margin. *Stam.* (in the perfect florets) Filaments five, very ſhort, capillary; anthers forming a cylinder. *Piſt.* (in the ſame florets) Germen ovate; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma cloven. In the female ones the ſame. *Peric.* none, except the permanent ſhining calyx. *Seeds* in both kinds of florets alike, ſolitary, oblong, ſmall, crowned with capillary or feathery down. *Recept.* naked.

Eſſ. Ch. Receptacle naked. Down capillary or feathery. Calyx imbricated, its inner ſcales rounded, ſcarioſe, coloured.

Willdenow reckons 146 ſpecies of *Gnaphalium*, of which 32 are ſhrubby, with ſilvery, white or crimſon flowers, or rather without any golden tinge; 12 are of a yellow or golden colour, likewiſe ſhrubby; 19 are herbaceous, with yellowiſh flowers; 28 herbaceous, with white or reddiſh ones; and 29 have the inconſpicuous whitiſh bloſſoms of the *Filago* family. The remaining 26 are ſpecies defined by Thunberg, without any attention to theſe leading ſections of the genus, ſo that it is impoſſible to ſay to which they belong. Ten ſpecies, all herbaceous, are deſcribed as natives of Britain.

In this large genus it is by no means certain that all the ſpecies correctly anſwer to the generic character, particularly in the receptacle, which is not always ſtrictly naked, but bears a few briſtles towards the margin, thus becoming an *Anaxeton* of Gærtner.

The marginal ſcales alſo, being ſometimes a little pointed and reflexed, intrench upon the proper character of *Elichryſum*; ſee that article. In fact theſe genera are naturally one and the ſame, but, on account of their great extent, are conveniently ſeparated by the character, though an imperfect one, of the more radiating calyx of *Elichryſum*. Linnæus's error conſiſted in referring the latter to *Xeranthemum*, which has a different habit and a chaffy receptacle.

The firſt ſpecies in Willdenow, G. *eximium*, Linn. Mant. 573. Curt. Mag. t. 300, is one of the moſt ſplendid. The *leaves* are clothed with very thick white wool, and the ſhrubby ſtem is terminated by a large corymbus of *flowers*, whoſe calyx is the ſize and ſhape of a raſpberry-fruit, of a rich ſhining crimſon. The *florets* are orange-coloured. It grows about 500 miles up the country above the Cape of Good Hope, and was for a long time known to European botaniſts merely by dried ſpecimens, (one of which is figured by Edwards in his Hiſtory of Birds, t. 183), brought occaſionally to the Cape by the diſtant ſettlers.

Several others of the ſhrubby kinds are very ornamental to our green-houſes.

Of the herbaceous ſorts G. *fœtidum*, whoſe flowers, uſually yellow, are occaſionally white or ſilvery, always very ſplendid, is one of the moſt remarkable, but the ſtrong ſmell of its viſcid herbage when touched is offenſive to moſt people. G. *orientale* is ſomewhat ſhrubby, though ranged with the herbaceous ones. Its ſhining lemon-coloured flowers frequently ſerve for ornamental purpoſes, and are known by the name of *Everlaſting*, a name appropriate to the whole genus.

G. *margaritaceum*, Engl. Bot. t. 2018, ſerves in Wales, where it grows wild, to adorn the graves of the departed, elegantly alluding to immortality by the unfading nature of its flowers, and to ſpotleſs purity by their ſnowy whiteneſs. This plant is often cultivated in cottage gardens.

G. *dioicum*, Engl. Bot. t. 267, the *Antennaria* of Gærtner, ſo called from its plumy crown to the ſeed, is one of our moſt elegant ſpecies, found on dry rather mountainous heaths. The *flowers* are of a beautiful roſe-colour.

The Cape of Good Hope is moſt fertile in this genus, but ſeveral fine ſpecies grow in South America, and there are ſome from New Holland to be added to what are enumerated in Willdenow. The mountains and fields of different parts of Europe produce various ſpecies, but few of the more handſome, except G. *arenarium*, Fl. Dan. t. 641, and its near relation G. *olympicum* of our gardens, gathered about the Bithynian Olympus by Dr. Sibthorp; both which vie with G. *orientale* in their ſhining golden or lemon colour, and the *olympicum* at leaſt is a hardy perennial, of eaſy culture.

Gnaphalium, in *Gardening*, affords plants of the herbaceous and under ſhrubby kinds: of which the ſpecies moſtly cultivated are, the tree everlaſting (G. arboreum); the red-flowered everlaſting (G. igneſcens); the eaſtern everlaſting, or immortal flower (G. orientale); the ſweet-ſcented everlaſting, or eternal flower (G. odoratiſſimum); the American everlaſting, or eternal flower (G. margaritaceum);

taceum); the plantain-leaved everlaſting (G. plantagineum); the common ſhrubby everlaſting, or ſtæchas (G. ſtæchas). Many of theſe are curious plants.

Method of Culture.—The firſt four ſorts may be increaſed by ſlips from the heads or cuttings; by planting them in pots of light earth in the ſpring or ſummer months, and plunging them in a moderate hot bed, refreſhing them often with water. When they have taken full root, they may be removed into ſeparate pots, and be placed among other plants of the hardy exotic ſort. They require the protection of a frame in the winter ſeaſon.

The ſeventh ſpecies may be increaſed in the ſame manner, being placed at once where it is to remain, in a ſhady ſheltered border, or other place that is proper.

The fifth and ſixth ſorts may be eaſily raiſed by dividing and planting their creeping roots where they are to grow, either in the autumn or ſpring months.

Theſe three laſt are ſufficiently hardy to ſtand the open air in warm ſituations.

They are all ornamental plants, the former in the greenhouſe collection, and the latter in the open ground.

GNAPHEUS, in *Ichthyology*, a name given by Athenæus and other of the Greek writers to the tench.

GNARP, in *Geography*, a town of Sweden, in the province of Helſingland; 20 miles N. of Hudwickſwal.

GNAT, in *Entomology*. See CULEX.

There is no ſpecies of inſect that we have ſo much reaſon to diſlike in regard to the injury it does us as the gnat. Others indeed give us more pain with their ſtings, but it is but by accident that we are ſtruck by them; the gnats thirſt for our blood, and follow us about in whole companies for it. There are many marſhy places where the legs and arms are all the ſummer ſwelled to an enormous ſize by the repeated bitings of theſe inſects, and in many other countries they are much more troubleſome than with us.

But as troubleſome enemies as theſe little creatures are to us, there is that about them which is extremely worthy our admiration; nor can we indeed fail greatly to admire even the very inſtrument of the miſchief they do. They have beſide this many very obſervable particulars in the courſe of their lives.

All the naturaliſts of late years have applied the microſcope to the examination of the parts of this little animal, and Swammerdam, Hook, Bonanni, Leeuwenhoeck, &c. have given very good accounts, and very valuable drawings of the creature.

There is a great number of very ſmall ſpecies of gnats, and though ſome are conſiderably large, yet none even of theſe approaches to the ſize of the tipula, or father long-legs, as commonly called. The larger tipulæ are therefore eaſily diſtinguiſhed from the gnats; but Swammerdam, Goedart, Liſter, and others, have very often given us the ſmaller tipulæ among the ſpecies of gnats. Both have long ſlender bodies, and both prominent corcelets, which make them look hump-backed; but when either of theſe inſects is taken into the hand it is very eaſily known, the gnat having a very long trunk, and the tipula no trunk at all.

There is a prodigious number of ſpecies of the gnat kind, comprehending the ſmaller ones; Dr. Derham obſerved near forty different ſpecies about Upminſter in Eſſex: but of thoſe of a ſize to be remarked with eaſe, and without the help of glaſſes, there are three principal kinds: the one has its body variegated with white and black; this is the larger kind, and its corcelet is ſtreaked with black or deep brown, and white lines or greyiſh ones; theſe have brown eyes; another is ſmaller than this ſpecies, and has a plain brown body, the colour of the corcelet, and that of the eyes is the ſame as in the larger or firſt ſpecies; the third kind is the ſmalleſt of the three and the moſt common, has its corcelet reddiſh, or of a faded reddiſh yellow, and the body whitiſh, and on the under part of the belly every ring has one ſingle brown ſpot; the reſt is grey: the eyes of this ſpecies are of a very pleaſant green.

All the gnats have a long cylindric body compoſed of eight rings; their corcelet is ſhort but large, in proportion to the ſize of the fly, and to this are fixed the ſix legs, which are hairy, with ſix joints to each, and at the end two little claws, the wings, and the balancers: four ſtigmata are alſo found here, as is the caſe in other flies: the two firſt of theſe are placed near the head, and have been miſtaken for ears.

The antennæ of gnats are extremely worth obſervation, and differ much from one another. Some of them are elegantly feathered; theſe belong to the males of certain ſpecies, for the antennæ of the females are not ſo beautiful. The bruſh-horned or male gnat has two pair, one of which is ſurrounded, at ſmall diſtances, with long hair, iſſuing out circularly, each circle leſſening as it approaches the extremity of the antennæ; the other pair are longer and much thicker, and hairy from end to end. In the great bellied or female gnat, the firſt pair of antennæ, though of the ſame figure as the male's, has hairs not near ſo long, and the ſecond pair is ſhorter than the firſt by at leaſt three parts in four. Reaumur, Hiſt. Inſ. vol. iv. p. 574, &c. Baker's Microſ. 1743. p. 203, &c. For the trunk and wings of the gnat, ſee TRUNK and WINGS.

GNATS, *Eggs of*. See EGGS.

For the *Eyes of* GNATS, ſee EYES *of Flies*.

GNAT-*worm*, in *Natural Hiſtory*, a ſmall water inſect, produced of a gnat, and which is, after its ſeveral changes, transformed into a gnat again.

From the eggs, depoſited by the gnat on the ſurface of the water, proceed a number of minute worms, which ſinking to the bottom of the water, form for themſelves coverings of fine ſand or earth, cemented together with a ſort of glue, but open at both ends, that they may come out and enter as occaſion requires.

Theſe worms do not frequent rivers; but ditches, ponds, and other ſtanding waters, afford them in vaſt abundance, from the middle of May till toward the beginning of winter. This is the reaſon why watery and marſhy places are found moſt to abound with gnats, and why the wet ſummers are found to produce the greateſt numbers of them; becauſe in dry ſeaſons, the ponds and ditches, where they are to paſs their worm-ſtate, are dried up, and the worms killed. Theſe are creatures, however, that one need not go far to ſeek, ſince a veſſel of water, expoſed in any open place in the ſummer months, will not fail to afford plenty of theſe worms in a little time.

Before theſe worms are arrived at their full growth, though they are then but ſmall, they are eaſily found, becauſe they are under a neceſſity of coming frequently to the top of the water, by having occaſion for frequent reſpiration; and to do this, they are obliged to keep the end of a ſmall pipe they are furniſhed with, from the laſt ring of their body, above water. The end of this pipe is hollow and indented, and forms a ſort of funnel on the ſurface of the water: it is of the length of about three rings of the body, and is ſomewhat thicker at its inſertion than at its extremity.

As there is a vaſt number of ſpecies of gnats, there is no leſs of the worms from whence they are produced: and to this is in a great meaſure owing the variety in the figures given of the worms by the authors who have treated of them; which may alſo be not a little added to by the particular views in which thoſe draughts have been taken. Notwithſtanding all the variations of theſe figures, the general form of the animal is however the ſame in all, and the ſpecies cannot but be known from any of them. While the worm is young, the body is whitiſh or greeniſh; but when it is at its full growth, and draws near the time of its changes, it becomes greyiſh. The great tranſparence of the body of this worm gives a fine view of what paſſes within it; it is at any time eaſy to ſee into the motion of the inteſtines, by which the food is puſhed on towards the anus. The two principal tracheæ are alſo ſeen very diſtinctly in this creature; they are two white tubes placed in a parallel direction one to another, and run from the firſt ring to the tube of reſpiration.

The great worm ſeveral times changes its ſkin in the courſe of its life. After three changes of this kind, which uſually happen in the ſpace of three weeks, or thereabout, it undergoes a fourth, where the old ſkin is as eaſily thrown off as in the reſt, but the animal now appears in a new form, that of a nymph; it is now ſhorter and rounder than before, and the body is ſo bent that the tail is applied to the under part of the head; this, however, is only its form in a voluntary ſtate of reſt, for it can yet move, and when it pleaſes extends its tail, and ſwims about as ſwiftly as when in its other ſtate.

When the creatures have quitted their firſt habitations and the figure of worms, they re-aſcend to the top of the water, incloſed in a kind of ſhell, with a large head and mouth, two black eyes, two horns, ſeveral tufts of hairs on different parts of the body, and a tail with a bruſh of hair at the end of it, which, being ſmeared over with an oily fluid, ſerves to keep them above water; their heads being ſometimes lifted in the air, and ſometimes plunged into the water, while the tail ſlides along the ſurface: and when the oil on the tail begins to dry, they ſhed from their mouth a freſh ſupply, which renders it capable of ſteering where they pleaſe, without being wetted and damaged by the water.

All the parts of the future gnat may be ſeen in this nymph; the ſkin of it is extremely thin and tranſparent, yet ſufficiently tough and firm for the uſe it is intended for. It is uncertain how long exactly the animal lives in this nymph ſtate; but after the time is accompliſhed, its change into a gnat is very quick, and is attended with great danger to the animal, ſince multitudes are drowned in the act of getting out and ſpringing into the air. Reaumur, Hiſt. Inſ. vol. iv. Baker's Microſ. 1743. p. 88.

Gnat, in *Rural Economy*, a ſmall well-known inſect, which is ſaid to deſtroy the leaves of ſome tender vegetables as ſoon as they appear, ſuch as the turnip, &c.

GNEISS, in *Mineralogy*, a primitive rock, compoſed of feldſpar, quartz, and mica; ingredients which are likewiſe thoſe of granite, from which it differs in the arrangement of thoſe parts; for while in the latter rock they uſually appear as granular aggregations, thoſe of gneiſs are diſpoſed in ſuch a manner as to exhibit a more or leſs ſlaty ſtructure. This ſtructure paſſes through various degrees of diſtinctneſs; on one hand it approaches ſo near to the granular texture, that the diſtinction between gneiſs and granite ceaſes to exiſt, while, on the other hand, when its peculiar texture is very obvious, and becomes what is termed *thin ſlaty*, a paſſage is formed into the primitive rock, next to it in antiquity, called mica-ſlate. In its progreſs towards the nature of granite, the feldſpar is generally predominant with regard to the mica; while thoſe varieties approaching mica-ſlate gradually exhibit a ſmaller proportion of feldſpar and much mica. Sometimes, however, the mica is only apparently predominating, owing to the circumſtance, that on breaking a maſs of gneiſs, the line of ſeparation will more frequently paſs through the mica than through the other layers, and diſplay a whole ſurface of that ſubſtance; but another fracture, perpendicular to the firſt, will, in this caſe, ſoon undeceive the obſerver. Though feldſpar is, generally ſpeaking, the predominant ingredient of gneiſs, yet the proportion of mica in this rock is, upon the whole, greater than what we ſee it in granite: and the leſs this is the caſe, the more the maſs appears granular, and the more it approaches to granite. It is often a matter of difficulty, in viewing ſmall ſpecimens only, to diſtinguiſh ſome kinds of gneiſs from the laſt-mentioned primitive rock; when the inſpection of the former in their natural ſituation, and on a large ſcale, would have left but little doubt in the mind of the examiner.

Gneiſs, viewed in the large, as a mountain maſs, always exhibits thick and diſtinct ſtrata, whoſe outgoings, or upper terminations, are generally lower than the ſubjacent granite, and higher than thoſe of the ſuperincumbent mica-ſlate.

Werner (to whom we owe more correct ideas reſpecting this rock,) diſtinguiſhes four kinds of gneiſs, *viz.* that approaching the granular ſtructure, the waved or undulated, the common, and the thin ſlaty gneiſs. As particular varieties of theſe, we have 1. The ſtriped gneiſs, in which the quartz is diſpoſed in narrow bars, ſurrounded by feldſpar, producing, on its longitudinal fracture, a ſtriped appearance, not unlike that of ſome kinds of petrified wood; while its tranſverſal fracture exhibits a granular diſpoſition of the parts. This ſtriped variety generally occurs together with the waved; ſuch as at Ober-Newſhönberg, Reiſland and Hartmanſdorf, near the Bohemian frontiers. 2. The ſprinkled, or that kind of gneiſs in which the feldſpar and mica exhibit themſelves in the form of ſmall neſts: ſuch as that found at Hartmanſdorf and Bobritſch, near Freiberg, and at Kuffenberg in Bohemia. 3. The ſhort lamellar or flaky variety, ſuch as it is found at Marienberg.

The *colour* of the ingredients of gneiſs is not ſubject to great variation. The feldſpar is generally of a greyiſh, yellowiſh, and reddiſh-white colour, ſeldom yellowiſh-grey, or deep fleſh-red, as it appears in many varieties of granite; upon the whole, its tint reſembles that of the quartz with which it is accompanied, and which ſeldom appears ſmoke-grey or brown. The colour of the mica is generally black or browniſh-black, ſometimes browniſh, yellowiſh, and aſh-grey, and rarely ſilver-white or of a golden hue.

Theſe component parts are found to vary alſo in regard to their *freſhneſs*; in general the feldſpar is perfectly foliated and ſhining; but ſometimes it appears in incipient decompoſition, or even converted into petunze; in the ſame manner as the mica is now and then ſeen paſſing into a greeniſh ſubſtance reſembling ſteatite. Dr. Reuſs found that the porcelain earth dug at the Galgenberg, near Puſchwitz, in the Saatz diſtrict of Bohemia, where it is uſed for white-waſhing walls, is the reſult of the higheſt ſtage of decompoſition of gneiſs; it forms thick ſtrata, and contains a great quantity of ſmall greyiſh white, light grey, and pale clove-brown grains of quartz. In the ſame manner this mineralogiſt obſerved in that country frequent proofs of the converſion of the feldſpar of gneiſs into a ferruginous clayey maſs. Near Kloſterly it is ſeen converted into bunt-thon or variegated clay.

Beſides the more eſſential feldſpar, quartz, and mica, the following *accidental ingredients* are now and then met with in gneiſs. 1. Shorl: both the common and black tourmaline ſhorl, ſometimes occur in the gneiſs of Freiberg, and particularly of Spain. 2. Garnet: rarely, but much more frequently than in granite; it occurs at Wieſenthal in Saxony, in Norway, in the iſland of Zealand, in Moravia, &c. 3. Hornblende

blende: is but ſeldom found, and only in the thin flaty variety of gneiſs, which paſſes into mica and hornblende ſlate. 4. Steatite: occurs principally in the gneiſs forming the walls of the metalliferous veins in the Freiberg diſtrict; it is conſidered by ſome as mica thus transformed by ſulphuric acid. 5. Actinote: is ſaid ſometimes to conſtitute an ingredient of gneiſs in Switzerland and Hungary. Metallic ſubſtances that are ſometimes found diſſeminated in gneiſs, in the vicinity of veins, cannot properly be enumerated even as accidental component parts of this rock.

Gneiſs abounds in metals more than any other rock, as may be ſeen from the richneſs of the Saxon and Bohemian mines, thoſe of Salzburg, &c. There are but few among the known metals that are not found in it, either in veins or beds. "The oldeſt gneiſs in the Saxon Ertzgebirge," ſays Mr. Jameſon, "that with reddiſh-coloured feldſpar, is the leaſt productive in ores; but the newer, with white coloured feldſpar, is the moſt productive; and the veins, though ſmall, are numerous. The oldeſt venigenous formation appears to be that which contains tin-ſtone. The tin-ore is accompanied with wolfram, molybdena, arſenic-pyrites, fluor-ſpar, chlorite, topaze, and opal. The ſecond venigenous formation appears to be a lead-glance formation. The third formation conſiſts principally of copper, and the ores are grey copper-ore, copper-glance, copper-pyrites, and variegated copper-ore. The fourth formation, which is very extenſive, contains ores of cobalt. The neweſt formation is that which contains ores of ſilver. Veins containing antimony, and red iron-ſtone occur in gneiſs, and theſe are ſuppoſed to be newer than any of the preceding. The metalliferous beds that occur in this rock contain argentiferous lead-glance, blende, copper and iron-pyrites. It ſometimes alſo contains formations of gold."

There are three conſiderable beds of *rocks ſubordinate* to, and ſynchronic with, gneiſs, and which are therefore not ſeen in granite, *viz*. granular limeſtone, as it is obſerved, for inſtance, near Freiberg; primitive trap, ſuch as hornblende-ſlate, at Kuttenberg in Bohemia, at Kongſberg in Norway, &c.; and the older porphyry. (See LIMESTONE, TRAP, and PORPHYRY.) Alſo ſmall beds of common garnets, actinote, with magnetic iron-ſtone, iron-pyrites, galena, &c. now and then occur in gneiſs.

Gneiſs being generally ſuperincumbent on granite, is hence conſidered as next to this primitive rock in point of *age*: there is, however, alſo a difference in the relative antiquity of the different kinds of gneiſs, and on the whole it may be ſaid that the nearer it approaches in its texture to *Mica-ſlate*, (ſee that article,) the more recent is its origin. From this it does not, however, follow that there ſhould not be found kinds of gneiſs which ſurpaſs in antiquity even ſome kinds of real granite. (See GRANITE.) The very thick flaky varieties of gneiſs, with black mica and a ſmall proportion of mica, may, in general, be ſaid to be of more ancient formation.

Gneiſs, though far leſs widely diſtributed than granite, has ſtill a conſiderable range; it extends over the greateſt part of the Saxon Ertzgebirge: the country about Freiberg, Glaſhütte, Marienberg, Ehrenfriederſdorf, conſiſting almoſt entirely of it. In the ſame manner it is the characterizing rock of the Bohemian mountainous mining diſtrict. It is alſo found in Sileſia, Carinthia, in ſome parts of the Black Foreſt in Suabia; nor is it wanting in the Tauriſkian mountains, in Salzburg, in the Swiſs Alps, the Pyrenees and Voſges, in Scandinavia, Greece, &c. In Great Britain it has been obſerved particularly in Scotland, in the iſlands of Coll, Tiree, Rona, and in the Shetland iſlands. It ſhould however be obſerved, that frequently other rocks have been deſcribed as gneiſs by topographical writers.

The *economical uſe* made of gneiſs is that for paving, and for the conſtruction of walls; for both which purpoſes it is extremely well calculated, by reaſon of the facility with which it is wrought by the maſon. Hence in the Saxon mining diſtrict not only almoſt all buildings are conſtructed of gneiſs, but alſo the walling of the ſhafts and levels is moſt advantageouſly executed in this uſeful rock.

GNEMON, in *Botany*, a tree ſo called in the iſland of Ternate and others of the Moluccas, which is named in the Malay language *Meninjo*, or *Meningo*, a word apparently of the ſame derivation, whatever that may be. See GNETUM.

GNERDEN, in *Geography*, a town of Perſia, in the province of Irak; 150 miles E. of Iſpahan. N. lat. 32° 20'. E. long. 55°.

GNERROUTOOH, a town of Birmah, on the Irawaddy; 10 miles N. E. of Pagham.

GNESEN, or GNESNA, a city of Poland, in the duchy of Warſaw, built, as it is ſaid, by king Lechus I., founder of the monarchy, and called *Gneſna*, from an eagle's neſt found there, denominated in the Poliſh language *Gneſiad*. The kings of Poland were crowned in this city, and the regalia were kept here till, in the year 1320, they were removed to Cracow. During the independent exiſtence of Poland, it was famous as the ſee of an archbiſhop, who was primate of Poland, and who acted as interrex or regent upon the king's demiſe; and who alſo announced the event, convoked the diets and dietines of convocation, and performed the functions of royalty. Gneſna is 100 miles N. E. from Breſlaw, and 130 W. from Warſaw. N. lat. 52° 26'. E. long. 17° 42'.

GNETUM, a name contrived by Linnæus, as we preſume from [illegible], *brotherhood*, alluding to the ſituation of the numerous male and female flowers, ſeveral of each together in each whorl. Linn. Mant. 18. Schreb. 659 Willd. Sp. Pl. v. 4. 591. Mart. Mill. Dict. v. 2. Juſſ. 406. (Thoa; Aubl. Guian. v. 2. 874. Schreb. 650 Juſſ. 406. Lamarck Illuſtr. t. 784.) Claſs and order, *Monœcia Monadelphia*. Nat. Ord. *Urticis affine*, Juſſ. or rather, as he himſelf hints, to be referred to a new order, which he propoſes to term *Piperes*.

Gen. Ch. *Cal.* Catkin compoſed of ſeveral remote, callous, thickened whorls, each ſubtended by a ſmall *partial calyx*, which is peltate, orbicular, flat, entire, containing ſeveral ſeſſile florets, the male ones inferior, the females ſuperior, in the ſame whorl. Perianth of the male a minute, ovate, coloured ſcale. *Cor.* none. *Stam.* Filament one, thread-ſhaped, longer than the ſcale; anthers in pairs, connected.

Perianth of the female a rude, lacerated ſcale. *Cor.* none. *Piſt.* Germen ovate, ſuperior, immerſed in the receptacle of its own whorl, the length of the ſtamens; ſtyle conical, ſhort; ſtigma three-cleft, acute. *Peric.* Drupa ovate, of one cell. *Seed.* Nut ſolitary, oblong, ſtriated, of one cell.

Eſſ. Ch. Male, Calyx an undivided ſcale of a whorled catkin. Corolla none. Filament one, with a pair of anthers. Female, Calyx a torn ſcale of the ſame whorl. Corolla none Stigma three-cleft. Drupa with one ſeed.

Obſ. Linnæus obſerves that Rumphius makes his plant diœcious, but he found it monœcious, and even ſaw one catkin entirely male, ſtanding on its own footſtalk, near a female floret. The *Thoa* of Aublet, though ſomewhat differently deſcribed, is undoubtedly the ſame genus, and indeed ſo like the original *Gnetum* in foliage, that it is not very eaſy to diſtinguiſh them.

1. G. *Gnemon*.

1. G. *Gnemon.* Linn. Mant. 125. (Gnemon domeſtica; Rumph. Amboin. v. 1. 181. t. 71, 72. Beretinus fructus; Cluſ. Exot. 55.)—Lateral veins of the leaves prominent, inter-branching archwiſe half way towards the margin. Catkins oppoſite, axillary, on ſimple ſtalks.—Native of the Molucca iſlands, and other parts of the Eaſt Indies. We have it from Java. A *tree*, with ſtraight, round, ſlender, ſmooth *branches*, ſwelling at each joint, under the inſertion of the leaves, and ſomewhat forked at the ends. *Leaves* oppoſite, ſtalked, ovate, inclining to lanceolate, pointed, entire, ſmooth and ſhining, three or four inches long, furniſhed with a midrib, channelled above, prominent beneath, ſending off ſeveral alternate, ſpreading, prominent though ſlender veins, which meet rather more than half way towards the margin in one common arching vein, whence numerous reticulations originate. *Stipulas* none. *Footſtalks* half an inch long, channelled and keeled. *Catkins* axillary, ſhorter than the leaves, two together from each oppoſite leaf, on ſimple ſtalks, their whorls when young crowded, but ſoon becoming diſtant and bead-like, every whorl bearing numerous female as well as male flowers. What Linnæus deſcribes as a torn ſcale in the former, ſeems rather a very denſe aſſemblage of ſhort tufted fibres. *Fruit* the ſize of an ordinary acorn or filberd, its coat thin, ſweetiſh according to Rumphius, but with too much acrimony to be eaten raw; as is alſo the caſe with the leaves, which, when dreſſed, are in almoſt daily uſe among the natives of Amboyna, though thought mawkiſh and inſipid by Europeans.

2. G. *Thoa.* (Thoa urens; Aubl. Guian. v. 2. 874. t. 336.)—Lateral veins of the leaves obſolete, inter-branching archwiſe. Catkins on ſimple ſtalks, from the repeated forks of the branches.—Gathered by Aublet in the woods of Guiana, where the natives call it *Thoa.* His own ſpecimen in our poſſeſſion has no fructification nor infloreſcence, ſo that we have been obliged to take part of our character from his figure. The *leaves* ſeem in general to be rather ſhorter and broader than in the former, but the chief diſtinction is obſervable in their lateral veins, which though they do in a ſimilar manner run into one common arching vein, above half way towards the margin, are all together far more ſlight and leſs prominent than in the firſt ſpecies. The *fruit* is like the former, reddiſh, and elliptical. Aublet ſays that when its outer ſkin is taken off, a dry ſubſtance is found underneath, compoſed of ſtiff depreſſed hairs, which eaſily ſeparate from each other, and if any of them fall upon the human ſkin, they cauſe a great itching. The kernel of the nut, boiled or toaſted, is good to eat. Birds of the fowl or pheaſant tribe feed in the woods upon this fruit, which they ſwallow whole. The ſame author aſſures us that a clear gum iſſues from the bark and branches, but that when the main trunk or great branches are cut, a clear taſteleſs watery liquor runs out, which may be drank by thoſe who are diſtreſſed for water. This tree is almoſt always in flower and fruit. Aublet deſcribes the catkins as male, with two female flowers at their baſe. This is ſo different from our ſpecimens of *G. Gnemon*, that it might almoſt afford a ſpecific character, but Rumphius deſcribes the ſame circumſtance in what he terms his male *Gnemon*, and Linnæus adverts to ſomething like it. It ſhould ſeem therefore that in the firſt, if not in every ſpecies, the genus is imperfectly diœcious, one tree bearing catkins with female flowers, with perhaps leſs perfect males, in every whorl, while on another are found more efficient males in every whorl, with females at the baſe only, as in Aublet's *Thoa.* Such examples throw great light on the phyſiology of vegetable generation, and confirm the Linnæan theory.

3. G. *funiculare.* Buchanan MSS. (Gnemon funicularis; Rumph. Amboin. v. 5. 12. t. 8. Ula; Rheed. Hort. Mal. v. 7. 41. t. 22.)—Lateral veins of the leaves ſeparate to the margin. Catkins oppoſite, axillary, on branched ſtalks.—Native of Amboyna and other places in the Eaſt Indies. This is a long trailing branched ſmooth *ſhrub*, turning black in drying, which the two former do not. The *leaves* are four or five inches long, various in breadth, pointed, firm, ſhining, diſtinguiſhed by their veins continuing diſtinct to the edge of the leaf. The *flower-ſtalks* are axillary, in pairs, more or leſs branched and forked; each catkin being about an inch long, compoſed of numerous orbicular imbricated ſcales concealing the flowers, and not unaptly compared in the Hortus Malabaricus to Long Pepper. Each ſtands on a partial ſtalk, of about its own length. The *fruit* reſembles that of the foregoing, and is roaſted over the fire, which renders the kernel eatable. The tender leaves ſerve for a pot-herb, like thoſe of *G. Gnemon.* The bark of the young twigs, ſplit into thread, ſerves to make nets.

Rumphius's vol. 5. t. 7, which he calls *Funis Gnemoniformis*, but of which he ſeems not to have known the flowers, may poſſibly be the male plant of our laſt-deſcribed ſpecies, bearing only one or two female flowers at the bottom of the ſtalks of the male catkins, according to the analogy obſerved in the foregoing ones. S.

GNIAFDA, in *Geography*, a town of Hungary; 7 miles W.S.W. of Palotza.

GNIDIA, in *Botany*, from *Gnidus*, where Venus had her temple. A ſeed, reported to be brought from thence, had been called *Coccognidium*, and there is a γνίδιον, or Κνίδιον, ſuppoſed to be a kind of Orache; but Linnæus probably had not theſe ſo much in view as the affinity of this genus to *Paſſerina*, named after a favourite bird of the goddeſs, in alluſion to which indeed it was firſt named *Struthia* by Van Royen. It is moreover akin to *Daphne*, one ſpecies of which, *Daphne Gnidium*, has been taken for the ancient γνίδιον.—Linn. Gen. 193. Schreb. 260. Willd. Sp. Pl. v. 2. 424. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 2. 27. Juſſ. 77. Lamarck Illuſtr. t. 291.—Claſs and order, *Octandria Monogynia.* Nat. Ord. *Vepreculæ*, Linn. *Thymelææ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, funnel-ſhaped, coloured; its tube thread-ſhaped, very long; limb flat, in four deep ſegments. *Cor.* Petals four, ſeſſile, flat, inſerted into the edge of the tube of the calyx, and ſhorter than its limb. *Stam.* Filaments eight, briſtle-ſhaped, erect, inſerted into the tube in two rows, the uppermoſt reaching nearly to the top; anthers roundiſh, erect, ſimple, of two cells. *Piſt.* Germen ovate, ſuperior; ſtyle thread-ſhaped, as long as the tube, inſerted laterally into the germen; ſtigma capitate, hiſpid. *Peric.* a dry berry, with a thin coat. *Seed* ſolitary, ovate, obliquely pointed.

Eſſ. Ch. Calyx funnel-ſhaped, four-cleft, withering, including the ſtamens. Petals four, inſerted into the calyx. Style lateral. Seed coated.

Obſ. It differs from *Paſſerina* only in having petals; which are often rather of a glandular appearance. The habit is altogether that of *Daphne* and *Paſſerina.* Willdenow enumerates ſixteen ſpecies, but of theſe G. *pinifolia* and *radiata* are one and the ſame, and G. *daphnæfolia*, Linn. Suppl. 225, ſeems rather to belong to *Dais.*

All the genuine ſpecies are natives of the Cape of Good Hope, of a humble ſhrubby growth, with white or yellowiſh ſweet-ſcented flowers.

GNIEWE, or MEVE, in *Geography*, a town of Pruſſia, in the province of Pomerelia, on the Viſtula; 30 miles S.S.E. of Dantzic.

GNOIEN, a town of the duchy of Mecklenburg; 21 miles E.S.E. of Roſtock. N. lat. 53° 59′. E. long. 12° 52′.

GNOLL Rail-Way. This is an eſtabliſhment in Glamorganſhire, in South Wales, which we had not heard of at the time of compiling our article Canal; it is called an iron *waggon-way*, the flanch being on the wheels of the waggons, inſtead of being on the tram-plates, as is more common in that diſtrict. It commences at the ſhipping-place 200 yards below Neath bridge, on the Neath river; croſſes the Neath canal on a wooden bridge, and proceeds about E. half a mile to the late ſir Herbert Mackworth's Gnoll collieries, of run coals, which are drawn up forty fathom, to be loaded into the waggons on this waggon-way, which has ſo regular a deſcent, as to require no inclined planes, or other conſiderable works.

GNOMES, Gnomi, a name which the Cabbaliſts give to certain inviſible people, whom they ſuppoſe to inhabit the inner parts of the earth, and to fill it to the centre.

They are repreſented as very ſmall of ſtature, tractable, and friendly to men; and are made the guardians of mines, quarries, hidden treaſures, &c. Vigenere calls them Gnomons: the females of this ſpecies are called Gnomides.

Vigneul de Marville, in his Melange de Hiſtoire et de Literature, tome i. p. 100, gives a relation of a conference with a philoſopher of this claſs, who held, that an infinity of ſpirits inhabited each of the four elements, fire, air, water, and earth, under the denomination of *Salamanders*, *Sylphs*, *Oudins*, and *Gnomes;* that the Gnomes are employed in working or actuating the machines of brutes upon earth.

He added, that ſome philoſophers of that ſect held that theſe ſpirits were of two ſexes, for the two ſexes of beaſts or moving machines; that they were more or leſs perfect as the brutes were; and that there was an infinite number of exceedingly ſmall ones, to actuate the infinite number of inſects and animalcula, both thoſe that are viſible, and thoſe which are too ſmall to come under our ſenſes; that all theſe ſpirits, in general, govern their reſpective machines according to the diſpoſition of the parts or organs, the humours, temperaments, &c that they do not lay hold of all machines indifferently, but of thoſe ſuited to their own character, element, &c. that a haughty one, for inſtance, ſeizes a Spaniſh gennet; a cruel one a tyger, &c.

Gnome, Γνωμη, or *chria*, is alſo uſed for a ſhort, pithy, and ſententious obſervation, reflection, or the like, which is worthy to be treaſured up and remembered.

Such is that of Juvenal, "Orandum eſt, ut ſit mens ſana in corpore ſano." The writers of rhetoric diſtinguiſh ſeveral kinds of gnomes, according as they turn on words, on actions, or both; denominating them *verbal*, *active*, and *mixed gnomes* or *chriæ*. See Apophthegm.

GNOMON, in *Dialling*, is the ſtyle, pin, or cock of a dial, the ſhadow whereof pointeth out the hours.

The word is Greek, γνωμων, which literally imports ſomewhat that makes a thing known; becauſe the ſtyle or pin indicates or makes the hour, &c. known.

The gnomon of every dial is ſuppoſed to repreſent the axis of the world; and therefore the two ends or extremities thereof muſt directly anſwer to the north and ſouth poles. See Dial and Dialling.

Gnomon, in *Geometry*. If a parallelogram be divided into four leſſer ones, by two lines interſecting each other, and one of theſe parallelograms be retrenched or taken away, the other three will make a gnomon, ordinarily called a *ſquare*.

Or, a gnomon, in a parallelogram, may be ſaid to be a figure formed of the two complements, together with either of the parallelograms about the diameter. Thus, in the parallelogram A C, *Plate* VIII. *Geometry*, *fig*. 96, the gnomon is $M + x + z + N$; or $M + N + X + Z$.

Gnomon, in *Aſtronomy*, the name given to any upright pillar, when uſed for the purpoſe of determining the altitude of a celeſtial object, but particularly the ſun.

The extreme ſimplicity of this inſtrument renders it very probable, that it was the firſt ever uſed for aſtronomical purpoſes. It fortunately happened for the ſcience, that it was capable likewiſe of being a very exact one; and all the knowledge the ancients had of the ſolar theory ſeems to have been derived from this inſtrument. The principle of it is ſo ſimple, as hardly to require explanation. If the height of a vertical pillar be compared with its ſhadow on a horizontal plane, the altitude of the ſun may be deduced by trigonometrical calculation, ſince theſe two quantities are to each other, as the tangent to the radius, or as the ſine to the coſine of the altitude required. The ancient obeliſks found in Egypt and the Eaſt were probably inſtruments of this kind: it would be too much to conclude that every one was erected for aſtronomical purpoſes, but this was probably their original deſtination; and the figure of an obeliſk being rather pleaſing to the imagination, it was adopted as an ornament to public ſquares and buildings. As practical aſtronomy advanced to accuracy and perfection, however, the gnomon appeared to be ſubject to conſiderable defects. The ſhadow is found to be generally ill defined, ſo that its length cannot be very accurately meaſured; and to obviate this, the gnomon muſt be of greater height than is eaſily practicable. In modern Europe, therefore, the original gnomon has been almoſt entirely abandoned, and a new one ſubſtituted upon principles nearly ſimilar, but of a ſomewhat different conſtruction.

The gnomons of modern Italy are uſually conſtructed in very large edifices; a ſmall aperture is made in the upper part of the building, which permits a luminous circular image of the ſun to be formed on the pavement, on which a meridian line is accurately traced: a plumb line is ſuſpended from the aperture to the floor, and thus both the height of the aperture, and the diſtance of the ſolar image from the point immediately beneath it, is very accurately aſcertained.

There are upon record ſome very ancient obſervations made with inſtruments of this kind, particularly of Pythias, who obſerved the ſolſtices at Marſeilles above three centuries before the Chriſtian era. Pliny mentions an obeliſk erected by Auguſtus: this obeliſk was brought from Egypt, and was ſaid to have been made by Seſoſtris, near a thouſand years before Chriſt. It was uſed by Manlius for the ſame purpoſe for which it was originally deſtined, namely, to meaſure the height of the ſun.

The Chineſe have from the earlieſt time been in the conſtant practice of making uſe of a gnomon.

In the year 1278, a gnomon 40 feet high was erected at Pekin, by the Chineſe emperor Co-cheou King.

Ulugh Beigh, in the year 1437, obſerved the ſolſtices at Samarcand by the ſhadow of a gnomon 165 feet high: and ſimilar inſtruments are even ſaid to have been uſed by the ancient inhabitants of Peru.

The gnomons to which modern aſtronomy is the moſt indebted, are chiefly thoſe of France and Italy.

Paul Toſcanelli conſtructed a gnomon in the cathedral of Florence, whoſe height was 280 feet. Ximenes repaired this, and publiſhed an account of it in 1757.

Gaſſendi conſtructed a gnomon of 50 feet in the "College de l'Oratoire" at Marſeilles, and obſerved the ſolſtices with it in 1636.

Ignatius Dante, in 1575, a Dominican friar, and afterwards biſhop of Alatri, firſt conſtructed the celebrated gnomon in the church of St. Petronius, at Bologna: it was originally only about 70 feet high, but was raiſed by Caſſini, in 1653, to the height of 90 feet, and it was with this that his valuable ſolar obſervations were made.

Moſt of theſe gnomons are accompanied by a meridian line, often highly ornamented with the names of the months and ſigns of the zodiac, ſo as to ſerve the purpoſe of a calendar. One of the fineſt in Italy is in the Carthuſian convent at Rome, built on the ancient Thermæ of Diocletian. There are two, one to the north 62 feet, another on the ſouth 75 feet high: they were conſtructed by Bianchini in 1701.

Picard erected a gnomon in the royal obſervatory at Paris, which ſtill exiſts.

The meridian line in St. Sulpice, at Paris, was begun in 1727 by Sully, a watchmaker, and has ſince been much improved and highly ornamented: its height is 80 French feet.

M. de Ceſaris and Reggio in 1786, conſtructed a gnomon and meridian line in the cathedral at Milan: its height is 73 feet.

The reaſon why none of theſe gnomons are to be found in England, is that we do not regulate our clocks by ſolar, but by mean time: to this may be added our unfavourable climate, which would very much diminiſh the intereſt which they obtain in other countries, where they are made to ſerve the uſeful purpoſes of civil life.

Notwithſtanding the great attention that has been paid to the conſtruction of theſe gnomons, their uſe has been entirely ſuperſeded by modern inſtruments of ſmall dimenſions, ſo that to the aſtronomer they are now become merely objects of curioſity: yet to no inſtrument has aſtronomy greater obligation. The ſolar theory was firſt brought to a very improved ſtate by the uſe of this ſimple inſtrument alone. The length of the year, and the obliquity of the ecliptic, were determined by it with very great exactneſs. The ancient method of deducing the ſolar theory was nearly as follows.

To determine the obliquity of the ecliptic, the length of the ſhadows were obſerved at the period of the ſolſtices, and the extreme points to which the longeſt and ſhorteſt ſhadows extended at the moment of noon were carefully obſerved, and the altitudes of the ſun deduced at each of theſe periods: half the difference of the greateſt and leaſt altitudes would be the obliquity of the ecliptic, ſubject to a ſmall error ariſing from refraction, the effects of which were not known at that early period, nor were they very conſiderable in thoſe ſouthern portions of the globe in which aſtronomy had its origin. But though it was not difficult to deduce the length of the ſolſtitial ſhadows, it was by no means eaſy to determine the day on which either of the ſolſtices actually happened, becauſe the length of the ſhadow would appear to be the ſame at thoſe ſeaſons for ſeveral ſucceſſive days. It appears, by ſome very ancient Chineſe obſervations ſtill on record, that this inconvenience was remedied by obſerving the length of the ſhadow, ten or twenty days before the ſolſtice; then waiting till they found the meridian ſhadow again of the ſame length, they concluded that the moment of the ſolſtice happened on the intermediate day between theſe correſponding obſervations.

The length of the year was determined from obſervations of the equinoxes, which could be much more exactly obſerved; for the obliquity of the ecliptic being determined by the method above deſcribed, the length of the equinoctial was known, and the day on which the ſhadow correſponded to the computed ſhadow was evidently the day of the equinox.

It was by examining a ſucceſſion of theſe ſimple obſervations, that Hipparchus firſt diſcovered the great inequality, in the length of the four ſeaſons, ariſing from what is now called the equation of the orbit: and from the diſcovery of this important fact, we may date the origin of phyſical aſtronomy.

GNOMONIC COLUMN. See COLUMN.

GNOMONIC, *Polyhedron.* See POLYHEDRON.

GNOMONIC, or *Gnomonical projection*, that which repreſents the circles of a hemiſphere, upon a plain touching it in the vertex, by lines or rays from the centre of the hemiſphere to all the points of the circles to be projected.

In this projection, all the great circles of the ſphere are projected into right lines. Any leſſer circle parallel to the plane of projection is projected into a circle. And any leſſer circle not parallel to the plane of projection, is projected into a conic ſection.

The gnomonic projection is alſo called the "horologiographic projection," becauſe it is the foundation of dialling. In other reſpects it is not much uſed, becauſe the circles of the ſphere are projected into conic ſections, which are difficult to be deſcribed. However, this projection has its conveniences in the ſolution of ſome problems of the ſphere, on account of the great circles being all projected into right lines.

Mr. Emerſon, known by an ingenious Treatiſe upon Fluxions, and a variety of other publications, has given the theory and practice of the gnomonic projection, in his Treatiſe on the Projection of the Sphere, Lond. 1749, 8vo. See PROJECTION.

GNOMONICA, Γνωμονικη, or *Gnomonics*, the art of dialing, or of drawing ſun and moon-dials, &c. on any given plane.

It is thus called, as it ſhews how to find the hour of the day, &c. by the ſhadow of a gnomon or ſtyle.

GNOSIMACHI, in *Eccleſiaſtical Hiſtory*, an ancient ſect in religion, whoſe diſtinguiſhing character was, that they were profeſſed enemies of all ſtudied knowledge in divinity.

The word is *γνωσιμαχος*, *q. d.* an enemy of wiſdom or knowledge.

Damaſcenus ſays, that they were perfectly averſe from all the gnoſes of Chriſtianity, *i. e.* all the ſcience or technical knowledge thereof. They held it an uſeleſs labour to ſeek for gnoſes in the holy ſcriptures; and ſaid, that God requires nothing of men but good works; that it were, therefore, much better to walk with more ſimplicity, and not to be ſo ſolicitous about the dogmata of the gnoſtic life.

GNOSSUS, in *Ancient Geography*, a town of the iſland of Crete, more anciently called "Cœratus," from the name of the river which watered it. It was the fixed reſidence of Minos, once the capital of the iſland, and, according to Strabo, a wealthy and populous place, being 30 furlongs in compaſs, and full of inhabitants. This writer places it 20 furlongs from the Ægean or Archipelago, and 90 from the African ſea. Its port, called Heracleum, was at a conſiderable diſtance, according to Olivier about four or five leagues to the eaſtward. Pauſanias (Attic.) ſays, that it had a labyrinth. From this town Ariadne, ſo much celebrated by the poets, derived the name of Gnoſſis. When the iſland was reduced by the Romans, Gnoſſus was humbled, and Gortyna, her rival, raiſed upon her ruins. Sonnini ſays, that a ſmall village, Cnoſſou, near Candia, would recal to mind the ſcite of the ancient town, were it not diſcoverable, in a manner no leſs certain than afflicting, from the rubbiſh which covers it, and a great part of which has ſerved for the buildings of modern *Candia*, which ſee. See alſo Crete.

GNOSTICS, in *Eccleſiaſtical Hiſtory*, ancient heretics, famous from the firſt riſe of Chriſtianity, principally in the Eaſt.

It appears from ſeveral paſſages of the ſacred writings, particularly 1 John ii. 18. 1 Tim. vi. 20. and Col. ii. 8. that many perſons were infected with the Gnoſtic hereſy in the firſt century; though the ſect did not render itſelf conſpicuous, either for number or reputation, before the time of Adrian, when ſome writers erroneouſly date its riſe.

The word is formed of the Latin *gnoſticus*, and that of the Greek γνωϛικος, *knowing*, of γινωσκω, *I know*.

The name Gnoſtic was adopted by thoſe of this ſect, as if they were the only perſons who had the true knowledge of Chriſtianity. Accordingly they looked on all the Chriſtians as ſimple, ignorant, and barbarous perſons, who explained and interpreted the ſacred writings, in a too low, literal, and unedifying ſignification.

At firſt, the Gnoſtics were only the philoſophers and wits of thoſe times, who formed for themſelves a peculiar ſyſtem of theology, agreeable to the philoſophy of Pythagoras and Plato; to which they accommodated all their interpretations of ſcripture. Theſe enthuſiaſtic and ſelf-ſufficient philoſophers boaſted of their being able to reſtore mankind to the knowledge (*gnoſis*) of the true and Supreme Being which had been loſt in the world. They alſo foretold the approaching defeat of the *evil principle*, to whom they attributed the creation of this globe, and declared, in the moſt pompous terms, the deſtruction of his aſſociates, and the ruin of his empire. But

Gnostics afterwards became a generical name, comprehending divers ſects and parties of heretics, who roſe in the firſt centuries, and who, though they differed among themſelves as to circumſtances, yet all agreed in ſome common principles. They were ſuch as corrupted the doctrine of the goſpel by a profane mixture of the tenets of the oriental philoſophy, concerning the origin of evil and the creation of the world, with its divine truths.

It was one of the chief tenets of the philoſophy of the Chriſtian Gnoſtics, that rational ſouls were impriſoned in corrupt matter, contrary to the will of the Supreme Deity. In conformity to the opinion of the oriental ſages, who expected an extraordinary meſſenger from the Moſt High, endowed with wiſdom and inveſted with authority to communicate to miſerable mortals juſt notions of the Supreme Being, and to deliver them from the chains of the tyrants and uſurpers of this world, they believed, when Chriſt appeared and wrought miracles of the moſt aſtoniſhing and ſalutary kind, that he was the expected and wiſhed-for meſſenger. Accordingly they imagined that he would reſcue men from the power of the malignant genii, or ſpirits, to which, agreeably to their doctrine, the world was ſubjected, and ſo free their ſouls from the dominion of corrupt matter. Having admitted this ſuppoſition, they interpreted, or rather corrupted, all the precepts and doctrines of Chriſt and his apoſtles, in ſuch a manner as to reconcile them with their own erroneous tenets.

Such were the Valentinians, Simonians, Carpocratians, Nicolaitans, &c.

Gnostics, a denomination ſometimes alſo more particularly attributed to the ſucceſſors of the firſt Nicolaitans and Carpocratians, in the ſecond century, upon their laying aſide the names of the firſt authors. Such as would be thoroughly acquainted with all their doctrines, reveries, and viſions, may conſult St. Irenæus, Tertullian, Clemens Alexandrinus, Origen, and St. Epiphanius; particularly the firſt of theſe writers, who relates their ſentiments at large, and confutes them at the ſame time: indeed, he dwells more expreſsly on the Valentinians than any other ſort of Gnoſtics; but he ſhews the general principles whereon all their miſtaken opinions were founded, and the method they followed in explaining ſcripture. He accuſes them with introducing into religion certain vain and ridiculous genealogies, *i. e.* a kind of divine proceſſions or emanations, which had no other foundation but in their own wild imagination.

In effect, the Gnoſtics confeſſed, that theſe æons or emanations were no where expreſsly delivered in the ſacred writings; but inſiſted, at the ſame time, that Jeſus Chriſt had intimated them in parables to ſuch as could underſtand him. They built their theology not only on the goſpels and the epiſtles of St. Paul, but alſo on the law of Moſes and the prophets.

Theſe laſt laws were peculiarly ſerviceable to them, on account of the allegories and alluſions with which they abound; which are capable of different interpretations.

However, their doctrine, concerning the creation of the world by one or more inferior beings of an evil or imperfect nature, led them to deny the divine authority of the books of the Old Teſtament, which contradicted this idle fiction, and filled them with an abhorrence of Moſes and the religion he taught; alleging, that he was actuated by the malignant author of this world, who conſulted his own glory and authority, and not the real advantage of men. Their perſuaſion that evil reſided in matter, as its centre and ſource, made them treat the body with contempt, diſcourage marriage, and reject the doctrine of the reſurrection of the body and its re-union with the immortal ſpirit. Their notion, that malevolent genii preſided in nature, and occaſioned diſeaſes and calamities, wars and deſolations, induced them to apply themſelves to the ſtudy of magic, in order to weaken the powers or ſuſpend the influence of theſe malignant agents.

The Gnoſtics conſidered Jeſus Chriſt as the Son of God, and, conſequently, inferior to the Father, who came into the world for the reſcue and happineſs of miſerable mortals, oppreſſed by matter and evil beings: but they rejected our Lord's humanity, on the principle that every thing corporeal is eſſentially and intrinſically evil; and, therefore, the greateſt part of them denied the reality of his ſufferings. They ſet a great value on the beginning of the goſpel of St. John, where they fancied they ſaw a great deal of their æons or emanations under the *Word*, the *Life*, the *Light*, &c. They divided all nature into three kinds of beings, *viz. hylic*, or material; *pſychic*, or animal; and *pneumatic*, or ſpiritual.

On the like principle they alſo diſtinguiſhed three ſorts of men; *material*, *animal*, and *ſpiritual*. The firſt, who were material, and incapable of knowledge, inevitably periſhed, both ſoul and body; the third, ſuch as the Gnoſtics themſelves pretended to be, were all certainly ſaved; the pſychic, or animal, who were the middle between the other two, were capable either of being ſaved or damned, according to their good or evil actions.

With regard to their moral doctrines and conduct, they were much divided. The greateſt part of this ſect adopted very auſtere rules of life, recommended rigorous abſtinence, and preſcribed ſevere bodily mortifications, with a view of purifying and exalting the mind. However, ſome maintained, that there was no moral difference in human actions; and thus, confounding right with wrong, they gave a looſe rein to all the paſſions, and aſſerted the innocence of following blindly all their motions, and of living by their tumultuous dictates. They ſupported their opinions and practice by various authorities: ſome referred to fictitious and apocryphal writings of Adam, Abraham, Zoroaſter, Chriſt, and his apoſtles; others boaſted that they had deduced their ſentiments from ſecret doctrines of Chriſt, concealed from the vulgar; others affirmed, that they arrived at ſuperior degrees of wiſdom by an innate vigour of mind; and others aſſerted, that they were inſtructed in theſe myſterious parts of theological ſcience by Theudas, a diſciple of St. Paul, and by Matthias, one of the friends of our Lord. The tenets of the ancient Gnoſtics were revived in Spain, in the fourth century, by a ſect called the *Priſcillianiſts.* (See Moſheim's Eccl. Hiſt. vol. i.)

The appellation Gnoſtic ſometimes alſo occurs in a good ſenſe, in the ancient eccleſiaſtical writers, and particularly in Clemens Alexandrinus, who, in the perſon of his Gnoſtic, deſcribes the characters and qualities of a perfect Chriſtian. This point he labours in the ſeventh book of his Stromata, where he ſhews, that none but the Gnoſtic, or learned perſon, has any true religion. He affirms, that were it poſſible for a knowledge of God to be ſeparated from eternal ſalvation, the Gnoſtic would make no ſcruple to chooſe the knowledge; and that if God would promiſe him impunity in doing of any thing he has once ſpoken againſt, or offer him heaven on thoſe terms, he would never alter a whit of his meaſures.

In this ſenſe the father uſes Gnoſtics, in oppoſition to the heretics of the ſame name; affirming, that the true Gnoſtic is grown old in the ſtudy of the holy ſcripture; and that he preſerves the orthodox doctrine of the apoſtles, and of the church; whereas the falſe Gnoſtic abandons all the apoſtolical traditions, as imagining himſelf wiſer than the apoſtles.

At length the name Gnoſtic, which originally was the moſt glorious, became infamous, by the idle opinions and diſſolute lives of the perſons who bore it; much as, in the preſent age, it has fared with the name *quietiſt*, *pietiſt*, &c.

GNU, in *Zoology*, a ſpecies of Antelope, having horns thick, rough, and bent much forwards at the baſe, then ſuddenly turned backwards, a ferruginous body, a neck with a mane, and a tail whitiſh. This animal inhabits the country of the great Namaquas, to the north of the Cape of Good Hope. It feeds in large flocks in the plains: is exceedingly fierce, very ſwift, and fights with its horns; it frequently drops on its knees, runs quickly in that poſture, furrowing the ground with its horns and legs. It is a ſingular animal, having the body like a horſe, with a thick bull-like head, elegant taper legs like a deer, and the lachrymal furrows of the Antelope tribe. It is about 6½ feet long, and 3½ high at the ſhoulders; of a ruſty brown colour, having its hair tipt with white, but on the breaſt and fore-legs long and black; the head is large and clumſy, with a ſquare mouth and broad flaps over its noſtrils; on the chin and gullet is a long hanging beard, or bunch of white hairs; the neck is ſhort, thick, and ſomewhat arched, with an erect aſh-coloured mane; the tail is long, white, and flowing like that of a horſe; the feet have only one ſpurious hoof on each. The fleſh is reckoned very good.

GO is ſometimes uſed in *Law*, in a ſpecial ſignification. Thus, to *go without day*, and to *go to God*, denote as much as to be diſmiſſed the court, and to be acquitted.

GOA, in *Geography*, an iſland in the Eaſt Indian ſea, near the weſt coaſt of Hindooſtan, ſeparated from the continent by a river called "Mandova;" about eight leagues in circumference. The ſoil, eſpecially in the vallies, is fertile; the trees are always covered with leaves, flowers, and fruit; and ſprings in abundance iſſue from the mountains. The rainy ſeaſon continues here from June till September or October; and the land-floods bring down ſuch quantities of mud and ſand as ſtop up the haven and impede the navigation. In the months of April and May the weather is ſultry, but from October to March it is very moderate.

Goa, a city and capital of the Portugueſe ſettlements in India, the ſeat of a viceroy, and ſee of an archbiſhop, taken by the Portugueſe general Albuberque in 1510 from a prince of Saracen extraction. The port of Goa is naturally, and ſtill more by the improvements of the Portugueſe, one of the beſt in India; it is fortified with many caſtles and towers, and furniſhed with abundance of good cannon. Beyond theſe caſtles the channel becomes narrow, ſtraitening ſometimes to one, ſometimes to two miles, and its banks are planted with the beſt fruits and fineſt trees which India affords. Eight miles up the channel is the town of Goa. About the middle of this diſtance is a palace, now ſerving as a barrack for the garriſon; and here begins a ſtrong broad wall, two miles in length, which is a foot-walk when the country is overflowed, and in the vicinity of it a great quantity of ſalt is collected. This channel, which forms ſo excellent a port, runs many miles into the country, dividing it into ſeveral fruitful iſlands and peninſulas, which plentifully furniſh the city with neceſſaries. Adjoining to this port is the haven of Murmugon, formed by the other channel, that runs between the iſland of Goa and peninſula of Salſete, and affords a ſafe retreat to the Portugueſe and other ſhips, when they are ſhut out of the port by the ſands which are brought down by the river Mandova, in conſequence of the firſt rains of June, and till the paſſage is opened in October. This port of Murmugon is defended by a caſtle on the iſland of Salſete, and a good garriſon. At the ſouth entrance into the channel are the ruins of Old Goa; and from thence to the new city is a commodious road, elegantly adorned with trees for fruit and ſhade. The walls of the new city, which is decaying, include a ſpace of 12 miles in circuit; and the public ſtructures that remain ſufficiently evince its former grandeur as well as extent. The number of inhabitants is ſaid to be about 20,000; they conſiſt of native Portugueſe, Meſtizos, and Canarians, or natives, who are black as jet, with long black hair, and fine features; here are alſo many negro ſlaves, and Pagans of different nations. As to the character of the inhabitants, the men are ſaid to be, for the moſt part, proud, indolent, jealous, revengeful, and indigent; the women lazy, laſcivious, and as well ſkilled in poiſoning as any in the world;—215 miles S.S.E. from Bombay. The inquiſition, formerly exiſting in this place, is now aboliſhed. N. lat. 15° 28 20″. E. long. 73° 45′ 45″.

Goa, or *Goach*, a kingdom on the weſt and ſouth-weſt coaſt of the iſland of Celebes, which, after various conflicts and revolutions, is now dependent on the kingdom of Boni. The capital of the ſame name ſtands on a little iſland, on the banks of a river, whence the kingdom derives its denomination. It was built about the ſame period as Samboupo and Tello; and was taken by the Dutch in 1778. S. lat. 5 12′. E. long. 119° 51′.

GOACHO, a town of Peru, in the dioceſe of Lima, near the Pacific ocean; 65 miles N.N.W. of Lima. S. lat. 11 .

GOAD, in *Rural Economy*, a term applied to a pointed inſtrument, by which oxen are driven when employed in team-labour. It has frequently, likewiſe, a leather thong attached to the contrary end of it, ſo as to form a ſort of whip.

GOAFFI, in *Geography*, a town of Africa, in the kingdom of Mandinga, on the Senegal.

GOAHIROS, a nation of South America, ſituated between the juriſdiction of Maracaibo and the Rio, or river de la Hache: they occupy the coaſt for more than 30 leagues, and extend equally far into the interior part of the country. They have at all times been conſidered as the moſt ferocious of the maritime Indians. The Spaniards never even attempted to conquer them. Some miſſionaries have made efforts for inſtructing and proſelyting them to the Chriſtian faith, but without any permanent effect. Their number amounts to 30,000. They are governed by a cazique, for whom they have erected a citadel upon a ſmall eminence, called "La Teta," the Pap; at the diſtance of ſome leagues from the ſea. They breed horſes upon which they ride with incredible rapidity. Their troops are all mounted, each ſoldier carrying a carabine, cartridge-box, bow and quiver. They experience much friendſhip from the Engliſh of Jamaica. They aſſiſt them with advice, and ſupply them with arms. Theſe marauders have rarely any communication with Maracaibo, becauſe, as its juriſdiction is the principal ſcene of their robberies and atrocities, the inhabitants are obliged to be continually on their guard, ſo as to be always ready to repel the aggreſſions of ſuch troubleſome neighbours. The Spaniſh city to which they chiefly reſort is Rio-de-la-Hache, depending upon the vice-royalty of Santa Fé, where they barter their commodities. They ſet out in bands, moſt commonly preceded by their wives, who carry their children upon their backs, beſides other loads, too heavy even for beaſts of burden. Dreading impoſition, they have never adopted the uſe of ſpecie, but barter their horſes and oxen chiefly for ſpirituous liquors, to the uſe of which they are much addicted. Urged by their neceſſities they recur to arms, and threaten the neareſt city or village. After ſome hoſtilities, the Spaniards ſue for peace, and obtain it in conſideration of ſome pipes of brandy and other ſmaller articles. Although theſe Indians are well received in the Spaniſh cities, they will not admit any Spaniard into their country; and yet ſome Spaniſh ſmugglers contrive, for pecuniary conſiderations, to obtain a paſſport and eſcort for traverſing the country of the Goahiros, and they have thus acquired many partizans among the Spaniards themſelves; but their principal and moſt uſeful connection is formed with the Engliſh of Jamaica. By them they are ſupplied, not only with arms and ammunition, but with the ſtuffs that clothe them. Their dreſs is ornamented by a great variety of feathers, fragments of ſhining metals, and gold ridiculouſly fixed to their ears, noſe, and arms. The articles with which they furniſh the Engliſh in exchange for the merchandize they receive are pearls, which they fiſh in their own ports, and horſes, mules, and oxen. Their ferocity is ſuch, that even the Engliſh will ſeldom ſo far confide in them as to venture on ſhore, but the buſineſs of bartering is tranſacted on board, and the ſhips haſten to depart. The ſhips that are accidentally caſt upon the coaſt, immediately become the prey of theſe cannibals, who maſſacre the crew and devour their fleſh; dividing the cargo among thoſe who are preſent on the occaſion. The Goahiros are ſaid to be a formidable nation, well mounted, armed, and diſciplined; and able to bring into the field 40,000 effective men.

On the eaſtern part of the territory of the Goahiros are the "Cocinas" Indians, who live like ſavages, but are ſo cowardly and puſillanimous as to allow the Goahiros to exerciſe an authority, which the bold always acquire over the timid. Theſe ſavages are, in fact, merely the ſlaves of other ſavages. Depons's travels, vol. i.

GOAL. See GAOL.

GOAL-PARAH, in *Geography*, a town of Hindooſtan, in Bengal, ſituated on the Burhampooter, and on the borders of Aſſam; where the Europeans have factors, who carry on a conſiderable trade with Aſſam, Bootan, Thibet, &c.; 32 miles E. of Rangamatty.

GOAN, the name of a Perſian tree, of the aſhes of which they make a ſort of antiſpodon, or medicinal powder, for diſeaſes of the eyes.

GOANAGOODY, in *Geography*, a town of Hindooſtan, in Marawar; 8 miles E. of Tripalore.

GOANDA, a naked, ſavage and ferocious race, who inhabited the extenſive and unexplored wilderneſs, E. of Nagpour, in Hindooſtan, which is pervaded by the great river Bain, or Baun Gonga, and terminates in the mountains bounding the Engliſh circars.

GOAR, ST. a town of France, in the department of the Rhine and Moſelle, and chief place of a canton, in the diſtrict of Simmern, ſituated on the weſt ſide of the Rhine, in which there is, near this place, a water-fall; 16 miles S. of Coblentz. N. lat. 50° 8′. E. long. 7° 43′.

GOAR-*Vetch*, a name ſometimes applied to the ſummer vetch. See TARE and VETCH.

GOARING, on *Ship-board*. The ſeamen ſay a ſail is cut *goaring*, when it is cut ſloping by degrees, and is broader at the clew than at the ear-ring, as all top-ſails and top-gallant-ſails are.

GOAS, in *Geography*, a town of Bengal; 11 miles E. of Moorſhedabad.

GOAT, in *Zoology*. See CAPRA.

GOAT, in *Rural Economy*, is an animal, that in particular ſituations may be kept with advantage by the farmer, as where the country is rocky and barren, and there is but little keep for any other ſort of animal. The goat is capable of climbing the ſteepeſt rocks, and of browſing upon the briers, heath, and ſhrubs of ſeveral different kinds, which are rejected by other ſorts of animals. When turned into paſture grounds they ſhould conſequently be prevented from nipping the young ſhoots of trees and other woods, as they prefer them to the graſs.

They are beneficial in ſeveral different points of view, as in their milk, which they afford plentifully, and which is of a very excellent quality. In ſome caſes, this and cow's milk are mixed together, and a highly valuable cheeſe prepared from them.

The young kids are likewiſe very excellent food, and two or three are frequently brought forth at a time, often twice in the courſe of the year.

The hair of the goat is alſo very valuable for different purpoſes, as the making of ropes to be uſed in the water, which are extremely durable. A ſort of ſtuff is alſo formed from it in ſome places. It may be ſheared in the ſame manner as wool from the ſheep.

The ſuet of the goat is excellent, the animals being in ſome places, as in Caernarvonſhire, killed merely for the object of their ſuet; which is capable of being made into candles of a ſuperior quality to thoſe of the common kind.

Their horns conſtitute valuable handles for tucks and pen-knives. The ſkin of the young kid is well ſuited to the glove manufactory, from its taking on a dye better than any other ſort of ſkin. The old ſkin is highly uſeful alſo, being in many caſes preferred to that of the ſheep; beſides, the fleſh affords a cheap and abundant food for the winter months, eſpecially when the kids have been ſent early to market. The haunches of the goat are often ſalted and dried, and ſupply all the uſes of bacon; and are known by the Welch under the name *coch yr wden*, or hung veniſon.

In chooſing goats for keeping, the following directions ſhould be attended to. The male ſhould have a large body, with long hair, and ſtraight ſtiff legs, the neck ſhould be plain and ſhort, the head ſmall and ſlender, the horns large, the eyes prominent, and the beard long.

The female ought to have a large udder with well ſized teats, and with none or very ſmall horns.

Goats are beſt kept in flocks, in order that they may have the leſs diſpoſition to ſtraggle; and they ſhould have good ſhelter both for ſummer and winter, great heat and cold being equally injurious to them.

The period of coupling them is about December.

They are moſtly kept without litter in the winter ſeaſon, in clean paved yards or other places.

The kids may be prepared for the table in a manner ſimilar in ſome degree to that of the lamb.

They have been vulgarly ſuppoſed uſeful in ſtables from the diſagreeable odour that iſſues from the males at particular ſeaſons, but there are probably no real grounds for ſuch a concluſion.

GOAT-*fiſh*, *Capriſcus*, in *Ichthyography*, the name of a fiſh, called alſo by ſome *caper*. It is a ſpecies of BALLISTES. In the middle of its back it has three very ſtrong and large prickles, the firſt of which is three times as large as any of the others, and all are connected by a membrane.

The whole fiſh is covered with a ſcaly ſkin; but the ſcales have more the appearance of thoſe of a ſerpent than thoſe of the fiſh; for they are placed in cancellated lines interſecting one another, and are ſo well fixed, that they with difficulty come off; and wood or ivory may be poliſhed with the ſkin, as with the common fiſh-ſkin uſed by the turners, &c. It is of a blueiſh-green colour, ſpotted with a fine blue, and the back and belly fins are black, with ſome blue and red ſpots. Its whole figure is very broad and flat, as well as ſhort, ſo that it approaches to a round form. It ſeldom exceeds two pounds in weight. It is caught in the Mediterranean, but not commonly. The ſkin of it is frequently found in the cabinets of the curious.

GOAT *Iſlands*, in *Geography*, two ſmall iſlands near the S. coaſt of Jamaica, they are denominated *Great* and *Little*; the former is ſituated in N. lat. 17° 53'. E. long. 76° 51'; and the latter about a mile N. W. from it.

GOAT *Iſland*, the ſouthernmoſt of the Baſhee iſlands, in the Eaſt Indian ſea. N. lat. 20° 6'. E. long. 121°.—Alſo, a ſmall iſland among the Philippines, near the S. W. coaſt of Luçon. N. lat. 13° 52'. E. long. 120° 13'.—Alſo, a ſmall iſlot of America, in the ſtate of Rhode iſland, oppoſite to the town of Newport, and on which is Fort Waſhington.

GOAT's *Beard*, in *Botany*. See TRAGOPOGON.

GOAT's *Eye*, in *Surgery*. See EYE.

GOAT's *Horns, petrified*. In Dr. Grew's "Rarities of Greſham College," p. 257, a Tephrites bœtii, or goat's horn, in that collection, is deſcribed as broken at both ends, about ſix inches long, and 2½ inches acroſs at the broadeſt part, the belly an inch over and furrowed, the back ſomewhat edged, of an aſhen colour, inwardly blueiſh grey, outwardly mixed with oblique and white ſtreaks, bended, one end thicker than the other: it is added, that ſuch are found in Germany, Moravia, Sileſia and other parts, and efferveſce with nitric acid.

In the Analyſis of the Labours of the French national Inſtitute for 1809, it is mentioned that M. Cuvier in the alluvial ſoils near Etampes had diſcovered horns, ſome of which do not ſeem to differ eſſentially from the horns of the exiſting ſpecies of goats. The evidence in neither of the above caſes, or any other which we have ſeen, is ſufficiently ſtrong to prove the foſſil horns of this claſs to have really belonged to goats: and analogy would juſtify us rather, in referring them to the extinct race of animals, fiſh, and vegetables with which the ſtrata are ſo abundantly ſtored, in ſome parts of the ſeries.

GOAT's *Rue*. See GALEGA.

GOAT, *Scape*. See SCAPE-GOAT.

GOAT's *Sucker*. See CAPRIMULGUS.

GOAT's *Stones, greater*. See SATYRIUM.

GOAT's *Stones, leſſer*. See ORCHIS.

GOAT's *Thorn*. See ASTRAGALUS.

GOATFIELD, in *Geography*, a mountain of Scotland, in the iſland of Arran; the ſummit of which is 2840 feet above the level of the ſea.

GOAVE, GRAND, a town of the iſland of Hiſpaniola; 10 miles S.W. of Leogane.

GOAVE, *Petit*, a ſea-port town of the iſland of Hiſpaniola, with a harbour capable of receiving veſſels of the largeſt ſize ſafe from winds; in its environs are plantations of ſugar, coffee, indigo, and cotton. The town is the emporium to which the inhabitants of Grand Goave, and other places, ſend their commodities; 20 miles W.S.W. of Leogane. N. lat. 18° 26'. W. long. 73° 37'.

GOBAN, a town of Perſia, in the province of Chuſiſtan; 75 miles S. of Suſter.

GOBAN, or *Geban*, a ſmall iſland in the mouth of the Euphrates, or Shat el Arab, at the entrance into the gulf of Perſia, with a town upon it; 50 miles E.S.E. of Baſſora. N. lat. 30° 10'. E. long. 48° 25'.

GOBANNIUM, in *Ancient Geography*, a town of Britain, placed in Antonine's Itinerary between Burrium or Uſk, and Magnis or Kencheſter, 12 miles from the former and 22 from the latter, and ſuppoſed to be Abergavenny, which ſee.

GOBBI, in *Geography*, a country of Africa, between that of Camma, and cape Lopez Gonſalvo; the chief trade of which conſiſts in elephants and ivory. The chief town is about a day's journey diſtant from the Atlantic. N. lat. 1° 30'. See CAMMA.

GOBBINS, in *Mining*, is a name with the colliers of ſeveral diſtricts for the hole-ing ſtuff and other refuſe of their works; as alſo for the hollows or ſpaces behind them, into which they throw the refuſe coal, earth, and ſtones: which laſt are alſo called waſtes and old-hollows.

In the coal-pits about Wedneſbury in Staffordſhire, and at Doniſthorp, Danby-Hall, &c. in Derbyſhire, the gobbins take fire ſpontaneouſly after ſome time, unleſs the air is excluded from them, owing to duns, tow, tawe or catdirt, a thin ſtratum found near the coal, which heats, ſwells, and ſpontaneouſly inflames, by the contact of air and moiſture. At Doniſthorp they encaſe their gobbins in walls of tempered clay at certain diſtances, for excluding the air.

GOBBS, otherwiſe *Cobbles*, are pieces of coal from the ſize of walnuts to that of a man's fiſt or larger, which are occaſionally picked or raked out of the ſleck or refuſe ſmall coals at the collieries, either by poor perſons, who are allowed to do ſo, or for ſale. Theſe are what in London, and many places in the eaſt and ſouth of England, would be called round-coals and highly valued, on account of the abſence of very ſmall or duſt coals among them. Where the rage among the buyers and dealers is for *large coals*, as about Wedneſbury in Staffordſhire, and the Erewaſh vale in Derbyſhire and Nottinghamſhire, an inconceivable waſte is made of cobbles and ſleck; in working the thick coal about Wedneſbury a heap of ſuch, ſix or ſeven yards thick, is ſaid to be left and waſted on the floor of their works:

and to occaſion a further waſte of a rib or wall of ſolid coal, round each ſtall or chamber, for excluding the air, which would otherwiſe fire theſe waſte heaps. See Gobbins.

GOBELINS, a celebrated manufactory, eſtabliſhed at Paris, in the Fauxbourg St. Marcel, for the making of tapeſtry, and other furniture for the uſe of the crown. The houſe where this manufactory is carried on was built by two brothers, Giles and John Gobelins, both excellent dyers; and the firſt that brought to Paris, in the reign of Francis I. the ſecret of dyeing that beautiful ſcarlet colour ſtill known by their name; as well as the little river Bievre, on whoſe banks they fixed their dye-houſe; and which is now known by no other name than that of the river of the Gobelins.

It was in the year 1667 that this place, till then called "Gobelins' Folly," changed its name into that of "Hotel Royal des Gobelins," in conſequence of an edict of Louis XIV. Monſ. Colbert having re-eſtabliſhed, and with new magnificence enriched and completed the king's palaces, particularly the Louvre and Thuilleries, began to think of making furniture ſuitable to the grandeur of thoſe buildings: with this view he called together all the ableſt workmen in the divers arts and manufactures throughout the kingdom; particularly painters, tapeſtry-makers, ſculptors, goldſmiths, eboniſts, &c. and by ſplendid offers, penſions, privileges, &c. called others from foreign nations.

And to render the intended eſtabliſhment firm and laſting, he brought the king to purchaſe the Gobelins, for them to work in, and draw up a ſyſtem of laws, or policy, in ſeventeen articles.

By theſe it is provided, that the new manufactory ſhall be under the adminiſtration of the ſuperintendant of the king's buildings, arts, &c. that the ordinary maſters thereof ſhall take cognizance of all actions and proceſſes brought againſt any of the perſons in the ſaid manufactory, their ſervants and dependants; that no other tapeſtry work ſhall be imported from any other country, &c.

The Gobelins has ever ſince remained the firſt manufactory of this kind in the world. The quantity of the fineſt and nobleſt works that have been produced by it, and the number of the beſt workmen bred up therein, are incredible; and the preſent flouriſhing condition of the arts and manufactures of France is, in a great meaſure, owing thereto.

Tapeſtry work, in particular, is their glory. During the ſuperintendance of M. Colbert, and his ſucceſſor M. de Louvois, the making of tapeſtry is ſaid to have been practiſed to a degree of perfection, ſcarce inferior to what was before done by the Engliſh and French.

The battles of Alexander, the four ſeaſons, four elements, the king's palaces, and a ſeries of the principal actions of the life of Louis XIV. from the time of his marriage to the firſt conqueſt of Franche Comté, done from the deſigns of M. Le Brun, director of the manufactory of the Gobelins, are maſter-pieces in their kind.

GOBEMOUCH, the *fly-catcher lizard*, a ſpecies of American lizard that is always employed in catching of flies. It is the ſmalleſt of all the lizard kind, and is very beautiful, its ſkin often appearing as if covered with leaf-gold, or leaf-ſilver, and in ſome others of a green, or red and gold, wonderfully bright and beautiful. They are not at all ſhy or fearful of men, but as they do not hurt, ſo they ſeem to dread none; they enter chambers and cloſets, and do no ſort of damage, but deſtroy the flies and other troubleſome vermin they find there. Their whole lives ſeem ſpent in the chace of theſe inſects, and it is a very pleaſing thing to obſerve the various ways they have of catching them. They are very cleanly creatures, and may be ſuffered to run over the table at meal time; where, if they ſee a fly, they will purſue it over the very hands or cloaths of people, or over the diſhes, without doing the leaſt hurt.

Notwithſtanding their great beauty while alive, they are only of a duſky grey when dead, all their other colours immediately vaniſhing.

GOBE-MOUCHE, in *Ornithology*, a name given by Buffon to ſeveral ſpecies of *Lanius*, *Todus*, *Turdus*, *Muſcicapa*, and *Motacilla*, which ſee reſpectively.

GOBIN, St., in *Geography*, a town of France, in the department of the Aiſne; celebrated for its manufacture of plate-glaſs; 4 miles S. of la Fere. See Glass.

GOBIO, in *Ichthyology*, a ſpecies of *Cottus*; and alſo of *Cyprinus*; which ſee reſpectively.

GOBIUS, a genus of the thoracic order, poſſeſſing, according to Linnæus, the following eſſential character. Head ſmall, eyes approximated, with two punctures between; gill-membrane four-rayed; body ſmall, compreſſed on each ſide, covered with ſmall ſcales, and furniſhed with a ſmall tubercle behind the vent; the ventral fins united into an oval or funnel ſhape; and the dorſal fins two in number.

At the time Linnæus wrote his Syſtema Naturæ, the above character was probably found ſufficiently explicit to embrace, in a correct and lucid order, all the ſpecies of this natural tribe of fiſhes at that period known. This, however, it muſt be confeſſed, is not preciſely the caſe at preſent. The number of ſpecies has been materially augmented by the recent diſcoveries of naturaliſts, and among theſe are certain kinds which exhibit differences eſſentially diſſimilar from each other; though ſtill, in the idea of the Linnæan ſtudent, they can be only referable to the genus Gobius; while others, no leſs intimately allied, cannot, without a palpable innovation on the order of nature, be configued to that genus. The later French writers, as Latreille, Boſc and others, after the example of Lacépede, divide the Linnæan Gobii, and their natural affinities, into four diſtinct genera, namely, Gobius, Gobioides, Gobiomorus, and Gobiomoroides, an extenſion perhaps requiſite, or at leaſt admiſſible. This extenſion is indeed, in our own opinion, rather deſirable, and we refrain from adopting it only to avoid that degree of perplexity which might probably reſult from the diſperſion of the ſpecies into the ſeveral diſtinct articles, which would then become neceſſary. For this reaſon, we propoſe to concentrate the whole in one point of view, obſerving only to refer the ſpecies reſpectively to their different genera as we proceed, and by this means leave it to the judgment of the reader, whether thoſe recently eſtabliſhed genera ought to be in reality conſidered eſſentially diſtinct, or as only conſtituting the natural ſubdiviſions of the Linnæan genus Gobius.

The habits of theſe fiſhes in general appear to correſpond; they are chiefly inhabitants of waters contiguous to the ſhores, and lie concealed among the rocks, under ſtones, or in the ſand and mud of ſeas and rivers: they feed on worms, inſects, and the ſpawn and fry of fiſhes; and adhere firmly to the rocks or other hard ſubſtances by means of their ventral fins.

Species.

Genus *Gobius* —*Ventral fins united; dorſal fins two.*

† Section. *Pectoral fins attached cloſe to the body.*

Boddaerti. Rays of the anterior dorſal fin cirriform, the third very long. Pallas.

A native of the Indian ſeas, in common about ſix inches in length, and never exceeding eleven or twelve inches. The head thick, blunt, and ſomewhat convex, with ſpots of brown and white; crown convex, and gradually ſloping down; jaws of nearly equal length; lips thick and fleſhy; eyes vertical and oblong; gill-membrane livid. The body is rather convex, tapering ſlightly towards the tail, and covered with ſmall and ſoft ſcales; the colour blueiſh brown above, beneath pale yellow, inclining to whitiſh; the back marked with a longitudinal ſeries of ſeven brown ſpots, beneath which, on the ſides, are ſeven other ſpots of the ſame colour, but theſe latter are ſpeckled with white; the vent, which is ſituated rather nearer the head, is ſurrounded by a black circle, behind which is a conic peduncle. The dorſal fins are blueiſh black, the firſt including five rays, has the membrane ſpotted with white; the membrane of the ſecond is remarkable in having ſix white lines between each ray, theſe rays are ſetaceous, and amount to twenty-five in number; the pectoral fin is roundiſh, and includes twenty-one rays; ventral, thirty-four; anal, twenty-five; and the tail, which is blueiſh white, eighteen rays.

LAGOCEPHALUS. Upper jaw hemiſpherical; no tongue and lateral line. Pallas.

The native place of this ſpecies is uncertain; it was firſt deſcribed by Kolreuter, in the Tranſactions of the Royal Academy of Peterſburgh, and afterwards by Pallas in his "Spicilegia Zoologica." The head is ſhort, thick, and deſtitute of ſcales, the mouth tranſverſe; eyes diſtant, ſmall, and covered with a common ſkin; upper jaw very thick, the lower with a few larger teeth, which are a little hooked; the lips cleft in the middle, doubled, the upper fleſhy and very thick, and alſo reaching much beyond the jaw; palate with numerous crowded teeth of ſmall ſize on the margin. The body round, compreſſed towards the tail, of a grey or brown colour, and covered with minute ſcales; vent in the middle of the body. The firſt dorſal fin contains ſix rays of a ſimple form, the rays in the ſecond fin, like thoſe of the tail, are branched, and amount in number to eleven; the pectoral fin lanceolate oval, with fifteen rays; ventral, with eight ſhort crowded rays; anal, ten rays; and caudal, twelve. The total length of this fiſh about three or four inches.

CYPRINOIDES. Body covered with large ſub-ciliated ſcales; tail rounded; the membrane connecting the rays teſſellate with brown. Pallas.

About the ſize of a finger, the body of a compreſſed form, thickiſh, convex, grey brown above, beneath whitiſh; ſkin ſoft and cancellated with fine lines; teeth minute and nearly equal; tongue flat, ſoft, and obtuſe; eyes lateral and between them a blackiſh ſemi-lanceolate creſt; rays of the fins moſtly branched; lateral line obſolete. The ſpecies inhabits Amboina.

LANCEOLATUS. Tail very long and acutely pointed. Bloch. *Gobius oceanicus*, Pallas.

Inhabits the brooks and rivers of Martinico, where Plumier ſaw it in great abundance. The body is oblong, and covered with round imbricated ſcales, which are larger on the poſterior part. The head is long and truncated; the eyes vertical with black pupil, and golden iris; jaws equal; tongue looſe and acute; cheeks blueiſh edged with red; lateral line in the middle of the body, and the vent nearer the head; dorſal and anal fins with ſimple, ſoft, diſtant rays, connected by a thin membrane; rays of the firſt dorſal membrane extended far beyond the membrane; between the dorſal fins on each ſide a brown ſpot; pectoral fin yellow edged with blue; tail at the baſe greeniſh yellow, the edge violet. The fleſh excellent.

MINUTUS. Whitiſh, ſpotted with ferruginous: rays of the dorſal and caudal fins obſcurely ſtreaked with the latter. Donov. *Gobius minutus; albicans ferrugineo-maculatus, radiis dorſalibus, et caudalibus ferrugineo obſolete ſtriatis*, Pallas. *Minute or ſpotted goby*, Pennant.

"The minute or ſpotted goby is a pretty, delicate, little creature, whoſe uſual length very rarely exceeds two inches and a half, or at the utmoſt three inches. Pallas, who deſcribes this ſpecies, defines its character with much preciſion; he ſpeaks eſpecially of the obſolete ſtreaks acroſs the rays of the two dorſal fins and tail, which are ſufficiently diſtinct, except when the fins happen to be conſiderably expanded, at which time they indeed appear as ſo many ſeries of unconnected dots. Theſe ſtreaks or dots are uniformly conſtant in all the ſpecimens of the fiſh that have fallen under our obſervation, varying a trifle only in the tint or denſity of colour.

"Bloch does not include this ſpecies in either of his works on fiſhes. Pennant conſiders it as the Gobius aphya of Linnæus, in which particular later writers are miſtaken; it muſt however be confeſſed, that there ſtill remains ſome little doubt as to the preciſe difference between the aphya and minutus; Linnæus tells us the former has the body and fins barred with brown, and this will, in a certain degree, apply to the characters of minutus. That the ſpotted goby is the minutus of Pallas cannot admit of doubt.

"It has been imagined, on the authority of Mr. Pennant, that the ſpotted goby appeared on our coaſts only during the ſummer months, and was beſides extremely local. This idea is certainly unfounded, for we have received them from various parts of the ſea-coaſt in all ſeaſons of the year In the wide ſweep of ſands, called Traeth Levan, which extends along the ſouth-ſide of Beaumaris bay; upon the ſhores of the Severn; and alſo many other of our ſandy coaſts, this diminutive fiſh has attracted our remark ſwimming or lurking among the ſhrimps in the ſhallow pools left by the ſea at ebb-tide. The ſame ſpecies is likewiſe not unfrequently captured with the ſprats, at a ſhort diſtance from the ſhore.

"In the firſt dorſal fin are ſix rays, in the ſecond eleven; the pectoral fin contains twenty rays; the ventral, nineteen; anal, eleven; and tail ſixteen."

We have been the more explicit in detailing the character and hiſtory of the ſpotted goby, in order to enable the reader to comprehend the preciſe difference between this and the following ſpecies.

APHYA. Body and fins barred with brown. Linn. Muſ. Ad. Fr. *Gobius uncialis, pinna dorſi ſecunda oſſiculorum* 17, Art

Deſcribed as a very ſmall ſpecies found in the Nile and ſome parts of the Mediterranean; the length about an inch. The firſt dorſal fin, as in minutus, contains ſix rays, the ſecond ſixteen or ſeventeen; pectoral, according to Linnæus, eighteen, or one leſs, as Artedi mentions. Linnæus ſtates the number of rays in the ventral fin at twelve, Artedi at only ſix, and in deſcribing thoſe of the anal fin they differ again, theſe being, as Artedi informs us, no more than eleven, though Linnæus ſays they amount in number to no leſs than fourteen.

JOZO. Rays of the dorſal fin ſetaceous, and extending above the membrane. Linn. *Jozo*, Salv. *Gobius albus*, Rendel. *Gobius tertius*, Will.

This is an inhabitant of the European and Mediterranean ſeas; its length is from four to ſix inches; the body above brown, beneath whitiſh, and the whole covered with ſcales. The head is compreſſed; pupil of the eye black with the iris white; the back ſlightly arched; jaws of equal length, and armed with numerous ſmall teeth; the lateral line ſtraight, blackiſh, and placed in the middle of the body. The colour of the fins, which is blue, conſtitutes, according to Bloch, the characteriſtic diſtinction of this particular ſpecies. Its haunts are the ſandy ſhores of the ſea, and its food teſtaceous animals, crabs, and other marine creatures. Though highly prolific, it is obſerved not to multiply very faſt, its eggs being eagerly ſought after by the larger kinds of fiſhes. The fleſh is indifferent, being hard and meagre.

Eleotris. Anal fin with nine rays; tail roundiſh. Lagerſtroëm. *Gobius Chinenſis*, Oſbeck.

Whitiſh, covered with large, round, and ſmooth ſcales, and marked on the back near the gill-covers with an ample violet ſpot; both the dorſal fins of equal height, the firſt containing ſix rays, the ſecond eleven; pectoral fin twenty; ventral, ten; anal, nine; and tail ten. The ſpecies inhabits China.

Pectinirostris. Teeth in the lower jaw horizontal. Gmel.—Lagerſtr. *Apocryptes Chinenſis*, Oſbeck.

A fiſh of ſmall ſize found in China: the firſt dorſal fin contains five rays, the ſecond twenty-ſix; pectoral, nineteen; central, twelve; anal, twenty-five; and caudal, fifteen.

Bicolor. Fuſcous; all the fins black. Linn.—Brünn piſc.

Length from three to four, or rarely exceeding ſix inches, and inhabits the Mediterannean ſea. The rays of the fins project very inconſiderably above the connecting membrane.

Cruentatus. Mouth puſtulate with red; rays of the dorſal fins reaching above the membrane. Brünn.

About a ſpan in length, the mouth, gill-covers, chin, and fins puſtulate with ſanguineous red ſpots; beneath the eyes a tranſverſe membranaceous line, and two others placed longitudinally before the dorſal fin; fins generally browniſh, with ſetaceous rays; pectoral rounded; ventral blueiſh, with the rays ſplit at the end; tail pointed and ſlightly banded with black. Gmelin is inclined to think this may be only a variety of the ſpecies Jozo.

Paganellus. Tail and ſecond dorſal fin purpliſh at the baſe; the firſt dorſal fin edged with a yellowiſh line. Linn. *Gobius paganellus*, Haſſelquiſt.

Length three, four, or ſix inches; the body ſlightly compreſſed and whitiſh, with a green tinge, and marked with blackiſh dots or ſmall ſpots. Native of the Mediterranean.

Arabicus. Five poſterior rays of the firſt dorſal fin terminating in a red filament twice the length of the membrane. Forſk.

Native of Djidda in Arabia. The body is about the ſize of the little finger, and of a greeniſh-brown colour, with numerous confluent violet ſpots and ſpecks of blue; ſkin ſoft and covered with minute firm ſcales; fins ſpotted; tail cuneated.

Nebulosus. Second ray of the firſt dorſal fin ending in a black filament twice as long as the body. Forſk.

Inhabits the ſame ſea as the former, and nearly the ſame ſize; body whitiſh, with brown clouded confluent ſpots, beneath white without ſpots; ſcales rhombic and rigid; pectoral fins glaucous, with obſolete brown ſpots at the baſe; ventral browniſh; dorſal fin and tail tranſparent, dotted with brown; anal fin hyaline, with the outer edge black.

Plumieri. Upper jaw prominent. Bloch.

This, according to Plumier, inhabits the rivers of the Antilles in great numbers, and is in much eſteem for the table, its fleſh being of good flavour, and very wholeſome. The body is round, fleſhy, above tawny, yellow on the ſides and white beneath; the whole covered with ſmall ſcales; head large; vent in the middle of the body; lateral line ſtraight; fins yellow; pectoral and caudal yellow at the edge, with branched rays; dorſal and anal with ſimple rays.

Ocellaris. Upper jaw longer; firſt dorſal fin ſix-rayed, with a black ocellated ſpot near the baſe on the poſterior part. Brouſſonet.

Found in the freſh waters of Otaheitee. The head is rather compreſſed, ſub-conic, blackiſh, above ſlightly curved, obtuſely carinated in the middle; teeth unequal, and minute, thoſe of the lower jaw ſmaller; body compreſſed, lanceolate, covered on the poſterior part with imbricated, ciliated ſcales, and obſcurely clouded with olive and black; beneath glaucous.

Niger. Blackiſh varied, ſecond dorſal fin with about fourteen rays. Artedi. *Gobius niger*, Donov. Brit. Fiſhes. *Apocryptes Cantonenſis*, Oſbeck. *Black goby.*

Native of the European and Aſiatic ſeas. Length ſix inches; colour blueiſh black, varied.

Boscii. Body and tail grey, ſpeckled with brown; the former marked with ſeven tranſverſe whitiſh bands. Lacépede.

Deſcribed and figured in the work of Lacépede, on the authority of Boſc, who obſerved it on the coaſts of North America; it grows to the length of four inches; the head is broader than the body; the firſt four rays of the anterior dorſal fin terminate in a filament; and the body, which is ſmooth, is apparently without ſcales. The fleſh is never eaten.

Cæruleus. Body blue; caudal fin red, with black border. Lacépede.

Inhabits the ſeas on the eaſtern coaſts of Africa, where it was obſerved by Commerſon, who deſcribes its appearance in the water, when the ſun ſhines, as ſplendid in the higheſt degree, though its ſize is ſmall, the total length not exceeding three inches. The firſt dorſal is ſomewhat triangular, with the rays terminating in filaments, the ſecond contains fourteen rays, the filamentous appendice of the laſt ray in which is thrice the length of the reſt. The fleſh is not eaten by the natives, but is uſed as bait in fiſhing.

** Section. *Pectoral fins attached or placed on a fleſhy proceſs or elongation.*

Schlosseri. Blackiſh-brown, beneath whitiſh; rays of the firſt dorſal fin ſpinous. Pallas. *Schloſſerian goby.*

This is about a ſpan in length, the body, rather compreſſed, decreaſing in an inconſiderable degree towards the tail, and covered with large round coriaceous ſcales; the head long, much thicker than the body, and ſloping in front; the mouth tranſverſe; lips thick, fleſhy, granulous within, and the upper one folded; teeth large, unequal, diſtant, and irregularly alternate; palate fleſhy; tongue thick, ſoft, and fleſhy; the eyes vertical and placed forward, protuberant, the pupils turned to the ſides with a large lunate cavity beneath each; gill-covers oblong and ſcaly; tail ovate-acute; and the vent in the middle of the body. In the firſt dorſal fin are eight rays, in the ſecond thirteen; pectoral, ſixteen; ventral, twelve; anal, twelve; and tail nineteen. The ſpecies inhabits the freſh waters in the iſland of Amboina, generally reſiding in the ſoft mud at the bottom, and ſubſiſting on worms; the fleſh is excellent. The ſame fiſh occurs alſo in many parts of China. In the Gmelinian Syſt. Nat. the ſpecies is deſcribed under two diſtinct names, ſchloſſeri and barbatus, the latter of which Linnæus defines as having the pectoral fins fan-ſhaped, and the firſt dorſal fin with twelve rays, the ſecond thirteen. Lacépede, Boſc, and other late writers agree in conſidering them the ſame.

Genus *Gobioïdes.*

Ventral fins united; dorſal fin one; head ſmall; gill-covers cloſed nearly throughout their contour.

Melanurus. Dorſal fin ſingle; tail black. Gmel. *Le gobioïde queue noire*, Brouſſ. *Black tailed goby.*

Deſcribed by Gmelin on the authority of Brouſſonet's Ichth. dec. I. ; it is mentioned as a ſmall ſpecies, the habitat of which is unknown. Boſc believes it was brought from the South ſea.

Amguillaris. Dorſal fin ſingle ; tail red. Gmel.

The general figure of this ſpecies is ſomewhat anguilliform, or ſhaped like an eel, and like that fiſh the body is fat and ſlippery ; the teeth are ſmall, and project out of the mouth ; the dorſal and anal fin are large, and extend to the tail, with the fin of which they are united ; the colour of the body is pale brown, of the fins red ; the firſt dorſal fin includes fifty-two rays ; the pectoral, twelve ; ventral, ten ; anal, forty-three ; and tail twelve. The fiſh is a native of the coaſt of China and other parts of India.

Smyrnensis. Edge of the jaws formed of a bony plate, and deſtitute of teeth. Lacépede.

Deſcribed on the authority of the new memoirs of the Tranſactions of the Academy of Peterſburg. It is a native of the Mediterranean ; the ſkin very viſcous, and the dorſal fin furniſhed with forty-three rays.

Broussonetti. Body very long and compreſſed ; tail elongated. Lacépede.

Suppoſed to be a native of the Indian ſeas. The example deſcribed by Lacépede appertained to the ſtadtholder's muſeum. The dorſal fin contains thirty-three rays, and extends nearly to the tail, as does likewiſe the anal fin ; the body nearly tranſparent, and the jaws furniſhed with ſmall teeth.

Genus *Gobiomorus.*

Head ſmall ; eyes approximated ; gill-covers cloſed nearly throughout their contour ; dorſal fins two.

* Section. *Pectoral fins connected cloſe to the body.*

Strigatus. Ventral fin divided ; firſt caudal fin ſix-rayed. Brouſſonet.

Native of the Pacific ocean, near Otaheitee. The head is compreſſed, yellow, ſtreaked and ſpotted, and greeniſh yellow above ; body compreſſed, lanceolate and covered with imbricated, ſubquadrated, and ſlightly crenated ſcales ; colour pale blueiſh-green ; beneath whitiſh, with browniſh ſtreaks behind the pectoral fins ; beneath the lateral, on the hind part, varied with obſolete reddiſh ſpots ; firſt dorſal fin green, with red rays and four fillets of the latter colour ; the ſecond dorſal fin with nine red fillets ; pectoral fin pale greeniſh, the marginal rays ſhorter and ſimple ; ventral whitiſh ; anal long, greeniſh-red ; tail round-oval, yellowiſh-green, the rays red and ſimple, with a broad oblique, ſlightly curved reddiſh fillet each ſide.

Dormitor. Upper jaw longeſt ; tail rounded. Lacépede.

Deſcribed from the drawing of Plumier, who ſaw it in the freſh waters and rivers in the marſhes of South America. The ſecond dorſal fin contains eleven rays, and each of the pectoral fins eight.

Gronovii. Ventral fins divided ; firſt dorſal fin ten-rayed ; tail forked. Gmel. *Ceſtrus argenteus*, &c. Klein. *Mugil Americanus*, Ray. *Harder*, Marcgr.

Inhabits the ſeas of South America. The body is ſilvery above, black, and ſpotted on the ſides with black ; ſcales ſmall and imbricated. The head of this ſpecies is naked ; eyes large and lateral ; mouth narrow ; teeth equal, in the jaws and palate ; tongue rounded, thin, ſmooth ; gill-covers ſmooth and roundiſh ; back a little convex ; lateral line curved and parallel to the back ; vent in the middle of the body.

** Section. *Pectoral fins attached or placed on a fleſh proceſs or elongation.*

Koelreuteri. Ventral fins divided ; firſt dorſal fin with eleven rays. Pallas.

Length about nine inches, the body ſoft, fat, and whitiſh-grey ; head long, thick, and convex in front : eyes on the top of the head ; lips doubled and fleſhy ; teeth unequal, conic, the anterior ones larger, and one larger on each ſide above ; aperture of the gills lunated ; lateral line impreſſed ; vent about the middle of the body with a peduncle behind ; fins ſoft ; the firſt on the back large and brown, with a black terminal band, the rays ſpinous ; the ſecond narrower, yellowiſh, with a longitudinal deep brown band, and branched rays ; pectoral fan-ſhaped or oval, and placed on a broad pedicle ; tail oval and lanceolate, with ramoſe rays.

Genus *Gobiomoroïdes.*

Head ſmall, with the eyes approximated ; gill-covers cloſed nearly throughout their contour ; dorſal fin one.

Pisonis. Ventral fins divided ; lower jaw longer. Gmel. *Amore pixuma*, Piſo.

A ſmall ſpecies found in South America. The head is depreſſed and covered with ſcales in ſize equal to thoſe on the back ; the mouth furniſhed with ſeveral rows of teeth ; and the tail rounded.

Gobius *Aſper*, a name given by Geſner and others to a ſpecies of perch called by many *aſper piſciculus*, a name confounding it with many other different fiſhes, and by Linnæus *perca aſper*. It is diſtinguiſhed among the perch tribe by Artedi under the name of the pearch with eight or nine black lines on each ſide. See Perca.

Gobius *Fluviatlis*, or *Gudgeon*. See Cyprinus *Gobio.*

Gobius *Marinus*, or *Goget*. See Gobius *Niger.*

GOBLET, or Gobelet, a kind of drinking cup, or bowl ; ordinarily of a round figure, and without either foot or handle.

The word is French, *gobelet ;* which Salmaſius, and others, derive from the barbarous Latin *cupa*. Budæus deduces it from the Greek κυπελλον, *a ſort of cup.*

Goblets, made of the wood tamariſk, are ranked among medicinal drugs ; becauſe the liquors infuſed a while therein, are ſuppoſed to acquire a quality which renders them good in diſeaſes of the ſpleen.

GOBONE', or Gobony, in *Heraldry*, the ſame as *componé.*

GOBYGANGE, in *Geography*, a town of Bengal ; eight miles S. E. of Goragot.

GOCEY, a town of Hindooſtan, in Allahabad ; 30 miles N. of Gazypour.

GOCH, a town of France, in the department of the Roer, and chief place of a canton, in the diſtrict of Cleves, ſituated on the Niers, ſurrounded with walls in 1291, and containing three churches ; ſix miles S. of Cleves. The place contains 2412, and the canton 12,728 inhabitants, in 19 communes.

GOCHLENIUS, Rodolphus, in *Biography*, a phyſician, was born at Wittemberg in 1572. His father was profeſſor of logic at Marpurg, where the ſubject of this article ſtudied medicine, and obtained the degree of doctor in May, 1601 ; and was himſelf elected profeſſor of philoſophy in 1608, and alſo profeſſor of mathematics in 1612. He died on the 2d of March 1621, at the age of 49. Although his life was not long, by extreme induſtry he had written a conſiderable number of treatiſes, in which he evinced much of the ſpirit of Paracelſus, of whom he was a zealous follower. It is unneceſſary to enumerate the long liſt of titles to his works, which relate to philoſophy, magnetiſm,

netiſm, aſtrology, chiromancy, &c. as well as to medicine. Eloy.

GOCIANO, in *Geography*, a town of the iſland of Sardinia; 30 miles E. of Algeri.

GOCKEL, or GOKELIUS, CHRISTIAN LOUIS, in *Biography*, of Gotha in Thuringia, was born on the 31ſt of December, 1662. In 1685, he was appointed phyſician to the city of Herſpruck, where he acquired great reputation by his practice, and obtained the confidence of ſeveral German princes, eſpecially of the duke of Wirtemberg. His publications likewiſe contributed to extend his fame, conſiſting of a "Medical Surgery," in German, and of ſome papers in the Memoirs of the German academy. He died in Auguſt 1736, aged 74.

With the preceding phyſician we muſt not confound another, called *Everard Gokelius*, who was born at Ulm, in 1636, and practiſed phyſic at Giengen in Suabia. Beſides ſome eſſays in the German language, he publiſhed, 1. "Enchiridion Medico-practicum de Peſte," 1669.—2. "Conſiliorum et Obſervationum Medicinalium Decades VI." 1682.—3. "Gallicinium Medico-practicum, ſive, Conſiliorum, Obſervationum, et Curationum Medicinalium novarum Centuriæ duæ cum dimidia," Ulmæ 1704. Eloy. Dict. Hiſt.

GOCULGUR, in *Geography*, a town of Hindooſtan, in the ſubah of Agra; 16 miles N. W. of Agra.

GOD, an immaterial, intelligent, and free being; of perfect goodneſs, wiſdom, and power; who made the univerſe, and continues to ſupport it, as well as to govern and direct it by his providence.

The Rabbins and Hebraiſts, particularly St. Jerom, and the interpreters, reckon up ten different names of God in Scripture; which are אל, *El*, אלהים, *Elohim*, אלהי, *Elohi*, or in the ſingular, אלה, *Eloah*, צבאות, *Tſebaoth*, עליון, *Elion*, אהיה, *Ehjeh*, ארוני, *Adonai*, יה, *Jah*, שדי, *Shaddai*, יהוה, *Jehovah*: but it is wrong to divide אלהי, from צבאוה; they ſhould be but one name אלהיצבא ת, *Elohetſebaoth*, *i. e. God of hoſts*. Of theſe names there are three which expreſs the eſſence of God, and are proper names; *viz.* אהוה, *Ehjeh*, יה, *Jah*, and יהוה, *Jehovah*: the others are only names of attributes. St. Jerom gives a particular explanation of theſe ten names, in his epiſtle to Marcella; and Buxtorf the younger has an expreſs diſſertation on the ſame, "Diſſertatio de Nominibus Dei." The Jeſuit Souciet has three ſeveral diſcourſes on the three names, *El*, *Shaddai*, and *Jehovah*, printed at Paris, 1715. The Hebrews call the name of God כןארנע אותיוה, and the Greeks, after this example, Τετραγραμματον; as conſiſting of four letters, which it is obſerved to do in moſt languages: thus, in the Hebrew God is called יהוה, *Jehovah*; in the Greek, Θεος; in Latin, *Deus*; in Spaniſh, *Dios*; in Italian, *Idio*; in French, *Dieu*; in the ancient Gauliſh, *Diex*; in ancient German, *Diet*; in the Sclavonic, *Buch*; in Arabic, *Alla*; in the Poliſh, *Bung*; in the Pannonian, *Iſtu*; in the Egyptian, *Tenu*; in the Perſian, *Sire*; in the language of the Magi, *Orſi*. But a diſtinction ought here to be made between the name God, and the name of God; it being the latter, not the former, that in the Hebrew conſiſts of four letters. The name or word God, in the Hebrew, is אלה, *Eloah*, which conſiſts but of three letters; or in the plural, אלהים, *Elohim*, which conſiſts of five. The name of God is יהוה, *Jehovah*; which is the true τετραγραμματον, or the name of four letters among the Hebrews and Greeks. But it is not this name that anſwers to the Greek Θεος, Latin *Deus*, Engliſh *God*, &c. In reality, none of theſe languages have any proper name of *God*, as יהוה, *Jehovah*, is in the Hebrew.

M. Hallenberg, a Swediſh writer, in a work publiſhed at Stockholm in 1796, and entitled "Diſſertatio hiſtorica et philologica de origine nominis Dei *Gud*," &c. ſuggeſts that the names given by different nations to the deity might denote *unity*; as the word *God* itſelf, by which in all the Teutonic dialects the Supreme Being is denominated.

Philologiſts have hitherto conſidered the word *God* as being of the ſame ſignification with *Good*; and this is not denied by M. Hallenberg. But he thinks, that both words originally denoted *unity*; and that the root is אחד *achad*, *unus*; whence the Syr. *Chad* and *Gada*; the Arab. *Abd* and *Gahd*; the Perſic *choda* and *chuda*; the Greek αγαθος and γαθος; the Teutonic *Gud*; the German *Gott*: and our Saxon *God*. The other names of God, this author thinks, are referable to a ſimilar origin.

By his immateriality, intelligence, and freedom, God is diſtinguiſhed from *fate*, *nature*, *deſtiny*, *neceſſity*, *chance*, *anima mundi*, and from all the other fictitious beings, acknowledged by the Stoics, Pantheiſts, Spinoſiſts, and other ſorts of atheiſts.

The knowledge of God, his nature, attributes, word and works, with the relations between him and his creatures, makes the ſubject of the extenſive ſcience called *theology*. In ſcripture God is defined by, "I am that I am; Alpha and Omega; the Beginning and End of all things."

Among philoſophers, he is defined a being of infinite perfection; or in whom there is no defect of any thing which we conceive may raiſe, improve, or exalt his nature.

Among men, he is chiefly conſidered as the firſt cauſe, the firſt being, who has exiſted from the beginning, has created the world, or who ſubſiſts neceſſarily, or of himſelf.

Sir Iſaac Newton chooſes to conſider and define God, not as is uſually done, from his perfections, his nature, exiſtence, or the like; but from his dominion. "The word God, according to him, is a relative term, and has a regard to ſervants; it is true, it denotes a being eternal, infinite, and abſolutely perfect; but a being however eternal, infinite, and abſolutely perfect, without dominion, would not be God.

"The word God," the ſame author obſerves, "frequently ſignifies *Lord*; but every lord is not God: it is the dominion of a ſpiritual being or lord, that conſtitutes God; true dominion, true God; ſupreme, the ſupreme; feigned, the falſe god.

"From ſuch true dominion it follows, that the true God is living, intelligent, and powerful; and from his other perfections, that he is ſupreme, or ſupremely perfect; he is eternal, and infinite; omnipotent, and omniſcient; that is, he endures from eternity to eternity, and is preſent from infinity to infinity.

"He governs all things that exiſt, and knows all things that are to be known: he is not eternity, or infinity, but eternal and infinite: he is not duration or ſpace, but he endures, and is preſent: he endures always, and is preſent every where; and by exiſting always, and every where, he conſtitutes the very thing, duration and ſpace, eternity and infinity.

"Since every particle of ſpace is always, and every indiviſible moment of duration every where, the Creator and Lord of all things can never be *nunquam*, or *nuſquam*.

"He is omnipreſent, not only virtually, but alſo ſubſtantially: for power without ſubſtance cannot ſubſiſt. All things are contained, and move, in him; but without any mutual paſſion: he ſuffers nothing from the motions of bodies;

dies; nor do they undergo any reſiſtance from his omnipreſence.

"It is confeſſed, that God exiſts neceſſarily; and by the ſame neceſſity he exiſts always, and every where. Hence, alſo, he muſt be perfectly ſimilar; all eye, all ear, all brain, all arm, all the power of perceiving, underſtanding, and acting; but after a manner not at all corporeal, after a manner not like that of men, after a manner wholly to us unknown.

"He is deſtitute of all body, and all bodily ſhape; and therefore cannot be ſeen, heard, or touched; nor ought to be worſhipped under the repreſentation of any thing corporeal.

"We have ideas of the attributes of God, but do not know the ſubſtance even of any thing: we ſee only the figures and colours of bodies, hear only ſounds, touch only the outward ſurfaces, ſmell only odours, and taſte taſtes; and do not, cannot, by any ſenſe, or any reflex act, know their inward ſubſtances; and much leſs can we have any notion of the ſubſtance of God.

"We know him by his properties and attributes; by the moſt wiſe and excellent ſtructure of things, and by final cauſes; but we adore and worſhip him only on account of his dominion: for God, ſetting aſide dominion, providence, and final cauſes, is nothing elſe but fate and nature." Newt. Philoſ. Nat. Princip. Math. in calce.

An ingenious divine has wrought theſe thoughts of that admirable philoſopher into form, and ripened them into a more expreſs ſyſtem, in a diſcourſe on this ſubject. Maxwell's Diſc. concerning God.

We ſhall here ſubjoin a compendious abſtract of the principal arguments that have been alleged in proof of the exiſtence of God. The admirable metaphyſician and divine, Dr. Clarke, has demonſtrated this truth, with that clearneſs and force of reaſoning, for which he is ſo eminently diſtinguiſhed, by a ſeries of propoſitions, mutually connected and dependent, and forming a complete and unanſwerable argument in proof both of the being and attributes of the Deity. 1. Something has exiſted from all eternity; for, ſince ſomething now is, ſomething always was: otherwiſe the things that now are muſt have been produced out of nothing, abſolutely and without cauſe; which is plain contradiction in terms. 2. There has exiſted from eternity ſome one unchangeable and independent being: or elſe, there has been an infinite ſucceſſion of changeable and dependent beings produced one from another in an endleſs progreſſion, without any original cauſe at all. From without, this ſeries of beings can have no cauſe of its exiſtence, becauſe it includes all things that are or ever were in the univerſe: nor is any one being in this infinite ſucceſſion ſelf-exiſtent or neceſſary, and therefore it can have no reaſon of its exiſtence within itſelf; and it was equally poſſible, that from eternity, there ſhould never have exiſted any thing at all, as that a ſucceſſion of ſuch beings ſhould have exiſted from eternity. Conſequently, their exiſtence is determined by nothing; neither by any neceſſity of their own nature, becauſe none of them are ſelf-exiſtent; nor by any other being, becauſe no other is ſuppoſed to exiſt. 3. That unchangeable and independent being, which has exiſted from eternity, without any external cauſe of its exiſtence muſt be ſelf-exiſtent, *i. e.* it muſt exiſt by an abſolute neceſſity originally in the nature of the thing itſelf, and antecedent in the natural order of our ideas to our ſuppoſition of its being. For whatever exiſts muſt either have come into being out of nothing without cauſe; or it muſt have been produced by ſome external cauſe; or it muſt be ſelf-exiſtent: but the two former ſuppoſitions are contrary to the two firſt propoſitions. From this laſt propoſition it follows, that the only true idea of a ſelf-exiſtent, or neceſſarily exiſting being, is the idea of a being, the ſuppoſition of whoſe non-exiſtence is an expreſs contradiction; and this idea is that of a moſt ſimple being, abſolutely eternal and infinite, original and independent. It follows alſo, that nothing is ſo certain as the exiſtence of a ſupreme independent cauſe; and likewiſe that the material world cannot poſſibly be the firſt and original being, uncreated, independent, and of itſelf eternal; becauſe it does not exiſt by an abſolute neceſſity in its own nature, ſo as that it muſt be an expreſs contradiction to ſuppoſe it not to exiſt. With reſpect both to its form and matter, the material world may be conceived not to be, or to be in any reſpect different from what it is, without a contradiction. 4 and 5. The ſubſtance or eſſence of the ſelf-exiſtent being is abſolutely incomprehenſible by us; nevertheleſs, many of the eſſential attributes of his nature are ſtrictly demonſtrable, as well as his exiſtence. The ſelf-exiſtent being, having no cauſe of its exiſtence but the abſolute neceſſity of its own nature, muſt of neceſſity have exiſted from everlaſting, without beginning: and muſt of neceſſity exiſt to everlaſting, without end. 6. The ſelf-exiſtent being muſt of neceſſity be infinite and omnipreſent. Such a being muſt be every where, as well as always, unalterably the ſame. It follows from hence, that the ſelf-exiſtent being muſt be a moſt ſimple, unchangeable, incorruptible being; without parts, figure, motion, diviſibility, and other properties of matter, which are utterly inconſiſtent with complete infinity. 7. The ſelf-exiſtent being, muſt of neceſſity be but one; becauſe in abſolute neceſſity there can be no difference or diverſity of exiſtence; and, therefore, it is abſolutely impoſſible, that there ſhould be two independent ſelf-exiſtent principles, ſuch *e. g.* as God and matter. 8. The ſelf-exiſtent and original cauſe of all things muſt be an intelligent being. This propoſition cannot be demonſtrated ſtrictly and properly *à priori;* but a *poſteriori*, the world affords undeniable arguments to prove that all things are the effects of an intelligent and knowing cauſe. The cauſe muſt be always more excellent than the effect; and, therefore, from the various kinds of powers and degrees of excellence and perfection, which viſible objects poſſeſs; from the intelligence of created beings, which is a real diſtinct quality or perfection, and not a mere effect or compoſition of unintelligent figure and motion; from the variety, order, beauty, wonderful contrivance, and fitneſs of all things to their proper and reſpective ends; and from the original of motion, the ſelf-exiſtent creating being is demonſtrated to be intelligent. 9. The ſelf-exiſtent and original cauſe of all things is not a neceſſary agent, but a being endued with liberty and choice. Liberty is a neceſſary conſequent of intelligence: without liberty, no being can be ſaid to be an agent, or cauſe of any thing; ſince to act neceſſarily is really and properly not to act at all, but to be acted upon. Beſides, if the ſupreme cauſe be not endued with liberty, it will follow, that nothing which is not could poſſibly have been; that nothing which is could poſſibly not have been; and that no mode or circumſtance of the exiſtence of any thing could poſſibly have been in any reſpect otherwiſe than it now actually is. Farther, if there be any final cauſe in the univerſe, the ſupreme cauſe is a free agent; and on the contrary ſuppoſition, it is impoſſible that any effect ſhould be finite: and in every effect, there muſt have been a progreſſion of cauſes *in infinitum,* without any original cauſe at all. 10. The ſelf-exiſtent being, the ſupreme cauſe of all things, muſt of neceſſity have infinite power; ſince all things were made by him, and are entirely dependent upon him; and all the powers of all things are derived from him, and perfectly ſubject

ject to him; nothing can reſiſt the execution of his will. 11. The ſupreme cauſe and author of all things muſt of neceſſity be infinitely wiſe. This follows from the propoſitions already eſtabliſhed; and the proof *a poſteriori*, of the infinite wiſdom of God, from the conſideration of the exquiſite perfection and conſummate excellency of his works, is no leſs ſtrong and undeniable. 12. The ſupreme cauſe and author of all things muſt of neceſſity be a being of infinite goodneſs, juſtice, and truth, and all other moral perfections; ſuch as become the ſupreme governor and judge of the world. The will of a being, infinitely knowing and wiſe, independent and all-powerful, can never be influenced by any wrong affection, and can never be miſled or oppoſed from without; and, therefore, he muſt do always what he knows fitteſt to be done; that is, he muſt act always according to the ſtricteſt rules of infinite goodneſs, juſtice, and truth, and all other moral perfections, and more particularly, being infinitely and neceſſarily happy and all-ſufficient, he muſt be unalterably diſpoſed to do and to communicate good or happineſs. See Clarke's Demonſtration of the Being and Attributes of God, paſſim.

To this more abſtruſe argument *à priori*, for the exiſtence of God, we may add another, more generally obvious, and carrying irreſiſtible conviction, which is deduced from the frame of the univerſe, and from the traces of evident contrivance and fitneſs of things for one another that occur through all the parts of it. Theſe conſpire to prove, that the material world, which in its nature is originated and dependent, could not have been the effect of chance or neceſſity, but of intelligence and deſign. The beautiful, harmonious, and beneficial arrangement of the various bodies that compoſe the material ſyſtem; their mutual dependence and ſubſerviency; the regularity of their motions, and the aptitude of theſe motions for producing the moſt beneficial effects; and many other phenomena reſulting from their relation, magnitude, ſituation, and uſe, afford unqueſtionable evidences of the creating power and wiſe diſpoſal of an intelligent and almighty agent. The power of gravity, by which the celeſtial bodies perſevere in their revolutions, deſerves our particular conſideration. This power penetrates to the centres of the ſun and planets, without any diminution of its virtue, and is extended to immenſe diſtances, regularly decreaſing, and producing the moſt ſenſible and important effects. Its action is proportional to the quantity of ſolid matter in bodies, and not to their ſurfaces, as is uſual in mechanical cauſes; and, therefore, ſeems to ſurpaſs mere mechaniſm. But however various the phenomena that depend on this power, and may be explained by it, no mechanical principles can account for its effects; much leſs could it have produced, at the beginning, the regular ſituation of the orbs, and the preſent diſpoſition of things. Gravity could not have determined the planets to move from weſt to eaſt in orbits nearly circular, almoſt in the ſame plane; nor could this power have projected the comets with all the variety of their directions. If we ſuppoſe the matter of the ſyſtem to be accumulated in the centre by its gravity, no mechanical principles, with the aſſiſtance of this power, could ſeparate the huge and unwieldy maſs into ſuch parts as the ſun and planets; and, after carrying them to their different diſtances, project them in their ſeveral directions, preſerving ſtill the equality of action and re-action, or the ſtate of the centre of gravity of the ſyſtem. Such an exquiſite ſtructure of things could only ariſe from the contrivance and powerful influences of an intelligent, free, and moſt potent agent. The ſame powers, therefore, which at preſent govern the material univerſe and conduct its various motions, are very different from thoſe which were neceſſary to have produced it from nothing, or to have diſpoſed it in the admirable form in which it now proceeds.

But we ſhould far exceed the proper limits of this article, if, confining our obſervation to the earth, our own habitation, we were to enumerate only the principal traces of deſign and wiſdom, as well as goodneſs, which are diſcernible in its figure and conſtituent parts, in its diurnal and annual motion, in the poſition of its axis with regard to its orbit, in the benefit which it derives from the light and heat of the ſun, and the alternate viciſſitude of the ſeaſons; in the atmoſphere which ſurrounds it, and in the different ſpecies and varieties of vegetables and animals with which it is repleniſhed. No one can ſurvey the vegetable productions of the earth, ſo various, beautiful, and uſeful, nor the various gradations of animal life, in ſuch a variety of ſpecies, all preſerved diſtinct, and propagated by a ſettled law, each fitted to its own element, provided with proper food, and with inſtincts and organs ſuited to its rank and ſituation, and eſpecially with the powers of ſenſation and ſelf-motion, and all more immediately or remotely ſubſervient to the government and uſe of man, without admiring the ſkill and deſign of the original Former. But theſe are more ſignally manifeſted in the ſtructure of the human frame, and in the noble powers and capacities of the human mind; more eſpecially in the moral principles and faculties, which are a diſtinguiſhing part of our conſtitution, and lead to the perception and acknowledgment of the exiſtence and government of God. In thoſe inſtances that have now been recited, and a variety of ſimilar inſtances ſuggeſted by them, or naturally occurring to the notice of the curious and reflecting mind, contrivance is manifeſt, and immediately, without any nice or ſubtle reaſonings, ſuggeſts a contriver. It ſtrikes us like a ſenſation; and artful reaſonings againſt it may puzzle us, without ſhaking our belief. No perſon, for example, that knows the principles of optics, and the ſtructure of the eye, can believe that it was formed without ſkill in that ſcience, and therefore, Sturmius held that the examination of the eye was a cure for atheiſm; and another excellent writer, cited below, obſerves, that if there were no example in the world of contrivance, except that of the eye, it would be alone ſufficient to ſupport the concluſion which we draw from it, as to the neceſſity of an intelligent creator: nor can it be ſuppoſed that the ear was formed without the knowledge of ſounds; or that the male and female, created and preſerved in due proportion, were not formed for each other, and for continuing the ſpecies. All our accounts of nature are full of inſtances of this kind. The admirable and beautiful ſtructure of things for final cauſes exalt our idea of the contriver; and the unity of deſign ſhews him to be one. The great motions in the ſyſtem, performed with the ſame facility as the leaſt, ſuggeſt his almighty power, which gave motion to the earth and the celeſtial bodies, with equal eaſe as to the minuteſt particles; the ſubtility of the motions and actions in the internal parts of bodies, ſhews that his influence penetrates the inmoſt receſſes of things, and that he is equally active and preſent every where. The ſimplicity of the laws that prevail in the world, the excellent diſpoſition of things, in order to obtain the beſt ends, and the beauty which adorns the works of nature, far ſuperior to any thing in art, ſuggeſt his conſummate wiſdom. The uſefulneſs of the whole ſcheme, ſo well contrived for the intelligent beings who enjoy it, with the internal diſpoſition and moral ſtructure of thoſe beings, ſhews his unbounded goodneſs. Theſe are arguments which are ſufficiently open to the views and capacities of the unlearned, while at the ſame time they acquire new ſtrength and luſtre from the diſcoveries of the learned. The Deity's acting and interpoſing in the univerſe ſhew that he governs it as well as formed it; and the depth of his counſels, even in conducting the material univerſe, of which a great part ſurpaſſes our knowledge, tends to preſerve an inward veneration and awe of this great being, and diſpoſes us to receive what may be otherwiſe revealed to us concerning him. His eſſence, as well as that of all other ſubſtances, is beyond the reach of all our diſcoveries; but his attributes clearly appear in his admirable works. We know that the higheſt conceptions we are able to form of them are ſtill beneath his real perfections; but his dominion over us, and our duty towards him, are manifeſt. See Maclaurin's Account of Sir I. Newton's Phil. Diſc. book iv. chap. 9.

Thoſe who wiſh to ſee the argument, which has been now ſketched out in ſome of its leading outlines, more fully illuſtrated and urged, may conſult the works of Ray, Nieuwentyt, Baxter in his Matho, Derham, De la Pluche in his Nature diſplayed, &c.; and more eſpecially archdeacon Paley in his "Natural Theology, or Evidences of the Exiſtence and attributes of the Deity, collected from the appearances of Nature." This admirable work, if our limits would allow it, would enable us very much to enrich this article. One atheiſtic way, ſays this much approved and popular writer, of replying to our obſervations upon the works of Nature, and to the proofs of a Deity which we think that we perceive in them, is to tell us, that all which we ſee muſt neceſſarily have had ſome form, and that it might as well be in its preſent form as any. Let us now apply this anſwer to the eye.—"Something or other muſt have occupied that place in the animal's head; muſt have filled up, we will ſay, that ſocket; we will ſay alſo, that it muſt have been of that ſort of ſubſtance, which we call animal ſubſtance, as fleſh, bone, membrane, cartilage, &c.; but that it ſhould have been an eye, knowing as we do what an eye comprehends, *viz.* that it ſhould have conſiſted, firſt, of a ſeries of tranſparent lenſes, (very different, by the bye, even in their ſubſtances from the opaque materials of which the reſt of the body is, in general at leaſt, compoſed; and with which the whole of its ſurface, this ſingle portion of it excepted, is covered): ſecondly, of a black cloth or canvas (the only membrane of the body which is black) ſpread out behind theſe lenſes, ſo as to receive the image formed by pencils of light tranſmitted through them; and placed at the preciſe geometrical diſtance at which, and at which alone, a diſtinct image could be formed, namely, at the concourſe of the refracted rays; thirdly, of a large nerve communicating between this membrane and the brain; without which the action of light upon the membrane, however modified by the organ, would be loſt to the purpoſes of ſenſation. That this fortunate conformation of the parts ſhould have been the lot, not of one individual out of many thouſand individuals, like the great prize in a lottery, or like ſome ſingularity in nature, but the happy chance of a whole ſpecies; nor of one ſpecies out of many thouſand ſpecies, with which we are acquainted; but of by far the greateſt number of all that exiſt, and that under varieties, not caſual or capricious, but bearing marks of being ſuited to their reſpective exigences; that all this ſhould have taken place, merely becauſe ſomething muſt have occupied theſe points in every animal's forehead; or that all this ſhould be thought to be accounted for by the ſhort anſwer, "that whatever was there muſt have had ſome form or other," is too abſurd to be made more ſo by any argumentation."—"Nor does it mend the anſwer to add, with reſpect to the ſingularity of the conformation, that, after the event, it is no longer to be computed what the chances were againſt it This is always to be computed, when the queſtion is, whether an uſeful or imitative conformation be the produce of chance or not. I deſire no greater certainty in reaſoning than that by which chance is excluded from the preſent diſpoſition of the natural world. Univerſal experience is againſt it. What does chance ever do for us? In the human body, for inſtance, chance, *i. e.* the operation of cauſes without deſign, may produce a wen, a wart, a mole, a pimple, but never an eye. Among inanimate ſubſtances, a clod, a pebble, a liquid drop, might be; but never was a watch, a teleſcope, or organized body of any kind, anſwering a valuable purpoſe by a complicated mechaniſm, the effect of chance. In no aſſignable inſtance hath ſuch a thing exiſted, without intention, ſomewhere."[*] Some have ſaid "that the eye, the animal to which it belongs, every other animal, every plant, and every organized body which we ſee, are only ſo many out of the poſſible varieties and combinations of being, which the lapſe of infinite ages has brought into exiſtence; and that the preſent world is the relict of that variety."—But "there is no foundation whatever for this conjecture in any thing which we obſerve in the works of nature: no ſuch experiments are going on at preſent! No ſuch energy operates as that which is here ſuppoſed, and which ſhould be conſtantly puſhing into exiſtence new varieties of beings; nor are there any appearances to ſupport an opinion that every poſſible combination of vegetable or animal ſtructure has formerly been tried." Should it be ſaid that the parts of animal bodies "were not intended for the uſe, but that the uſe aroſe out of the parts; this diſtinction is intelligible."—But "there is little place for it in the works of nature. When roundly and generally affirmed of them, as it has ſometimes been, it amounts to ſuch another ſtretch of aſſertion, as it would be to ſay, that all the implements of the cabinet-maker's workſhop, as well as his fiſh-ſkin, were ſubſtances accidentally configurated, which he had picked up and converted to his uſe; that his adzes, ſaws, planes, and gimlets, were not made, as we ſuppoſe, to hew, cut, ſmooth, ſhape-out, or bore wood with; but, that theſe things being made, no matter with what deſign, or whether with any, the cabinet-maker perceived that they were applicable to his purpoſe, and turned them to account." If this kind of ſolution "be applied to thoſe parts of animals, the action of which does not depend upon the will of the animal, it is fraught with ſtill more evident abſurdity. Is it poſſible to believe that the eye was formed without any regard to viſion, that it was the animal itſelf which found out, that though formed with no ſuch intention, it would ſerve to ſee with; and that the uſe of the eye, as an organ of ſight, reſulted from this diſcovery, and the animal's application of it? The ſame queſtion may be aſked of the ear: the ſame of all the ſenſes," none of which depend upon the election of the animal; nor conſequently upon his ſagacity or experience. "Others have choſen to refer every thing to a *principle of order* in nature. A principle of order is the word; but what is meant by a principle of order, as different from an intelligent creator, has not been explained either by definition or example; and without ſuch explanation, it ſhould ſeem to be a mere ſubſtitution of words for reaſons, names for cauſes."—"Was a watch ever produced by a principle of order; and why might not a watch be ſo produced as well as an eye?"—"The confidence," continues the author now cited, "which we place in our obſervations upon the works of nature, in the marks which we diſcover of contrivance, choice, and deſign, and in our reaſoning upon the proofs afforded us, ought not to be ſhaken, as it is ſometimes attempted to be done, by bringing forward to our view our own ignorance, or rather the general imperfection of our knowledge of nature."—"True fortitude of underſtanding conſiſts in not ſuffering what we know to be diſturbed by what we do not know. If we perceive an uſeful end, and means adapted to that end, we perceive enough for our concluſion. If theſe things be clear, no matter what is obſcure. The argument is finiſhed."—"Our ignorance of many points need not ſuſpend our aſſurance of a few."—"Contrivance," ſays our author, "if eſtabliſhed, appears to me to prove every thing which we wiſh to prove. Amongſt other things, it proves the *perſonality* of the Deity, as diſtinguiſhed from what is ſometimes called nature, ſometimes called a principle: which terms, in the mouths of thoſe who uſe them philoſophically, ſeem to be intended, to admit and expreſs an efficacy, but to exclude and deny a perſonal agent. Now that which can contrive, which can deſign, muſt be a perſon. Theſe capacities conſtitute perſonality, for they imply conſciouſneſs and thought. They require that which can perceive an end or purpoſe; as well as the power of providing means, and of directing them to their end. They require a centre, in which perfections unite, and from which volitions flow; which is mind. The acts of a mind prove the exiſtence of a mind;" and that, whatever it be, in which a mind reſides, is a perſon,—"Whenever we ſee marks of contrivance, we are led for its cauſe to an *intelligent* author. And this tranſition of the underſtanding is founded upon uniform experience."—"There may be many ſecond cauſes, and many cauſes of ſecond cauſes, one behind another, between what we obſerve of nature and the Deity; but there muſt be intelligence ſomewhere; there muſt be more in nature than what we ſee; and amongſt the things unſeen, there muſt be an intelligent deſigning author;"—"after all the ſtruggles of a reluctant philoſophy, the neceſſary reſort is to a deity. The marks of *deſign* are too ſtrong to be got over. Deſign muſt have had a deſigner. The deſigner muſt have been a perſon. That perſon is God." But we muſt content ourſelves with earneſtly recommending the works from which theſe detached extracts are made, to the peruſal of our readers; for we cannot do juſtice to the author's admirable reaſoning.

Another argument to prove the exiſtence of God, as the creator and governor of the univerſe, may be deduced from the univerſal conſent of mankind, and the uniform tradition of this belief through every nation and every age; it is impoſſible to conceive, that a fallacy ſo perpetual and univerſal, ſhould be impoſed on the united reaſon of mankind. No credible and ſatisfactory account can be given of this univerſal conſent, without aſcribing it to the original conſtitution of the human mind, in conſequence of which it cannot fail to diſcern the exiſtence of a deity, and to the undeniable traces of his being, which his works afford. Fear, ſtate-policy, and the prejudices of education, to which the concurrence of mankind in this principle has been ſometimes reſolved, are founded on this univerſal principle, ſuppoſe its being and influence, and are actuated by it. It is much more reaſonable to imagine, that the belief of a God was antecedent to their operation, than that it ſhould have been produced by them; and that it was dictated by reaſon and conſcience, independent of the paſſions and policy of men. The uniform and univerſal tradition of this belief, and of the creation of the world by the divine power, affords concurring evidence both of the principle and of the fact.

The exiſtence of God is alſo farther evinced by thoſe arguments which have been uſually alleged to prove, that the world had a beginning, and, therefore, that it muſt have been created by the energy of divine power. In proof of this, the hiſtory of Moſes, conſidered merely as the moſt ancient hiſtorian, deſerves particular regard. His teſtimony is confirmed by the moſt ancient writers among the heathens, both poets and hiſtorians. It may be alſo fairly alleged, that we have no hiſtory or tradition more ancient than that which agrees with the received opinion of the world's beginning, and of the manner in which it was produced; and that the moſt ancient hiſtories were written long after that time. And this conſideration is urged by Lucretius, the famous Epicurean, as a ſtrong preſumption that the world had a beginning.

> "——— Si nulla fuit genitalis origo
> Terrarum et cœli, ſemperque æterna fuere:
> Cur ſupra bellum Thebanum, et funera Trojæ,
> Non alias alii quoque res cecinere poetæ?"

Beſides, the origin and progreſs of learning, and the moſt uſeful arts, confirm the notion of the world's beginning, and of the common era of its creation; to which alſo may be added, that the world itſelf, being material and corruptible, muſt have had a beginning; and many phenomena occur to the obſervation of the aſtronomer and natural hiſtorian, which furniſh a ſtrong preſumption that it could have had no long duration, and that it gradually tends to diſſolution. From all theſe conſiderations we may infer the exiſtence, attributes, and providence of God. If we admit miracles, as facts authenticated by credible hiſtory, theſe, conſidered as deviations from the eſtabliſhed courſe of nature, afford independent evidence of the being of God. See MIRACLE.

GOD is alſo uſed in ſpeaking of the falſe deities of the heathens, many of which were only creatures to which divine honours and worſhip were ſuperſtitiouſly paid.

The Greeks and Latins, it is obſervable, did not mean, by the name God, an all-perfect being, whereof eternity, infinity, omnipreſence, &c. were eſſential attributes: with them, the word only implied an excellent and ſuperior nature; and, accordingly, they give the appellation gods to all beings of a rank, or claſs, higher and more perfect than that of men; and eſpecially to thoſe who were inferior agents in the divine adminiſtration, all ſubject to the one ſupreme.

Thus men themſelves, according to their ſyſtem, might become gods, after death; inaſmuch as their ſouls might attain to a degree of excellence ſuperior to what they were capable of in life.

The firſt divines, father Boſſu obſerves, were the poets: the two functions, though now ſeparated, were originally combined; or, rather, were one and the ſame thing. Now the great variety of attributes in God, that is, the number of relations, capacities, and circumſtances, wherein they had occaſion to conſider him, put theſe poets, &c. under a neceſſity of making a partition, and of ſeparating the divine attributes into ſeveral perſons: becauſe the weakneſs of the human mind could not conceive ſo much power and action in the ſimplicity of one ſingle divine nature. Thus the omnipotence of God came to be repreſented under the perſon and appellation of Jupiter; the wiſdom of God under that of Minerva; the juſtice of God under that of Juno.

The firſt idols, or falſe gods, that are ſaid to have been adored, were the ſtars, ſun, moon, &c. on account of the light, heat, and other benefits which we derive from them. (See IDOLATRY.) Afterwards the earth came to be deified, for furniſhing fruits neceſſary for the ſubſiſtence of men and animals; then fire and water became objects of divine worſhip, for their uſefulneſs to human life. In proceſs of time, and by degrees, gods became multiplied to infinity; and there was ſcarce any thing but the weakneſs, or caprice of ſome devotee or other, elevated into the rank of deity; things uſeleſs, or even deſtructive not excepted.

The principal of the ancient gods, whom the Romans called *dii majorum gentium*, and which Cicero calls *celeſtial gods*, Varro *ſelect gods*, Ovid *nobiles deos*, others *conſentes deos*, were Jupiter, Juno, Veſta, Minerva, Ceres, Diana, Venus, Mars, Mercury, Neptune, Vulcan, and Apollo. Jupiter is conſidered as the god of heaven; Neptune as god of the ſea; Mars as the god of war; Apollo of eloquence, poetry, and phyſic; Mercury of thieves, Bacchus of wine, Cupid of love, &c.

A ſecond ſort of gods, called *demi-gods*, *ſemi-dii*, *dii minorum gentium*, *indigetes*, or gods adopted, were men canonized and deified. As the greater gods had poſſeſſion of heaven by their own right; theſe ſecondary deities had it by right and donation; being tranſlated into heaven becauſe they had lived as gods upon earth.

The heathen gods may be all reduced to the following claſſes:

1. Created ſpirits, angels, or dæmons: whence good and evil gods; Genii, Lares, Lemures, Typhones, guardian gods, infernal gods, &c.

2. Heavenly bodies; as the ſun, moon, and other planets: alſo the fixed ſtars, conſtellations, &c.

3. Elements; as air, earth, ocean, Ops, Veſta; the rivers, fountains, &c.

4. Meteors. Thus the Perſians adored the wind: thunder and lightning were honoured under the name of Geryon; and ſeveral nations of India and America have made themſelves gods of the ſame. Caſtor, Pollux, Helena, and Iris, have alſo been preferred from meteors to be gods; and the like has been practiſed in regard to comets: witneſs that which appeared at the murder of Cæſar. Socrates deified the clouds, if we may give credit to Ariſtophanes; and the primitive Chriſtians, Tertullian aſſures us, were reproached with the ſame thing.

5. They erected minerals, or foſſils, into deities. Such was the Bætylus; the Finlanders adored ſtones; the Scythians iron; and many nations ſilver and gold.

6. Plants have been made gods. Thus leeks and onions were deities in Egypt; the Sclavi, Lithuanians, Celtæ, Vandals, and Peruvians, adored trees and foreſts; the ancient Gauls, Britons, and Druids, paid a particular devotion to the oak; and it was no other than wheat, corn, ſeed, &c. that the ancients adored under the names of Ceres and Proſerpina.

7. They took themſelves gods from among the waters. The Syrians and Egyptians adored fiſhes; and the Tritons, Nereids, Syrens, &c. what were they but fiſhes? Several nations have adored ſerpents; particularly the Egyptians, Pruſſians, Lithuanians, Samogitians, &c.

8. Inſects, as flies and ants, had their prieſts and votaries: theſe among the Theſſalians, and thoſe in Acarnania, where bullocks were offered to them.

9. Among birds, the ſtork, raven, the ſparhawk, ibis, eagle, griffon, and lapwing, have had divine honours; the laſt in Mexico, the reſt in Egypt, and at Thebes.

10. Four-footed beaſts have had their altars; as the bull, dog, cat, wolf, baboon, lion, and crocodile, in Egypt, and elſewhere; the hog in the iſland of Crete; rats and mice in the Troas, and at Tenedos; weaſels at Thebes, and the porcupine throughout all Zoroaſter's ſchool.

11. Nothing was more common than to place men among the number of deities; and from Belus or Baal, to the Roman emperors before Conſtantine, the inſtances of this kind are innumerable: frequently they did not wait ſo long as their deaths for the apotheoſis. Nebuchadnezzar procured his ſtatue to be worſhipped while living; and Virgil ſhews that Auguſtus had altars and ſacrifices offered to him, Eclog. i. 6, 7 As we learn, from other hands, that he had prieſts called *Auguſtales*; and temples at Lyons, Narbona, and ſeveral other places; and he muſt be allowed the firſt of the Romans, in whoſe behalf idolatry was carried to ſuch a pitch. The Ethiopians deemed all their kings gods: the Velleda of the Germans; the Janus of the Hungarians; and the Thaut, Woden, and Aſſa, of the northern nations, were, indiſputably, men.

12. Not men only, but every thing that relates to man, has alſo been deified: as labour, reſt, ſleep, youth, age, death, virtues, vices, occaſion, time, place, numbers, among the Pythagoreans; the generative power, under the name of Priapus. Infancy, alone, had a cloud of deities; as Vagetanus, Levana, Rumina, Edufa, Potina, Cuba, Cumina, Carna, Oſſilago, Statulinus, Fabulinus, &c.

They alſo adored the gods health, fever, fear, love, pain, indignation, ſhame, impudence, opinion, renown, prudence, ſcience, art, fidelity, felicity, calumny, liberty, money, war, peace, victory, triumph, &c.

Laſtly, nature, the univerſe, or *το παν*, was reputed a great god.

Heſiod has a poem under the title of Θεογονια, *i. e.* the generation of the gods; wherein he explains their genealogy and deſcent; ſets forth who was the firſt, and principal; who next deſcended from him, and what iſſue each had: the whole making a ſort of ſyſtem of heathen theology.

Beſide this popular theology, each philoſopher had his ſyſtem: as may be ſeen from the Timæus of Plato, and Cicero De Natura Deorum.

Juſtin Martyr, Tertullian in his Apologetics, and in his book Contra Gentes; Arnobius, Minutius Felix, Lactantius, Euſebius, Præpar. & Demonſt. Evangel. St. Auguſtine De Civit. Dei, and Theodoret Adverſ. Gentes, ſhew the vanity of the heathen gods.

It is very difficult to diſcover the real ſentiments of the heathens with reſpect to their gods: they are exceedingly intricate and confuſed, and even frequently contradictory. They admitted ſo many ſuperior and inferior gods, who ſhared the empire, that all was full of gods. Varro reckons up no leſs than 30,000 adored within a ſmall extent of ground, and yet their number was every day growing. The way to heaven was ſo eaſy for the great men of thoſe days, that Juvenal brings in Atlas complaining he was ready to ſink under the load of ſuch a number of new gods as were daily placed in the heavens: yet father Mourgues ſeems to have proved that all the philoſophers of antiquity have acknowledged that there was but one God. Plan. Theol. des Sect. Scavans. de la Greece.

GOD, *Act of.* See DISABILITY.

GOD, *Peace of.* See PEACE.

GOD, *Son of.* See SON.

GOD, *Truce of.* See TRUCE.

GOD, *Worſhip of.* See WORSHIP.

GODAGARY, in *Geography*, a town of Bengal; 18 miles N. of Moorſhedabad.

GODALMING, a market town and pariſh in the county of Surry, England, contains 474 houſes and 3405 inhabitants. The town is built in a valley, on the banks of the river Wey, which is divided into ſeveral ſmall ſtreams here. The chief of theſe is navigable to Weybridge, where it unites its waters with the Thames. In the vicinity of the town are ſome corn-mills, and paper-mills. Here are ſeveral manufactories for weaving ſtockings, patent fleecy hoſiery, and coarſe woollen cloths; wool-combing and ſpinning of worſted alſo conſtitute part of the trade of the place. The pariſh of Godalming is divided into nine tythings, and the whole is governed by a warden, eight aſſiſtants, and a bailiff. The church is diſtinguiſhed by its handſome ſpire. In the town are a quakers' meeting-houſe, two chapels for diſſenters, a charity ſchool, and in the immediate vicinity is an hoſpital for the accommodation of ten poor men. A ſingular impoſition on public credulity and curioſity was practiſed in this town about the year 1726. A female, named Mary Tofts, circulated a report that ſhe was pregnant with rabbits, and alſo excited a very general belief that ſhe had actually been delivered of ſome of theſe animals. The impoſition, like that of "the Cock-lane ghoſt," was ſupported with ſo much cunning and addreſs, that many perſons, among whom were ſome of the faculty, were deceived, and, for ſome time, credited the tale. Godalming has a weekly market on Saturday, and two annual fairs. Manning's Hiſtory and Antiquities of Surrey, folio.

GODAMA, GODEMA, *Gaudma*, *Gotma*, or *Goutam*, in *Indian Mythology*, different names applied in various parts of India, and particularly in the Birman empire, to their deity Budha, or Boodh. (See BOODH.) Godama or Kodama is the moſt common appellation among his worſhippers in India beyond the Ganges; it ſeems alſo to be common among the Hindoos, who, according to the idiom of the Sanſcrit, write it Gotamas. This name, as ſome ſay, literally ſignifies cow-herd, but metaphorically king; and, according to others, the meaning of Godama is eminently wiſe, or a ſage. Many other appellations are given to this deity derived from the poſtures in which his various images repreſent him. Godama was probably an Indian prince, deified by ſuperſtition; and in an ancient treatiſe, giving an account of the religion of Godama, entitled "Zarado," Godama is ſaid to have attained divinity at the age of 35 years, to have preached his law for 45 years, and to have brought ſalvation to all living beings. Dr. Buchanan, who cites this treatiſe (Aſ. Reſ. vol. vi.) places the death of Godama 546 years B. C. The doctrine and laws, ſaid in this treatiſe to be delivered by Godama, conſiſt chiefly in obſerving the five commandments, and in abſtaining from the ten ſins. The five commandments are as follow: 1. From the meaneſt inſect up to man, thou ſhalt kill no animal whatever. 2. Thou ſhalt not ſteal. 3. Thou ſhalt not violate the wife or concubine of another. 4. Thou ſhalt tell nothing falſe. 5. Thou ſhalt drink neither wine, nor any thing that will intoxicate; thou ſhalt not eat opium, or any other inebriating drug. The perſon who keeps theſe five commandments ſhall attain high rank, and ſhall not be liable to poverty, nor to other misfortunes and calamities. The ten ſins are the killing of animals—theft—adultery—falſhood—diſcord—harſh and indignant language—idle and ſuperfluous talk—the coveting of your neighbour's goods—envy, and the deſire of your neighbour's death, or misfortune—and the following of the doctrine of falſe gods. Every one who abſtains from theſe ſins, will ſucceſſively increaſe in virtue through all his ſucceſſive tranſmigrations, till at length he will become worthy of beholding a God, and of hearing his great voice; and he will be exempted from the four human miſeries, *viz.* weight, old age, diſeaſe, and death. The good works required are giving alms, and thoughtfully pronouncing three words. Whoever dies without the abſtinence and good works here preſcribed, will certainly paſs into one of the infernal ſtates, and be doomed to certain tranſmigrations. The prieſts of Godama are called Rahans in the Burma language, and they have alſo beſtowed upon them the title of Somona or Samana, which is likewiſe applied to the images of the divinity when he is repreſented, as he commonly is, in the prieſtly habit. (See RAHANS.) Godama commanded his images and relics to be worſhipped. The largeſt and moſt celebrated temples are generally in the form of a pyramid; and contain ſome of theſe relics, ſuch as a tooth, a bone, a hair, or a garment. To theſe temples the prayers of the devout are addreſſed, and their offerings preſented. The images of the god are of very various materials; clay, copper, ſilver, and alabaſter. Many of them are richly gilt, and adorned with paintings of flowers; they are of different ſizes, ſome being not above ſix inches high, and others of a coloſſal ſtature. Other objects of great veneration among the worſhippers of Godama are ſtones of large dimenſions, carved with various hieroglyphics, and ſaid to repreſent, or to be the impreſſions of his feet. The principal diſciples of Godama are by his followers conſidered as ſaints; and many images of theſe, in a prieſtly habit, accompany that of their maſter. Every true worſhipper of Godama prays before he goes to ſleep, and before he riſes in the morning, which is generally at the dawn of day.

Beſides their private devotions, which are numerous and regularly performed, it is cuſtomary to make offerings at the temple; the ſeaſons for which are thoſe of the four phaſes of the moon, eſpecially the full and change, which may be conſidered as the Burma ſabbaths. Friday is with them reckoned an unfortunate day, and therefore on this day they undertake no buſineſs; but they keep holy no particular day of the week. The ſect of Godama eſteem the opinion of a divine being, who created the univerſe, to be highly impious; and accordingly the followers of Godama are, ſtrictly ſpeaking, atheiſts, as they ſuppoſe every thing to ariſe from fate; and their gods are merely men, who by their virtue acquire ſupreme happineſs, and by their wiſdom become entitled to impoſe a law on all living beings. See BIRMAN *Empire*, and BOODH.

GODANA, in *Geography*, a town of Perſia, in the province of Irak; 105 miles E. of Iſpahan.

GODAVERY, or GONGA GODOWRY, a river of Hindooſtan, ſometimes called the *Gang* in Feriſhta's Hiſtory, was, till very lately, conſidered as the ſame with the Cattack river, or Mahanuddy; but it is now aſcertained to be a different river, which has its ſource about 70 miles N.E. of Bombay; on the weſtern Gauts, more properly called the Sukhien mountains; and, in the upper part of its courſe, at leaſt, is eſteemed a ſacred river by the Hindoos; that is, ablutions performed in its ſtream have a religious efficacy ſuperior to thoſe performed in ordinary ſtreams. The Godavery, after traverſing the Dowlatabad ſoubah, and the country of Tellingana, from weſt to eaſt, turns to the ſouth-eaſt; and receiving the Bain Gonga, about 90 miles above the ſea, beſides many ſmaller rivers, ſeparates into two principal channels at Rajamundry; and thence ſubdividing again, they form altogether ſeveral tide harbours, for veſſels of moderate burden. Ingeram, Coringa, Yanam, Bandarmalanka, and Narſapour, are among the places ſituated at the mouth of this river; which appears to be the moſt conſiderable one between the Ganges and cape Comorin. Extenſive foreſts of teak-trees border on its banks, within the mountains, and ſupply ſhip-timber for the uſe of the ports abovementioned. The Kiſtnah and Godavery rivers, however remote at their fountains, approach within 80 miles of each other in the lower parts of their courſe; and form an extenſive tract of country, compoſed of rich vegetable mould, ſuch as is uſually found at the mouths of large rivers. Rennell. See DELTA.

GOD-BOTE, in our *Ancient Saxon Cuſtoms*, an eccleſiaſtical or church fine, for crimes and offences committed againſt God. Theſe, according to Blackſtone, are *apoſtacy* and *hereſy;* which ſee.

GODDARD, Jonathan, in *Biography*, an eminent phyſician and chemiſt, was born at Greenwich in the year 1617. After ſtudying for four years at Oxford, he ſet out on his travels, and on his return he ſettled in practice in London, having taken his degree at Cambridge. He was elected a fellow of the College of Phyſicians in 1646, and in 1647 was appointed lecturer on anatomy. In conjunction with ſome friends, he formed a ſociety for experimental inquiry, which met at his lodgings in Wood-ſtreet, and in promoting the objects of which he was extremely aſſiduous. Having gained conſiderable reputation, and having, with the reſt of his party, ſided with parliament, he was appointed by Cromwell chief phyſician to the army, and in this capacity accompanied the uſurper to Ireland in 1649, to Scotland in the following year, and thence returned with his maſter, who, after the battle of Worceſter, rode into London in triumph, September 12th, 1651. He obtained many favours from Cromwell, who firſt made him warden of Merton college, Oxford, afterwards ſole repreſentative of that univerſity in the Short Parliament in 1653; and in the ſame year one of the council of ſtate. Theſe favours were ſufficient to procure for him the diſpleaſure of Charles II.; and, being driven from Oxford, he removed to Greſham college, where he had been choſen profeſſor of phyſic in November 1655. Here he continued to frequent thoſe meetings, which gave birth to the Royal Society, and was nominated one of the firſt council of that inſtitution in the charter. Dr. Goddard was a conſcientious and able practitioner. Partly from the love of experimental chemiſtry, principally from a diſtruſt in the knowledge of apothecaries, he prepared his own medicines, and recommended the practice to be adopted by phyſicians in general. Finding numerous obſtacles, however, in his way, he publiſhed "A Diſcourſe, ſetting forth the unhappy condition of the practice of phyſic in London," 1669. But this was of no avail. He died on the 24th of March, 1674, being ſeized with an apoplectic fit in Cheapſide, when returning from one of the philoſophic meetings. Two papers of his were publiſhed in the Philoſophical Tranſactions, N° 137, 138; and many others in Birch's Hiſtory of the Royal Society.

GODDESS, Dea, *Diva*, a heathen deity, to whom they attributed the female ſex.

The ancients had almoſt as many goddeſſes as gods. Such were Juno, the goddeſs of air; Diana, the goddeſs of woods and chaſtity; Proſerpina, the goddeſs of hell; Venus, of beauty; Thetis, of the ſea: ſuch alſo were Victory, Fortune, &c.

Nay they were not contented to make women gods, and admit both ſexes into the roll; but they had alſo hermaphrodite gods. Thus Minerva, according to ſeveral of the learned, was both man and woman, and worſhipped both under the appellation of Lunus and Luna. Mithras, the Perſian deity, was both god and goddeſs, and the ſexes of Venus and Vulcan are very dubious: whence, in the invocations of thoſe deities, they uſed this formula; "Be thou god or goddeſs;" as we learn from A. Gellius. It was a privilege peculiar to goddeſſes, that they might be repreſented, on medals, naked. The imagination, it was ſuppoſed, muſt be awed, and kept from taking liberties, by the conſideration of the divine character.

GODEAU, Anthony, in *Biography*, was born at the city of Dreux in the year 1605. He was educated for civil and active life, but having met with a diſappointment in the object of his affections, he repaired to Paris, where he cultivated the ſociety of men of letters, and was one of the firſt of thoſe who eſtabliſhed the French academy of belles lettres. This ſociety ſuggeſted to the cardinal Richlieu the foundation of the French academy, of which M. Godeau was an original member. He took orders in the year 1735, and having enriched his own mind with the moſt pure maxims of Chriſtian morality, he taught them from the pulpit with much eloquence, and he is ſaid to have practiſed them in all his actions. In the year 1636 he was, by the influence of cardinal Richlieu, nominated to the biſhopric of Graſſe, and from this time he divided his time between his ſtudies, and the diligent diſcharge of his epiſcopal functions. He found the ſtate of eccleſiaſtical diſcipline exceedingly relaxed, and ſet about its reformation; he perſonally examined the qualifications of the clergy, and enquired in what manner they diſcharged the important duties of their office; he frequently preached in different parts of his dioceſe, and exhibited in his own life an admirable model of thoſe virtues which he was anxious to recommend to the attention of his flock. He was in high favour with pope Innocent X. who granted him bulls of union of the biſhopric of Venice with that of Graſſe, but when he found that the people and clergy oppoſed the meaſure, he choſe rather to give up his pretenſions, than break in upon the peace of the church. He died in 1672, at the age of ſixty-ſeven years. He was a conſiderable writer, chiefly on ſubjects connected with his profeſſion, but his moſt important work was "The Hiſtory of the Church from the commencement of the World to the end of the Ninth Century," in three volumes, folio. This is the firſt eccleſiaſtical hiſtory written in the French language; and though compoſed with leſs preciſion than that of the abbé Fleury, it poſſeſſes conſiderable merit. It is characterized by Dupin as "exact, faithful and agreeable:" he farther adds, that it always will have a merit, which neither time, nor any other hiſtory will be able to efface. Beſides the hiſtory, we may notice M. Godeau's "Paraphraſes on the Epiſtles of St. Paul:" "The New Teſtament tranſlated and explained:" "The lives of St. Paul, St. Auguſtine, and St. Charles Borromeo, &c." Moreri.

GODEFROI, Denys, a very learned juriſt, was born at Paris in 1549. He ſtudied at Louvain, Cologne, and Heidelberg, and upon his return to France acquired a high reputation in the parliament, in which he was nominated to a counſellor's place. In 1580 his religious principles obliged him to ſeek a refuge at Geneva, where he was admitted a burgher, and a profeſſor of the law. In 1589 Henry IV. created him bailiff of ſome villages at the foot of mount Jura, and a ſupernumerary counſellor in the parliament of Paris. After this he was deprived of his employment and his valuable library by the invaſion of the duke of Savoy, and in 1594 he accepted the profeſſorſhip of the law in the univerſity of Straſburg. In 1604, at the invitation of Frederick, elector-palatine, he went to ſettle at Heidelberg, and in 1618 that prince ſent him on an embaſſy to Lewis XIII., who received him with marks of high eſteem. He died at Straſburg in 1622, leaving behind him many works that teſtify to his great learning. The titles of theſe are enumerated by Moreri and others, and a few of the principal may be mentioned here: "Corpus Juris civilis cum notis;" this treatiſe has been frequently reprinted: the beſt edition is ſaid to be that from the Elzevir preſs in two volumes folio. "Notæ in IV. Libros Inſtitutionum:" "Praxis Civilis ex antiquis et recentioribus Scriptoribus."

Godefroi, Theodore, the eldeſt ſon of the preceding, was born at Geneva in 1580. He purſued his ſtudies firſt in that city, then at Straſburg, and afterwards at Paris, where he embraced the Catholic religion. In 1643 he obtained the office of counſellor of ſtate, and acted during the ſix laſt years of his life as counſellor and ſecretary to the French embaſſy for the general peace at Munſter. Here he died in 1649. He was particularly verſed in the genealogical and ceremonial hiſtory of France, and publiſhed ſeveral learned works for its illuſtration; ſuch are "Le Ceremonial de France," 4to. "Mem. concernant la Preſſeance des Rois de France ſur les Rois d'Eſpagne:" "De la veritable Origine de la Maiſon d'Auſtriche:" "Traité touchant les Droits du Roi Tres-chretien ſur pluſieurs Etats voiſines," &c. Moreri.

Godefroi, James, brother to Theodore, was born at Geneva in 1587. He followed the ſteps of his father by a ſtrict adherence to the reformed religion, and by purſuing the ſtudies of law, hiſtory, and philoſophy. In 1619 he was created profeſſor of the law at Geneva, and was called to a ſeat in the council in 1629. He filled with the greateſt zeal and ability every public office with which he was entruſted. He was five times elected ſyndic of the republic, and was made ſecretary of ſtate. He was choſen as a fit perſon to conduct various negociations in France, Piedmont, Switzerland, and Germany; and, at the ſame period, he devoted all his leiſure to public lectures in juriſprudence, and compoſed a variety of learned works. He maintained a correſpondence with the moſt learned men of the age, by whom he was greatly reſpected. He died in 1652, and his works bear teſtimony to his profound erudition, and to his great and unwearied induſtry; among them may be mentioned "Fragmenta Duodecim Tabularum;" "Animadverſiones Juris Civilis;" "De Jure Præcedentiæ;" "Codex Theodoſianus," a poſthumous work, regarded as a moſt valuable monument of ancient juriſprudence. He edited the works of Cicero, "cum notis Lambini et Gothofredi." He had likewiſe made large collections for the hiſtory of Geneva, which were afterwards uſed by Spon. Moreri.

Godefroi, Denys, ſon of Theodore, born at Paris in 1615, was an able French hiſtorian. He was author of "Memoires et Inſtructions pour ſervir dans les Negociations et les Affaires concernant les Droits du Roi," a work, which has ſometimes been attributed to the chancellor Seguier, by whoſe order it was compiled. He re-edited many of his father's works, adding to them new illuſtrations with learned notes. He continued to his own time Feron's "Hiſt. des Officiers de la Couronne." As a public man he was appointed in 1668 the director and keeper of the chamber of accounts at Lille in Flanders, where he died in 1681. Moreri.

Godefroi, John, ſon of the preceding, ſucceeded his father in the direction of the chamber of accounts at Lille, where he died, much advanced in years, in 1732. He publiſhed an edition of the "Memoirs of Philip de Comines," in five volumes 8vo. "The Journal of Henry III." "The Memoirs of Queen Margaret." He is ſaid to have contributed more than any other writer to the elucidation of the affairs of the League. Moreri.

GODERVILLE, in *Geography*, a town of France, in the department of the Lower Seine, and chief place of a canton, in the diſtrict of La Havre; 9 miles N.E. of Montvilliers. The place contains 650, and the canton 12,539 inhabitants, on a territory of 150 kiliometres, in 31 communes.

GODESCHALC, in *Biography*, a Benedictine monk, who flouriſhed in the ninth century, was born in Saxony, and was brought up, contrary to his own inclination, to the profeſſion, in the convent of Fulda. He was ordained prieſt when he was about forty years of age, and in 846 we find him at Rome viſiting the holy places there; thence he proceeded to Pannonia and Dalmatia, where he commenced preaching the doctrine of predeſtination with much fervour, which it is ſuppoſed he imbibed from the works of St. Auguſtine. Upon his return to his own country he had a conference with Nothingus, biſhop of Verona, before whom he maintained that God, from all eternity, had pre-ordained ſome to everlaſting life, and others to everlaſting puniſhment and miſery. Nothingus, aſtoniſhed and terrified at ſo daring, and, as he thought, impious a poſition, complained of it to Rabanus, archbiſhop of Mentz, who undertook to confute his error, in writing. Diſſatisfied, perhaps, with his own arguments, Rabanus ſummoned a council to meet at Mentz, in the year 848, to which, however, Godeſchalc preſented a juſtification of his opinions, and reſolutely perſiſted in maintaining them to be conſiſtent with the ſcriptures and the ſenſe of the orthodox fathers. The council paſſed ſentence of condemnation upon him, and ſent him priſoner to Hincmar, archbiſhop of Rheims, within whoſe juriſdiction he had received the prieſthood. Hincmar, who was devoted to the intereſt of Rabanus, aſſembled a council in 849, in which the monk was a ſecond time condemned, and rendered liable to a puniſhment repugnant to all the principles of religion and humanity. Godeſchalc, however erroneous his ſentiments might be, was not to be intimidated; he believed what he aſſerted, and he firmly adhered to the doctrine in ſpite of the higher powers. Hincmar accordingly proceeded to put the ſentence into execution, degraded the monk from the prieſthood, and ordered him to be ſcourged with the utmoſt ſeverity. It appears that he was not prepared for ſo grievous a trial of his fortitude; the force of the pains inflicted on him obliged him, in compliance with the dictates of his proſecutors, to throw into the fire the juſtification of his opinions which he had delivered into the council. The infamous perſecutors were not contented with this triumph; they committed him cloſe priſoner to the monaſtery of Hautvilliers, in the dioceſe of Rheims. In this, as in every other caſe of a ſimilar kind, the ſufferings of Godeſchalc gained him followers and adherents, and many became advocates for his cauſe. A conſiderable ſchiſm was produced in the Latin church. Some confined themſelves to the defence of his perſon and conduct, while others employed all their zeal and talents in the vindication of his doctrine. The ſpirit of the controverſy ran ſo high between the contending parties, that Charles the Bald, in 853, ſummoned the council to meet at Quiercy. Here the ſuffering monk was again condemned, but the decrees of this council were declared null and void, and Godeſchalc and his doctrine vindicated and defended, in a council at Valence, in Dauphiny, in 855, the decrees of which were confirmed in the council of Langres, and in that of Touſi. Such was the origin of the diſputes concerning the doctrines of predeſtination and grace, which, from time to time, have divided the Catholic world into two parties, and which have ſubſiſted in full force among the Proteſtants. The unfortunate Godeſchalc died in priſon about the year 869, maintaining with his laſt breath the doctrine for which he had ſuffered. The only writings of this monk that have come down to the preſent times are, two "Confeſſions of Faith," inſerted in archbiſhop Uſher's "Hiſtoria Godeſchalci," printed at Dublin in 1641; an epiſtle to Ratramnus, publiſhed in Cellot's "Hiſtoria Godeſchalci," at Paris, in 1655, and ſome fragments of other pieces, noticed by Cave. Godeſchalc has immortalized his name by ſetting on foot the controverſy to which we have referred, and by his ſufferings in vindication of his favourite doctrine. In the year 1650, the celebrated Maguin publiſhed at Paris, in two volumes 4to. a collection of the early treatiſes produced on both ſides of this controverſy, entitled "Veterum Auctorum qui nono ſeculo de Prædeſtinatione et Gratia ſcripſerunt, &c."

GOD-FATHERS, and God-Mothers, perſons who direct and attend at the baptiſm of infants, or other perſons; who give the name, and who become ſureties for the faith and good conduct of the infant baptized. Hence they are called *ſuſceptors*, or more commonly *ſponſors*. To this purpoſe Dr. Nichols, (Def. part ii. p. 273.) ſays, that "the ſureties in baptiſm religiouſly engage for the faith of the baptized; that they ſhall ſincerely believe all that is revealed in the goſpel, and ſhall direct the ſubſequent actions of their lives by the laws of Chriſt." Againſt this practice Proteſtant diſſenters have alleged, that the parents, to whom both God and nature have committed the education of their child, are the proper perſons to ſtand forth at its baptiſm, and take upon them this great and important truſt; and to bind themſelves by a ſolemn vow faithfully to diſcharge it. They object to the order and practice of the eſtabliſhed church, that without ſufficient authority from reaſon, or ſcripture, or the ancient practice of the Chriſtian church, parents are ſet aſide in this ſolemnity, and forbidden to ſtand forth, and take upon them this great charge to which God hath called them. For the 29th canon expreſsly commands, "that no parent ſhall be urged to be preſent at his child's baptiſm, nor *be admitted* to anſwer as god-father for *his own* child." They alſo object, that the forms of the church ſhould require other perſons to appear inſtead of the parents, and to take upon them this important truſt, and moſt ſolemnly to promiſe before God and the church the performance of that, which few of them ever do, or perhaps ever intended to perform, or are capable of performing. It has been pleaded, and even generally allowed, that ſponſors in baptiſm were not known or thought of in the primitive apoſtolic church. Tertullian, who lived about A.D. 200, ſeems to have been the firſt of all Chriſtian writers who mentions perſons of this deſcription: "What neceſſity is there," ſays he, (De Baptiſm.) "that ſponſors ſhould expoſe themſelves to danger, who, through death, may fail of the performance of their promiſes, or may be deceived by the wicked diſpoſition of thoſe for whom they promiſe." "Whether the uſe of ſponſors was from the apoſtles' days," (ſays lord King, in his Enquiry into the Conſtitution, &c. of the Primitive Church,) "I cannot determine, unleſs the negative may be conjectured from Juſtin Martyr, Tertullian's ſenior by 50 years, who, when he enumerates the method and form of baptiſm, ſays not one word of ſponſors or god-fathers, as may be ſeen in his ſecond apology, p. 93, 94." St. Auſtin, one of the earlieſt of Chriſtian writers who mention ſponſors, who lived about A.D. 390, informs us when, and upon what occaſion, theſe ſponſors were admitted: "A great many," ſays he, "are offered to baptiſm, not by their parents, but by others, as infant-ſlaves are ſometimes offered by their maſters; and ſometimes when the parents are dead, the infants are baptized, being offered by any who can afford to ſhew this compaſſion to them. And ſometimes infants, whom their parents have cruelly expoſed, to be brought up by thoſe who light on them, are now and then taken up by the holy virgins, and offered to baptiſm by them who have no children of their own, nor deſign to have any." Upon theſe words of Auſtin, Dr. Wall ingenuouſly confeſſes, (Hiſt. Inf. Bapt. vol. i.) "Here we ſee the *ordinary* uſe there was for *parents* to anſwer for the children; but yet that this was not counted ſo *neceſſary*, as that a child could not be baptized without it." Hence it has been inferred, that parents were never ſet aſide, when they were capable and willing to offer their children; and that only in caſes of the incapacity of parents, were ſponſors admitted; and in all ſuch caſes, provided that the practice be not enforced as a Chriſtian inſtitution, and as abſolutely indiſpenſable, the diſſenters, we conceive, could not reaſonably object to it. Mr. Wheatly, a well-known writer on the Common Prayer, obſerves, that the god-fathers and god-mothers of perſons baptized at riper years "are only appointed as *witneſſes* of the engagement, and undertake no more than to remind them hereafter of the vow and profeſſion, which they made in their preſence." And yet our church catechiſm expreſsly aſſerts, and repeats the aſſertion, that the ſponſors, engaging for *infants*, engage that they ſhall believe and repent; for the infants are ſaid to promiſe both theſe things by their ſureties. Free and Candid Diſquiſitions, p. 131.

The number of god-fathers and god-mothers is now reduced to three in the church of England, and two in that of Rome: anciently, they had as many as they pleaſed.

The Romaniſts have alſo god-fathers and god-mothers at their confirmation. They even give god-fathers, &c. to bells, at their baptiſm.

Among the ancients it was the cuſtom for perſons of quality to have others of like quality cut their children's hair the firſt time; by which they became reputed a ſort of god-fathers: and the like was practiſed with regard to the hair of the beard.

God-Father was alſo a name anciently given to a kind of ſeconds, who attended and aſſiſted the knights in tournaments, or ſingle combats.

The god-fathers of duels were a kind of advocates, who were choſen by the two parties, to repreſent the reaſons of their combat to the judges.

Something of this kind was long retained at ſolemn carouſals. There were two or more in each quadrill. See Quadrill.

The inſtitution of god-fathers and god-mothers, *patrimi* and *matrimi*, is originally Roman. They are ſaid to have been people who, in the games of the Circus, attended the chariots, ſhows, and images, of the gods. Cicero makes mention of them, in his oration De Haruſpicum Reſponſis. Their office was much like that of the children in ſome Romiſh ceremonies, who are dreſſed in the habit of angels, to ſtrew flowers, bear incenſe-pots, lights, &c. and accompany the relics and images of ſaints.

GODFREY of Bouillon, in *Biography*, celebrated for the part which he took in the firſt cruſade, and king of Jeruſalem, was the ſon of Euſtace II., count of Boulogne. The appellation of Bouillon was derived from his lordſhip of that name in the Ardennes. In his youth he ſerved in the armies of Henry IV., who, as a reward of his valour and fidelity, conferred upon him the title of duke of Lorrain. When the religious enthuſiaſm of the times ſet on foot an expedition for the recovery of the Holy Land from the poſſeſſion of the Saracens, Godfrey was one of the earlieſt and moſt illuſtrious of the princes who took the croſs. The command of the principal army was entruſted to his care, and it is agreed that none among the leaders were actuated by purer motives than Godfrey. He gave a diſtinguiſhing proof of the diſintereſtedneſs of his conduct, by ſacrificing almoſt all his property to defray the neceſſary expences of the expedition. Godfrey ſet out in the autumn of 1096, and proceeded with his hoſt through Germany and Bulgaria, taking care to abſtain from thoſe acts of hoſtility and rapine which characterized, and had cauſed the deſtruction of the fanatics of Peter the Hermit. It was not till June 1099, that Godfrey was able to lay ſiege to the renowned city, and though his army was greatly diminiſhed in point of numbers, he was able to ſucceed, and on July 15th Jeruſalem was taken by ſtorm. The fanaticiſm and madneſs of the victors indulged themſelves in a horrible maſſacre of the vanquiſhed, which, it is believed, their general and leader was unable to prevent. Godfrey was almoſt immediately proclaimed ſovereign of the new acquiſition, but he refuſed to aſſume the title and enſigns of royalty in the place where Chriſt, in whoſe cauſe he was acting, had been crowned with thorns, and he governed under the modeſt appellation of “Defender and Baron of the Holy Sepulchre.” He was ſoon after attacked by the ſultan of Egypt, but the Chriſtians ſoon put him and his numerous forces to flight, and the whole of Paleſtine was reduced under the power of Godfrey. He eſtabliſhed the feudal inſtitution in his kingdom; and a code of juriſprudence, under the title of “The Aſſize of Jeruſalem,” gave a model of the pureſt form of European liberty in the midſt of Aſiatic deſpotiſm. He died, after he had ſat on the throne about a year, and was ſucceeded by his brother Baldwin. The celebrity of Godfrey is immortalized as the hero of Taſſo's “Jeruſalem Delivered,” one of the nobleſt of epic poems; nor has the bard found it neceſſary to borrow the colours of fiction, in order to throw ſplendour round a character ſo truly eſtimable: “Godfrey,” ſays the hiſtorian in deſcribing his character,” was the firſt who aſcended the walls of Rome, and his ſickneſs, his vow, perhaps his remorſe for bearing arms againſt the pope, confirmed an early reſolution of viſiting the holy ſepulchre, not as a pilgrim, but a deliverer. His valour was matured by prudence and moderation; his piety, though blind, was ſincere, and in the tumult of a camp he practiſed the real and fictitious virtues of a convent. Superior to the private factions of the chiefs, he reſerved his enmity for the enemies of Chriſt; and though he gained a kingdom by the attempt, his pure and diſintereſted zeal was acknowledged by his rivals.” Gibbon Univer. Hiſt. See alſo the article CROISADE.

GODFREY of Viterbo, an Italian hiſtorian of the 12th century, was chaplain and ſecretary to the emperors Conrad III., Frederick I., and Henry IV. According to his own account he was a great traveller for knowledge; and was converſant in ſeveral languages. His principal work was a “Chronicle,” entitled the “Pantheon,” as treating on the “Gods of Earth,” is dedicated to pope Urban III., and is a general hiſtorical record from the creation of the world to the year 1186. It is written in the Latin language, and is deemed very worthy of credit for the events of his own time. It was firſt printed at Baſil in 1559; then at Frankfort in 1584, and afterwards at Hanover in 1613, in the collection of German hiſtorians, edited by Piſtorius. Godfrey was author of a work intitled “Speculum Regum, ſive de Genealogia omnium Regum:” the MS. is preſerved in the Imperial library of Vienna.

GOD-GILD, in our *Ancient Cuſtoms,* that which is offered to God, or for his ſervice.

GODHEAH, or GOOD HOPE, in *Geography*, a ſettlement in Weſt Greenland. N. lat. 64° 25'. W. long. 50° 10'.

GODIN, LOUIS, in *Biography*, was born at Paris in 1704. He ſtudied aſtronomy under de l'Iſles, and in 1725 was made adjunct of the Academy of Sciences. To him was entruſted the care of editing its memoirs, and under his direction the firſt eleven volumes were publiſhed. In 1735 he was ſent, with other members of the academy, to meaſure a degree of the meridian at Peru. He was ſome time profeſſor of mathematics at Lima, and on his return in 1751, he was appointed a colonel in the Spaniſh ſervice, and director of the naval academy at Cadiz, where he died in the year 1760. He was author of ſeveral aſtronomical papers in the memoirs of the academy from 1726 to 1739: and he publiſhed “Machines et Inventions approvées par l'Academie des Sciences,” in 6 vols. 4to. “Connoiſſances des Tems,” which he conducted five years. “Cours des Mathematiques,” 1756. Gen. Biog.

GODING, or HODONING, in *Geography*, a town of Moravia, in the circle of Brunn; 16 miles E.S.E. of Auſpetz.

GODO, a town of Arabia, on the S. coaſt of the Perſian gulf; 140 miles W. of Julfar.

GODOUA, a ſmall town of Fezzan; 30 miles N. of Mourzouk, and about the ſame diſtance from Sebbah, which ſee.

GODRA, a town of Hindooſtan, and capital of a circar of the ſame name in Guzerat; 55 miles E. of Amedabad. N. lat. 22° 50'. E. long. 73° 40'.

GOD's HOUSE, *League of*, a territory of Switzerland, formerly under the dominion of the biſhop of Coire, until the people, oppreſſed by their rulers, threw off the yoke, and, forming a general league, compelled the biſhop to ratify their independence. The revolution, which finally exalted this league into its preſent ſtate of freedom, probably took place between 1424, the era of the formation of the Grey league, and 1436, the year in which the ten juriſdictions roſe into independence. This league is denominated in Romanſh “La Ligia de la Chiada,” in German “Gottſhauſband,” whence is derived the appellation of the “league of the houſe of God,” which it takes from the cathedral ſituated in its capital, as well as becauſe it was once under the juriſdiction of the biſhop of Coire. This league is divided into eleven diſtricts, each of which (Coire excepted) is ſubdivided into two little republics, or communities, and ſends 22 deputies to the general diet. Formerly the burgomaſter of Coire was perpetual chief of the league without election; but in the latter end of the 17th century the other communities claimed a power of nominating to this office in their turn. At length, by the arbitration of Zuric, it was decided, that the 22 deputies ſhould chuſe two candidates from the members of the ſenate of Coire, who ſhould draw lots for the charge. The chief thus appointed is called “Bunds-preſident,” has ſeveral privileges which diſtinguiſh him from the chiefs of the two other leagues; he receives all the letters addreſſed to the republic of the Griſons from foreign powers, and is perpetual preſident of the congreſs, becauſe that aſſembly is always held at Coire. See COIRE.

The league of God's houſe is divided into 11 high juriſdictions, and comprehends 21 communes.

High Juriſdictions.		Communities.	Members of General Diet.
I. Coire	1.	Coire	2
II. Pregalia	2.	Sopra Porta	1
	3.	Sotto Porta	1
III. Upper Engadina	4.	Sopra Fontana Merla	1
	5.	Sotto Fontana Merla	1
IV. Lower Engadina	6.	Sopra Taſma	1
	7.	Sotto Taſma	1
V. Bivio or Stalla	8.	Bivio and Marmorara	1
	9.	Avers	1
	10.	Remus, Schlins, and Samun	1
VI. Ortenſtein	11.	Ortenſtein	1
	12.	Furſtenau	1
VII. Obervats	13.	Obervats	1
	14.	Breguns	1
VIII. Oberhaſtein	15.	Tinzen and Reamp	1
	16.	Tiefen Caſten	1
IX. Puſchiavo	17, 18.	Valley of Puſchiavo	2
X. Munſter	19.	Valley of Munſter	1
XI. Four villages	20.	Sitzers, Igis, Tremes	1
	21.	Unter Vatz	1

God's *Mercy, Iſlands of*, three or four ſmall iſlands at the N.W. extremity of Hudſon's ſtraits. N. lat. 63° 45. W. long. 73°.

GODWIN, Earl, in *Biography*, a powerful Saxon baron, was the ſon of Wolfnoth, governor of Suſſex, and he himſelf, at the acceſſion of Canute, was earl of Kent, and lord of very great poſſeſſions. When the Daniſh poſſeſſions of Canute were attacked by the king of Sweden, Canute took over as auxiliaries a body of Engliſh commanded by the earl of Godwin, who obtained a complete victory, which ſo delighted the king, that he beſtowed his daughter in marriage upon him, made him large grants of land, and admitted him to the cloſeſt confidence. After the death of Canute, the ſucceſſion being diſputed between Harold Harefoot and Hardicanute, Godwin eſpouſed the part of the latter, and was inſtrumental in preventing a civil war. It is reported that he afterwards concurred with Harold, in a plan for deſtroying the two Engliſh princes, ſons of Ethelred II. and Emma, and the murder of one of them, *viz.* Alfred, is imputed to the vaſſals of Godwin. In the reign of Hardicanute the ſurviving prince Edward preferred an accuſation againſt the earl for the murder of his brother, and loudly demanded juſtice for the crime; Godwin, to appeaſe the king, made him a preſent of a galley finely gilt and decorated, rowed by fourſcore men, each of whom wore on his arm a gold bracelet, weighing ſixteen ounces, and they were all armed and clothed in the moſt ſumptuous manner. Hardicanute, delighted with the ſpectacle, forgot his brother's murder, and on Godwin's own teſtimony he was allowed to be acquitted. In 1041, he was ſo completely reconciled to Edward, that on the death of Hardicanute he was the chief inſtrument of promoting him to the ſucceſſion of the crown: he now acquired much influence in the ſtate, and was created duke of Weſſex, and the counties of Kent and Suſſex were annexed to his government. The friendſhip between Godwin and the king was not of long continuance. Upon his refuſal to act againſt the inhabitants of Dover, who had incurred Edward's diſpleaſure, he was threatened with the royal vengeance. The earl, feeling his own power, actually excited a rebellion againſt his ſovereign. Edward now ſummoned to his aid the dukes of Northumberland and Mercia, and being thereby ſuperior to Godwin and his ſons, he marched to London and ſummoned a great council to paſs judgment upon the rebels. Godwin, with three of his ſons, took refuge with Baldwin earl of Flanders, while Harold and another fled to Ireland. Godwin, after many misfortunes, failed with a powerful force to London, and forced the king to an accommodation: Edward conſented to baniſh his Norman favourites, who had been, in a great meaſure, the cauſe of the diſcontents, and Godwin and his ſons were reſtored to their eſtates, and the high offices which they had formerly held. Godwin's death, which happened ſoon after this, while he was ſitting at table with the king, prevented him from making farther inroads on the ſovereign's authority, or from reducing him to ſtill greater ſubjection. He was ſucceeded in the government of Weſſex, Suſſex, Kent, and Eſſex, and in the office of ſteward of the houſhold, by his ſon Harold, who was actuated by an ambition equal to that of his father, and was ſuperior to him in addreſs, in inſinuation, and in virtue. With reſpect to Godwin, his character is blackened by the monkiſh hiſtorians, who pretend that his ſudden death was the effect of a miraculous interpoſition from heaven. With great abilities, Godwin poſſeſſed an ambitious ſpirit, which rendered him a ſubject of wavering fidelity, and made him but little ſcrupulous in means that tended to his aggrandizement. Hume's Hiſt. vol. i. Biog. Brit.

Godwin, Thomas, was born at Oakingham, in Berkſhire, in 1517, where he received at the free-ſchool the elements of a learned education. His rapid proficiency in grammar-learning attracted the notice, and ſecured to him the patronage of Dr. Layton, archdeacon of Bucks, who received him into his houſe, and took care of his farther inſtruction. In 1538, he was ſent by his friend and patron to Magdalen college, Oxford: here he purſued his ſtudies, and in 1543 he took his degree of B. A. and in the following year he was elected fellow of his college, which rendered him independent of the pecuniary aſſiſtance of his friends. His ſteady regard to the principles of the reformation rendered his ſituation at college in many reſpects very uneaſy, and he gladly embraced the opportunity of a vacancy in the maſterſhip of the free-ſchool of Brackley in Northamptonſhire, which was in the gift of the college, to reſign his fellowſhip. He retired to this ſituation in 1549, and having married, continued there peaceable and happy during the reign of king Edward, devoting what time he could ſpare from the duties of his office to the ſtudy of theology and phyſic, and on the acceſſion of Mary, he became an object of Bonner's fury, and was obliged to reſign his ſchool, and turn his attention to phyſic. By the practice of this, he maintained his family till Elizabeth aſcended the throne. He now reſolved to follow the bent of his inclination, devoted his whole time to theological ſtudies, was admitted to holy orders, and appointed chaplain to the biſhop of Lincoln. He was ſhortly after introduced to the queen, who made him one of the Lent preachers. This poſt, which was probably attended with little emolument, he filled eighteen years, with very high reputation, during which he received no preferment in the church; but, in 1565, he was promoted to the deanery of Chriſt-church, Oxford, and in the ſame year a prebend was conferred on him. In 1566, he was advanced to the deanery of Canterbury, and attended the queen in her viſit to the univerſity of Oxford, on which occaſion he took his degree of D D. with great applauſe. In 1584, after eighteen years reſidence at Canterbury, he was nominated by the queen to the vacant ſee of Bath and Wells. This honour did not augment the happineſs of Dr. Godwin: in reſiſting the unjuſt claims of one of Elizabeth's favourites, he loſt the favour of the queen herſelf, which ſo affected his mind, as to render him incapable of performing his epiſcopal functions. The affairs of his dioceſe, being left to the management of others, fell into ſuch diſorder, that his metropolitan, archbiſhop Whitgift, thought proper to viſit it in the year 1587. At this time Dr. Godwin's health was in a very bad ſtate, and he gradually became worſe till he ſunk under the effects of diſeaſe, in his ſeventy-third year. He is highly ſpoken of for learning and unaffected piety, and was beloved and reſpected for his cheerful hoſpitality, benevolence, and charity. Biog. Brit.

Godwin, Francis, the ſon of the preceding, was born at Havington, in Northamptonſhire, in the year 1561, and having been carefully educated in grammar learning, he was ſent to Chriſt-church college, Oxford, when he was in his ſixteenth year, and in 1578 he was elected a ſcholar of that inſtitution. In 1580, he took his degree of B. A., and three years after he proceeded to his degree of M.A. About this time he wrote an entertaining philoſophical fiction, which he did not at that period publiſh, becauſe it contained ideas at variance with the ſyſtems then prevalent in the ſchools. It was given to the world five years after his death, under the title of "The Man in the Moon, or a Diſcourſe of a Voyage thither by Domingo Gonzales." The hints, conjectures, &c. contained in this piece, prove that the author was not ignorant of the writings of Copernicus, and was probably a convert to his doctrines. In 1587, he was a canon in the cathedral church of Wells, and promoted to the ſubdeanery of Exeter. The hiſtory and antiquities of his country became favourite ſubjects of his enquiries, and in the year 1590 he accompanied the celebrated Camden into Wales, in ſearch of objects to illuſtrate them. In 1595, he took the degree of doctor in divinity, being in poſſeſſion of very conſiderable and lucrative preferment in the church. He publiſhed, in 1601, "A Catalogue of the Biſhops of England, ſince the firſt Planting of the Chriſtian Religion in this Iſland, together with a brief Hiſtory of their Lives and memorable Actions, ſo near as can be gathered out of Antiquity." As a reward for the great diligence uſed in the compoſition of this catalogue, the queen promoted him, the ſame year, to the vacant ſee of Landaff; being allowed to retain, in connection with the biſhopric, the ſubdeanery of Exeter, and a good rectory in the dioceſe of Bath and Wells. He now employed himſelf in improving his "Catalogue," and in making collections relative to civil and eccleſiaſtical hiſtory. In 1615 he publiſhed a new edition of his "Catalogue," to which he prefixed a diſcourſe "Concerning the firſt Converſion of our Britain unto the Chriſtian Religion." It was afterwards republiſhed in Latin, under the title of "De Præſulibus Angliæ Commentarius." In the ſame year he publiſhed "Rerum Anglicarum Henrico VIII., Edwardo VI., et Maria, regnantibus, Annales," which was much admired for the elegance of the ſtyle. By king James he was tranſlated from Landaff to the biſhopric of Hereford in the year 1617, and from this period, he devoted ſuch time as the diſcharge of his epiſcopal functions would permit, chiefly to the improvement of his former works; but in 1629 he publiſhed a diſcourſe on the ſeveral methods of conveying ſecret and ſpeedy intelligence, with the title of "Nuncius Inanimatus, Utopia." It has been ſuggeſted that this was written in obſcure and enigmatical language, with a deſign of concealing the author's ſecret; but from certain expreſſions, it ſhould ſeem, that the hints contained in it might have led to an earlier eſtabliſhment of public telegraphs. Beſides ſeveral editions of the Annales, and a tranſlation into Engliſh of the ſame work, we have a learned diſſertation by the biſhop, on the value of the Roman ſeſterce and attic talent, which was printed at the end of Hakewell's "Apology of Divine Providence." This was his laſt labour in the field of literature. He died in 1633 in his ſeventy-ſecond year. Of his learning and claſſical taſte, his works bear moſt deciſive evidence, and they exhibit him as a zealous friend to the eſtabliſhment, of which he was a member. According to Anthony Wood, "he was a good man, a grave divine, a ſkilful mathematician, an excellent philoſopher, a good preacher, and a ſtrict liver; but ſo much employed in his ſtudies and matters of religion, that he was a ſtranger to the world and the things thereof." Biog. Brit.

Godwin, Thomas, a learned Engliſh divine and writer on Jewiſh antiquities, was born in Somerſetſhire in the year 1587. In his fifteenth year, he was ſent from the grammar-ſchool to Magdalen-hall, in the univerſity of Oxford, where he was entered a ſcholar. Here, in due courſe, he took his degrees, and ſoon after was choſen maſter of the free-ſchool at Abingdon, in Berkſhire. In this ſituation he diſtinguiſhed himſelf by his diligence and aſſiduity in forming good ſcholars, who afterwards became eminent in various departments of literature, and in poſts of honour and emolument in the church and ſtate. In 1613 he publiſhed "Romanæ Hiſtoriæ Anthologia,"—an Engliſh expoſition of the Roman antiquities, which went through ſeveral editions. Shortly after this, he entered into orders, and was appointed chaplain to Dr. James Montague, biſhop of Bath and Wells, and in 1616 he was admitted to the degree of bachelor of divinity, and publiſhed a work, entitled "Synopſis Antiquitatum Hebraicarum ad Explicationem utriuſque Teſtamenti valde neceſſaria, &c." lib. 3. 4to. About this period he reſigned his ſchool, upon obtaining a preſentation to the rectory of Brightwell, near Wallingford, in Berkſhire. In the year 1625, he publiſhed the work by which he is chiefly known, *viz.* "Moſes and Aaron; civil and eccleſiaſtical Rites, uſed by the ancient Hebrews, obſerved, and at large opened, for the clearing of many obſcure Texts, throughout the whole Scripture." This work was immediately regarded as a ſtandard book in our places of academical education, and has been repeatedly printed. In 1636, Mr. Godwin was admitted to the degree of doctor of divinity. He died in 1642. Beſides the works already noticed, Dr. Godwin was the author of "Florilegium Phraſicon,"—or A Survey of the Latin Tongue. And Three Arguments to prove election upon foreſight of faith. Gen. Biog.

Godwin, or *Goodwin Sands*, in *Geography*, a bank in the ſea, about five miles from Deal, near the coaſt of Kent, England, were formerly part of the eſtate of the celebrated earl Godwin, but were ſeparated and overwhelmed by a ſudden inundation of the ſea, about the end of the eleventh century. Theſe ſands are frequently fatal to mariners, but, notwithſtanding, are of conſiderable uſe, as it is by them alone that the Downs are conſtituted a road or harbour for ſhipping. In all eaſterly winds they ſerve as a pier, or break-water, and greatly mitigate the force and immenſity of the waves, which, in ſtormy weather, would otherwiſe roll upon this ſhore with unabated fury. The ſands extend in length about ten miles; the north ſand-head being nearly oppoſite to Ramſgate, and the ſouth ſand-head to Kingſdown. The danger of ſtriking upon them ariſes from their nature, which Mr. Smeaton deſcribes as that of a quick-ſand, clean and unconnected, yet lying ſo cloſe, as to render it difficult to work a pointed bar to the depth of more than ſix or ſeven feet. Their ingurgitating property is ſo powerful, that even the largeſt veſſel driven upon them would, in a few days, be ſwallowed up, and ſeen no more. At low-water they are in many parts dry, and parties frequently land upon them; but when the tide begins to flow, the ſand becomes ſoft, and is moved to and fro by the waves. The largeſt portion of this bank which becomes dry, is known to ſeamen by the name of the Jamaica iſland. Some years ago, in order to prevent the many accidents which occur to ſhipping on theſe ſands, the Corporation of the Trinity-houſe formed the deſign of erecting a light-houſe on them; but after the ſand had been penetrated by boring augers to a great depth, the ſcheme was given up as impracticable, as no ſolid foundation could be obtained. Floating lights have, however, been placed off theſe ſands, conſiſting of three diſtinct lights in the form of a triangle, of which the middle one is conſiderably the higheſt; when they are obſcured in hazy-weather, a bell is kept conſtantly ringing.

GODWIT, in *Ornithology*. See Scolopax *Ægocephala*.

Godwit, *Great*, or *American*. See Scolopax *Fedoa*.

Godwit, *Leſſer*. See Scolopax *Limoſa*.

Godwit, *Red*. See Scolopax *Lapponica*.

Godwit, *White*. See Recurvirostra *Alba*.

GOELANS, Point au, in *Geography*, a promontory on the N. ſide of lake Ontario; about 33 miles S. W. of fort Frontinac.

GOELHEIM, a town of France, in the department of Monte Tonnerre, and chief place of a canton, in the diſtrict of Kaiſerſlautern. The place contains 860, and the canton 4999 inhabitants, in 16 communes.

GOELICKE, Andrew Otton, in *Biography*, a German phyſician, who acquired conſiderable reputation at the beginning of the eighteenth century, and taught the ſcience of medicine at Halle, in Saxony, and at Franckfort on the Oder, with diſtinction. His writings were in high eſtimation among the followers of the doctrines of Stahl, of whom he was one of the ableſt defenders. Nothing more is known reſpecting his life. He left ſeveral works, which relate principally to the hiſtory of anatomy, of ancient and modern ſurgery, and of medicine. His "Hiſtoria Medicinæ Univerſalis, quâ celebriorum quorumcunque Medicorum, qui a primis Artis natalibus ad noſtra uſque tempora inclaruerunt, vitæ, nomina, dogmata ſingularia, ratiocinia, hypotheſes, ſectæ, &c. accurate pertractantur," was printed in ſix different portions or epochs, between the years 1717 and 1720. The firſt four brought down the hiſtory to Hippocrates; the fifth treated of the Hippocratic medicine alone; and the laſt part included a ſketch of the deſcendants of the father of medicine, until the time when the art was divided into three profeſſions. Eloy. Dict. Hiſt.

GOELL, in *Geography*, an iſland of Denmark, in Lymford gulf, about 10 miles in circumference; on which are a town and a village or two; 6 miles W. of Aalborg. N. lat. 57° 5′. E. long. 9° 49′.

GOELMA, a port of Egypt, in the Red ſea, capable of accommodating only ſmall veſſels.

GOELWARA, a circar of Hindooſtan, in Guzerat, on the W. coaſt of the gulf of Cambaye.

GOEREE, William, in *Biography*, who flouriſhed in the 17th century, was born at Middleburg, in Zealand, in the year 1635. He had a decided turn for literature, but by the death of his father while very young, he was conſigned to the care of an illiterate ſtep-father, who would not permit him to purſue the bent of his mind. Being obliged to fix upon a trade, inſtead of ſtudying for one of the learned profeſſions, he fixed on that of a bookſeller, as that which he imagined beſt adapted for the improvement of his leiſure hours in the acquiſition of knowledge. His various works will ſhew how well he filled his time, and to what advantage he turned thoſe intervals from occupation, which are too frequently ſpent in liſtleſſneſs or devoted to pleaſure. He died at Amſterdam in 1711, leaving his "Jewiſh Antiquities," in two volumes, folio. "The Hiſtory of the Jewiſh Church," in four volumes folio. "Hiſtory Sacred and Profane." "An Introduction to Painting." "A Treatiſe on Architecture;" and ſome other uſeful works. Moreri.

GOERZEOD Ghezere, in *Geography*, a town of Aſiatic Turkey, in Natolia; 25 miles S. of Sinob.

GOES, a town of Portugal, in the province of Beira; 9 miles E. of Coimbra.—Alſo, a town of Holland, in Zealand, called "Ter-Goes," ſituated on the N. coaſt of the iſland of South Bevelandt, on an arm of the Scheldt, with which it is connected by means of a canal. The great church is a handſome ſtructure; and though the town is not large, it carries on a conſiderable trade, particularly in ſalt and grain; 10 miles E. of Fluſhing. N. lat. 51° 33′. E. long. 3° 46′.

GOETIA, Γοητεία, a ſpecies of magic, oppoſed to Theurgia, the object of which was miſchief; and accordingly it invoked only the malevolent genii.

GOEZ, Damiana, in *Biography*, a learned Portugueſe, of the 16th century, was born at Alenquer, and educated in the court of the king Emanuel, to whom his brother was gentleman of the chamber. He was, as he advanced in life, employed in various negociations from his court to the court of France, Germany, Poland, and the Low Countries. In 1534, we find him at the univerſity of Padua, in which he ſtudied ſome years under Buonamico, and contracted a friendſhip in Italy with Bembo, Sadolet, and other great men. He carried forward his ſtudies at Louvain, where he fixed his reſidence after his marriage, and was the principal means of defending the city againſt the attack of Martin van Roſſem. He was, however, ſeized by the enemy, under the pretence of a violation of the truce, and obliged to ranſom himſelf. He was after this recalled by the king of Portugal, who wiſhed to employ him to write the hiſtory of that country. The materials put into his hands were in ſo confuſed a ſtate, and ſo ſcanty in regard to quantity, that he was able to perform but a ſmall part of the taſk. He was malignantly accuſed, arreſted, and thrown into priſon. At length, as there was nothing found againſt him, he was liberated, and returned ed to his own dwelling, where he was ſhortly after found burnt to death, the conſequence, probably, of an apoplectic fit. His works are, " Legatio magni Indorum Imperatoris ad Emanuelem Luſitaniæ Regem." " Fides, Religio, Moreſque Æthiopum." " Hiſpaniæ Laudatio." " Urbis Lovanienſis Obſidio." " Comment Rerum Geſtarum in India à Luſitanis." " Urbis Ulyſſiponenſis Deſcriptio." " Hiſtoria del rey Dom. Manuel." " Chronica de Principe D. Juao II." Moreri.

GOEZE, John Augustus Ephraim, was born at Aſcherlen in the year 1731, where he received the elements of a learned education. He was afterwards ſent to Halle to purſue his ſtudies preparatory to the exerciſe of the profeſſion of preacher. In 1751 he ſettled in that capacity at Quedlingburg, which he retained till the period of his death. It was not till he was about forty years of age that he turned his attention to the microſcope and natural hiſtory, for his ſkill in which he afterwards became ſo famous. At firſt he made uſe of his microſcope only for amuſement, but in a ſhort time he poſſeſſed himſelf of the very beſt inſtruments of the kind that had been manufactured, and his reſearches led him to the ſtudy of the natural hiſtory of inſects. Baker's deſcription of certain water inſects induced him to explore the ditches, rivulets, and ponds. He wrote down his obſervations for his own private uſe, and cauſed many of the objects which he ſaw to be delineated. The facts thus collected he publiſhed in the Hanoverian magazine, which attracted the notice of the learned, from whom he received many flattering and highly complimentary letters on the ſubject. He tranſlated Bonnet's treatiſe on inſectology, which met with a very favourable reception from naturaliſts. He ſet out without regard to ſyſtem or order, but ſoon found that ſyſtematic knowledge was neceſſary in his purſuits; and completely acquainted himſelf with the Linnæan arrangement; and his " Entomological Collections" were intended as a ſupplement to the works of the Swediſh naturaliſt. The next conſiderable work of Goeze was on the natural hiſtory of inteſtinal worms, which he publiſhed in quarto in 1782. This work contributed greatly to encreaſe his reputation as a naturaliſt, and entitles him to an honourable place among the diſcoverers of modern times. The intereſt which he took in the education and improvement of his own children led him to publiſh ſome works on natural hiſtory, intended particularly for young perſons in general, and being a very agreeable as well as learned writer, his productions were all well received, and to his honour it muſt be ſpoken that he never forgot to inculcate the duties of religion and morality while he was deſcanting on the wonders of the natural world. After he had communicated to the public the reſult of his obſervations on inteſtinal worms, he ſent his collection to Pavia, where it was ſold for a thouſand dollars. His fame, however, had extended much beyond his own country, and within a very few weeks after he had parted or at leaſt agreed to part with his curious collection for the above named price, he received a letter from Dr. Hunter, offering him nearly double the ſum for it. He died in June 1786. Gen. Biog.

GOFABAD, in *Geography*, a town of Perſia, in the province of Irak: 55 miles E. of Iſpahan.

GOFFE. See Geoff.

GOFFSTOWN, a town of America, in Hillſborough county, New Hampſhire, ſituated on the weſtern bank of Merrimack river, 3 miles from Amuſkeag falls, or 60 miles W. of Portſmouth. It was incorporated in 1761, and contains 1612 inhabitants.

GOG and Magog, in *Scripture Hiſtory*, are names generally connected in the ſacred writings. (See Ezek. xxxviii. 2, 3, &c. xxxix. 1, 2, Rev. xx. 8.) Moſes (Gen. x. 2.) ſpeaks of Magog, the ſon of Japheth, but ſays nothing of Gog. According to Ezekiel, (ubi ſupra,) Gog was prince of Magog; the latter ſignifying the country or people, and the former, the king of it. The ancients generally repreſent Magog as the father of the Scythians or Tartars; and traces have been found of the name in the provinces of Great Tartary. Others ſay that the Perſians are deſcendants of Magog; and to this purpoſe people have been found there called Maguſians, and philoſophers called Magoi or Magi. Some have imagined that the Goths were deſcended from Gog and Magog: and that the wars deſcribed by Ezekiel, and undertaken by Gog againſt the ſaints, are thoſe which the Goths carried on, in the 5th century, againſt the Roman empire. Bochart has placed Gog in the vicinity of Caucaſus; and he derives the name of this celebrated mountain from the Hebrew גוג חסן, gog-chaſan, the fortreſs of Gog. He alſo ſays, that Prometheus, ſaid to be chained to Caucaſus, is Gog; and it may be obſerved, that there is a province in Iberia S. of Caucaſus, called the Gogarene. Moſt perſons are of opinion, that Gog and Magog, in Ezekiel and the Revelations, are taken, allegorically, for ſuch princes as were enemies to the church. Accordingly many, by Gog in Ezekiel, underſtand Antiochus Epiphanes, the perſecutor of the Jews; and Gog in Revelations, they ſuppoſe to repreſent Antichriſt. Calmet apprehends that the Gog of Ezekiel and Cambyſes, king of Perſia, were the ſame perſons. The Arabians are of opinion that the deſcendants of Gog and Magog inhabit the northern parts of Aſia, beyond the Tartars and Sclavonians: and hence it is probable that Gog and Magog, according to the notions of the Arabians, formerly inhabited the mountains of the Hyperboreans, and that they were known to the ancients by this name. This nation is unqueſtionably famous in antiquity, and there is reaſon for imagining, that they were ſome of the Scythians, and confounded among the Great and Little Tartars, and perhaps among the Muſcovites, and other northern people. Calmet.

Gog-Magog *Hills*, in *Geography*, hills ſo called, about three miles from Cambridge, remarkable for the intrenchments and other works found there, and ſuppoſed by ſome to be a Roman camp, and by others, a work of the Danes.

GOGA, a town of Abyſſinia; 30 miles S. of Gondar.—Alſo, a ſmall town of India, on the weſtern ſide of the gulf of Cambaya, about 28 or 30 leagues from Cambaya, abounding with banians and ſea-men.

GOGARD, a town of Sweden, in Eaſt Gothland, 23 miles N.N.W. of Linkioping.

GOGARENA, in *Ancient Geography*, a country of Aſia, in Armenia. Strabo.

GOGARY, in *Geography*, a town of Bengal; 24 miles N.W. of Boglipour. N. lat. 25° 26′. E. long. 86° 36′.—Alſo, a town of Hindooſtan, in Bahar; 10 miles N. E. of Monghir.

GOGAVINUS, Antonius Graviensis, or Anthony Gogavin de Grave, in *Biography*, a laborious writer, who, according to the inſinuations of the famous Zarlino, publiſhed *in corpo* all the ancient authors on muſic, at Venice, 1562, 4to.

His compilation contains the books of Ariſtoxenus and Ptolemy, and the fragment of Ariſtotle, with the Commentary of Porphyry, the whole enriched with notes by Bottrigari. See Meibomius, and Bottrigari.

GOGET, in *Ichthyology*. See Gobius *Niger*.

GOGGLES, in *Rural Economy*, a morbid affection in ſheep, which is ſometimes extremely deſtructive to them. It is ſuggeſted in the Bath papers as firſt ſhewing itſelf, by a dropping of the ears, and frequent rubbing of the tail; but not to have any relation or affinity to giddineſs, as the ſheep do not run round as in that diſeaſe. It appears to have the greateſt reſemblance to the diſorder called the ſtaggers in lambs; but differs inſomuch, as that the ſtaggery lambs diſplay weakneſs before, and of courſe fall in that direction, while the goggly ſheep ſhew weakneſs behind, and when forced to run fall backwards. Sheep under this diſorder conſtantly get poorer and poorer, and become more weak, until they are not able to drag their limbs after them, and conſequently die. Some have contended that it is a diſeaſe of the paralytic kind, and that the ſeat of the complaint is in the ſpinal marrow. It was formerly either wholly unknown, or unattended to by ſheep-farmers, as it is never mentioned.

Hitherto no ſatisfactory method of cure has been pointed out for the diſeaſe, but warmth and frequent change of paſture have been found beneficial in it.

GOGGLES, in *Surgery*, are inſtruments uſed for curing ſquinting, or that diſtortion of the eyes which occaſions this diſorder. They are ſhort conical tubes, compoſed of ivory ſtained black, with a thin plate of the ſame ivory fixed in the tubes near their anterior extremities. Through the centre of each of theſe plates is a ſmall circular hole, about the ſize of the pupil of the eye, for the tranſmiſſion of the rays of light. Theſe goggles muſt be continually worn in the day-time, till the muſcles of the eye are brought to act regularly and uniformly, ſo as to direct the pupil ſtraight forwards; and by theſe means the cure will be ſooner or later effected. Warner on the Eye, p. 32.

GOGMOW, in *Geography*, a town of Hindooſtan, in Oude; 35 miles N. of Maniakpour.

GOGO. See GOGA.

GOGODUNGA, a town of Bengal, on a ſmall iſland formed by a branch of the Hoogly; 45 miles S. of Calcutta.

GOGOROMOW, a town of Guzerat, on the coaſt; 50 miles W. S. W. of Noanagur.

GOGRA, alſo called *Dewah* and *Soorjew*, a river of Hindooſtan, which proceeds from a lake named Lanke-Dhe, having to the E. of it another larger lake, named Manſawar, both ſituated on the weſtern ſide of Thibet, and forces its way through the vaſt ridge called Himmaleh, and afterwards joins the Ganges. See DEWAH.

GOGUET, ANTONY-YVES, in *Biography*, was born at Paris in 1716, where his father was an advocate. He himſelf became a counſellor to the parliament. By cloſe ſtudy and by great aſſiduity in his purſuits, he produced in the year 1758, a work that has obtained a high reputation, and which has been tranſlated into the Engliſh and other languages. It is entitled "Origine des Loix, des Arts, des Sciences, et de leur Progrès chez les anciens Peuples," in three volumes 4to. It was printed in 1778, in ſix volumes 12mo. This work treats of the origin and progreſs of human knowledge, from the creation to the age of Cyrus, and diſplays much erudition in hiſtorical diſcuſſions, though leſs of ſcience and philoſophy than might have been expected. He died of the ſmall-pox almoſt immediately after the publication of this valuable work. He was a man of much private worth, modeſt and unaſſuming. He had begun another work on the Origin and Progreſs of the Laws, Arts, Sciences, &c. in France, from the commencement of the monarchy.

GOHANNA, in *Geography*, a town of Hindooſtan, in Ballogiſtan; 54 miles W.S.W. of Delhi.

GOHEE, a town of Hindooſtan, in Bahar; 35 miles W.N.W. of Saſeram.

GOHUD, a circar of Hindooſtan, in the ſoubah of Agra, lying on the right ſide of the river Jumnah. It is bounded on the N. by the Chumbal, on the E. by Dooab and Oude, on the S. by Bundelcund, and on the W. by Rantampour and Cottah.—Alſo, a town of this circar, the revenues of which are eſtimated at 20 or 30 lacks of rupees per annum; 55 miles S. E. of Agra. N. lat. 26° 24′. E. long. 78° 44′.

GOJAK, a town of Croatia, on the river Mreſnitza; 18 miles S. of Carlſtadt.

GOJAM, a province of Abyſſinia, about 80 miles in length, and 40 in breadth. It is a very flat country, altogether appropriated to paſture; it has few mountains, but theſe are very high, and are chiefly on the banks of the Nile, to the ſouth, which river ſurrounds the province. Gojam is full of great herds of cattle, which are the largeſt in the high parts of Abyſſinia. The country is populous, but the men are in the loweſt eſtimation as ſoldiers. The Jeſuits were ſettled in many convents throughout the province, and are held in the utmoſt deteſtation. The monks are thoſe of St. Euſtatius, which may be called the Low Church of Abyſſinia; they are ſaid to be much inclined to turbulence in religious matters, and are, therefore, always made tools by diſcontented people who have no religion at all. On the S.E. of Gojam is Damot; which ſee. Bruce.

GOJAS. See GOYAS.

GOIAVA, a town of Africa, on the Grain coaſt; 25 miles S.E. of Grand Seſto.

GOJEIDA, or GOGIDA, a town of Algiers; 90 miles S.E. of Oran.

GOING, in the *Manege*, called in French *allure*, is the pace or gait of a horſe.

GOIT, GURT, *Gorl*, *Leat*, &c. are names for a ditch or trench for conveying water, uſed by engineers and miners of different diſtricts.

GOITO, in *Geography*, a town of Italy, in the department of the Mincio, ſituated on the river Mincio, between the lake of Mantua and that of Garda; 9 miles N.N.W. of Mantua.

GOITRE, or GOUTIER, in *Surgery*, names ſometimes applied to a morbid enlargement of the thyroid gland. See BRONCHOCELE.

Perſons labouring under this complaint are found in various mountainous diſtricts of Europe, in China, in Bootan, and many other regions of the Eaſt, in Sumatra, &c. (See CRETINS.) Turner, in his "Account of an Embaſſy to Tibet," ſays, that in Bengal this unſightly tumour is known by the name of "Gheig," and "Aubi," and in Bootan is called "Bà," or "Ke Bá," the neck-ſwelling, and that it forms itſelf immediately below the chin, extending from ear to ear, and ſometimes growing to ſuch an enormous ſize, as to hang from the throat down upon the breaſt. It is particularly obſervable, he ſays, among the inhabitants of the hills of Bootan, immediately bordering upon Bengal, and in the tract of low country watered by the rivers that flow from them to the ſouth, beyond the ſpace of a degree of latitude. The ſame malady prevails among the people inhabiting the Morung, Nipal, and Almora hills, which, joined to thoſe of Bootan, run in continuation, and bound, to the northward, that extenſive tract of low land embraced by the Ganges and the Berhampooter. The ſame diſeaſe is alſo more particularly met with in the low lands adjoining to theſe hills. From the frontier of Aſſam, N. lat. 27°. E. long. 91°, it is to be traced through Bijnee, Gooch Bahar, Rungpore, Dinagepore, Purnea, Tirrooto, and Betiah, along the northern boundary of Oude, in Gooracpore, Barraitch, Pillibeat, and on the confines of Rohilcund, to Hurdewar, ſituated in N. lat. 30°. E. long. 78° 25′. It has the effect, he adds, or rather is accompanied with the effect, ariſing from the ſame cauſe, of debilitating both the bodies and the minds of thoſe who are affected with it. Marſden, in his "Hiſtory of Sumatra," obſerves, that it has been uſual to attribute this affection to the badneſs, thawed ſtate, mineral quality, or other peculiarity of the waters: "My experience," he adds. "enables me to pronounce without heſitation, that the diſorder, for ſuch it is, though it appears here to mark a diſtinct race of people, *(orang goonong,)* is immediately connected with the hillineſs of the country, and, of courſe, if the circumſtances of the water they uſe contribute thereto, it muſt be only ſo far as the nature of the water is affected by the inequality or height of the land. But in Sumatra neither ſnow nor other congelation is ever produced, which militates againſt the moſt plauſible conjecture that has been adopted concerning the alpine goitres. From every reſearch that I have been enabled to make, I think I have reaſon to conclude, that the complaint is owing, among the Sumatrans, to the foggineſs of the air in the vallies, between the high mountains, where, and not on the ſummits, the natives of theſe parts reſide. I before remarked, that between the ranges of the hills, the "caboot," or denſe miſt, was viſible for ſeveral hours every morning; riſing in a thick, opaque, and well-defined body, with the ſun, and ſeldom quite diſperſed till afternoon. This phenomenon, as well as that of the wens, being peculiar to the regions of the hills, affords a preſumption that they may be connected; excluſive of the natural probability that a cold vapour, groſs to an uncommon degree, and continually enveloping the habitations, ſhould affect with tumours the throats of the inhabitants. I cannot pretend to ſay how far this ſolution may apply to the caſe of the goitres, but I recollect it to have been mentioned, that the only method of curing theſe people is by removing them from the vallies to the clear and pure air on the tops of the hills; which ſeems to indicate a ſimilar ſource of the diſtemper with what I have pointed out. The Sumatrans do not appear to attempt any remedy for it, the wens being conſiſtent with the higheſt health in other reſpects."

GOKAUP, in *Geography*, a town of Hindooſtan, in Viſiapour; 16 miles S.S.E. of Raiboug.

GOKIA, a town of Turkiſh Armenia; 30 miles E.S.E. of Akalziké.

GOLABAD, a town of Perſia, in the province of Irak; 45 miles E. of Iſpahan.

GOLAH, a town of Hindooſtan, in Bahar; 10 miles E. of Ramgur.

GOLAN, a town of the duchy of Warſaw; 10 miles N.E. of Poſen.

GOLAPILLY, a town of Hindooſtan, in the circar of Guntoor; 10 miles W. of Innaconda.

GOLAWARRY, a town of Bengal; 48 miles N.W. of Midnapour.

GOLCONDA, a province of Hindooſtan, part of the poſſeſſions of the Nizam, or Soubah of the Deccan, our firm ally, correſponds to the ancient province of Tellingana, or Telling, ſituated between the lower parts of the courſes of the Kiſtnah and Godavery rivers; and is bounded on the N. by Berar, on the E. by the Circars, on the S. by the Myſore country and the Carnatic, and on the W. by Dowlatabad. and Viſiapour. It takes its name from a famous fortreſs. The kings of this country were, at a former time, immenſely rich and powerful; as they maintained in their pay 500,000 ſoldiers, and derived very large revenues from their lands, cuſtoms of merchandizes and proviſions, but chiefly from the diamond mines, for which this country has been ſingularly famous. The winter in Golconda begins in June with rain and thunder; the rain pouring down, accompanied by violent ſtorms of wind, till the middle of July, with occaſional intervals of fine weather. In Auguſt, September, and October, the rains again fall, and very much ſwell the rivers. Theſe rains render the land exceedingly fertile, particularly in fruits. Vines are plentiful, and of the grapes, which ripen in January, they make white wine. Two crops of rice are produced annually, and the country affords other kinds of grain. The capital of Golconda is Hydrabad.

GOLCONDA is alſo the name of a fortreſs, ſurrounded by ſtone walls and deep ditches, which was formerly the reſidence of the kings of the country. This fortreſs, on account of its extent, might be denominated a city; a hill roſe in the middle of it like a ſugar-loaf, and the ſides of it were encompaſſed by the king's palace, which was very large and well ſituated for air, and which had a good view of Hydrabad. When Aurungzebe conquered the kingdom of Golconda in 1687, this fortreſs was taken by treachery; the king offered to pay a tribute of 3,700,000 rupees, and become the vaſſal of the conqueror; but he refuſed, and entered the palace in triumph.

GOLD. *Gold*, Germ.; *Guld*, Swed. Dan.; *Or*, Fr.; *Arany*, Hung.; *Soloto*, Ruſſ.

Mineralogical Deſcription.—This metal never having been found in a mineralized ſtate, we are acquainted with one ſpecies only, namely,

Native gold, which is ſubdivided by Werner into three ſub-ſpecies, *viz. gold-yellow*, *braſs-yellow*, and *greyiſh-yellow gold.* Though this ſubdiviſion may appear arbitrary, and not founded on conſtant characters excluſively belonging to each of the above varieties or ſub-ſpecies, it is nevertheleſs entitled to attention, ſince colour, however unimportant it may be in the claſſification of earthy foſſils, conſtitutes a character of conſiderable value in native metallic ſubſtances, the range of whoſe colours is confined to a narrow compaſs. But alſo their geognoſtic relation appears to conſtitute a diſtinction, at leaſt between the two firſt of the Wernerian ſub-ſpecies; for as to the third, or the *greyiſh-yellow gold*, its claims to be kept ſeparate from the two others appear doubtful: all we know of it is its being found in ſmall flat particles, along with that mixture of different metals called platina in grains, of whoſe colour it partakes in general, and with which it is ſuppoſed to have occurred alſo originally under the ſame geognoſtic relations.

1. *Light or Braſs-coloured native Gold.* Meſſing-gelbes gediegen gold of Werner. Its colour is pretty well indicated by its name; but it varies in intenſity from what may be called pale-gold yellow to yellowiſh-ſilver white. It is alſo ſometimes found with deep-yellow, and with pavonine tarniſh.

It occurs maſſive, diſſeminated in angular and amorphous particles, but more frequently in films, membranes, and plates even and curled or twiſted, and with ſmooth or druſed ſurface; alſo capillary, tooth and wire-ſhaped, ſhrub and fern-like, and as moniliform ſtrings; often imitating reticulated and filigree work; all which forms are generally produced by the aggregation of minute imperfect cryſtals. Among theſe, perfect cryſtals are not unfrequently ſeen, ſometimes ſingle, oftener in groups, on the margin of the plates, &c. The following ſecondary forms have been obſerved: the cube; the octahedron; the garnet-dodecahedron; the leucite-dodecahedron with trapezoidal planes. Alſo modifications intermediate between the cube and the octahedron occur, but they are ſcarce. The minute three-ſided pyramids, which are often ſeen to druſe the membrane, and the ſimple triangular marks on the plates of the Tranſylvanian native gold, are the reſults of hurried and diſturbed cryſtallization; the former of them being the ſolid angles of the cubical, and the latter the rudiments of the octahedral variety.

. The cryſtals are minute (thoſe deſcribed by Mr. Eſmark as octohedra and cubes of two lines in diameter, have never before been heard of); their ſurface is always ſmooth.

Luſtre metallic: externally ſplendent: while that of the grains is ſometimes gliſtening, ſometimes approaching to dull; internally it is glimmering and gliſtening.

The fracture of gold is fine hackly. Its fragments are indeterminately angular.

It is ſoft, highly flexible, malleable, and ductile.

The ſpecific gravity of pure gold is from 19.253 to 19.640; but that of the braſs-yellow variety, owing to a greater proportion of ſilver with which it is alloyed, is generally conſiderably leſs, though always above twelve.

The light, or braſs-yellow gold, occurs almoſt always in veins in greywacke, greywacke ſlate, and newer porphyry; ſeldom, as the following ſub-ſpecies, in primitive rocks, or under other circumſtances that beſpeak a ſimilar remote antiquity.

It occurs chiefly with quartz and iron pyrites, and not unfrequently with grey antimony. Other concomitant ſubſtances are, among the earthy foſſils, calcareous ſpar, brown ſpar, barytes, ſelenite, and ſeldom ſmall quantities of bole, lithomarge, and common garnet; of metallic ſubſtances, red and vitreous ſilver ores, (ſeldom native ſilver,) copper pyrites, grey copper ore, copper green, brown iron ſtone, galena, green lead ore, blende, with occaſional traces of white cobalt, copper nickel, red orpiment, native arſenic, and arſenical pyrites.

2. *Deep or Gold-yellow Native Gold.*—Gold-gelbes gediegen-gold of Werner.

Its colour is the higheſt gold-colour, ſeldom verging on braſs yellow.

It occurs maſſive and in ſmall roundiſh and flattened pieces, as alſo in grains of various dimenſions, detached or diſſeminated; ſeldom in particular external forms, ſuch as in leaves and laminæ, filiform and moſslike; ſcarcely ever cryſtallized: almoſt all the cryſtalline forms deſcribed by authors belonging to the light-coloured ſub-ſpecies.

External luſtre gliſtening, ſometimes (as in the variety called Spaniſh ſnuff) diveſted of all luſtre. Its ſpecific gravity is rather greater than that of the light or braſs-coloured gold, with which it agrees in the remaining characters.

It occurs moſtly looſe, in alluvial ſituations, and in the ſand of rivers, and, as ſuch, appears to have been originally diſſeminated in rocks of ancient formation: it is, however, alſo found in veins in Norway, Siberia, Bohemia, Hungary, in the Eaſt Indies, &c. almoſt always diſſeminated in quartz, accompanied by iron-pyrites; but nothing is as yet known reſpecting the age of theſe veins. At Fatzebay it is found in minutely moſslike external forms, often of a dull powdery appearance, on common quartz ſometimes mixed with iron pyrites; in this ſtate it is by the miner called Spaniſh ſnuff.

Geographical ſituation.—The following localities comprehend both the ſub-ſpecies into which native gold is divided by Werner. By far the greater part of that found in Europe belongs to the braſs-yellow ſub-ſpecies, except the gold of rivers and alluvial ſoil, which is principally deep yellow, and to which the immenſe quantities of this precious metal, furniſhed by the other parts of the world, appear likewiſe to be referable.

Europe:—Hungary, the Bannat, and principally Tranſylvania. In Upper Hungary it occurs in gneiſs: at Schemnitz, in Lower Hungary, it is found accompanied with ſeveral ſilver ores, and with galena; at Kremnitz, in and on cellular and ſhattered quartz, lamellar barytes, with vitreous ſilver and grey copper ore, copper pyrites, brown ſpar, &c.; at Oravizza, in the Bannat, it occurs filiform and diſſeminated in pale fleſh-red and greeniſh-white limeſtone, with white cobalt ore and copper nickel. In Tranſylvania, the richeſt country of Europe in this metal, it principally occurs in a kind of clay-porphyry of different degrees of freſhneſs, which is the Saxum metalliferum of Born, in grauwacke and grauwacke ſlate: at Kapnik it is ſometimes found with red orpiment: at Staniſha in calcareous ſpar, mixed with arſenical pyrites, &c.: other places of Tranſylvania abounding in gold (which is for the greater part braſs-yellow), are Vereſhpatak, Abrudbanya, Boiza, Offenbanya, Fatzebay, Toplitza, Treſhtyan, &c. Alſo the rivers, both of Hungary and Tranſylvania, are richly auriferous; gold ſand is found in the Nera, and underneath a ſtratum of chalk on the plain traverſed by this river. The richeſt river of Tranſylvania is the Araniosh, and the plain bordering on the river Moroſh, contains likewiſe gold in grains, between a ſtratum of mould, and another of ſchiſtus, neither of which ſtrata is in the leaſt auriferous. Alſo at Olapian, gold is obtained by waſhing; it is there mixed with magnetic ironſtone, titanium, garnet, and cyanite. The gold of the great rivers of Tranſylvania is generally of 21 carats, that of Olapian and Roſhinar is even of 23 carats, ſix grains.

In Germany it is found in ſeveral places, at Johangeorgenſtadt in Saxony, in Carinthia, where it accompanies copper-ores, in Tyrol and Saltzburg; but it is only in the laſt of theſe diſtricts, or rather in the chain of mountains, ſeparating Tyrol from Carinthia, that gold-mines are worked: in the Zillerthal it is found in various external forms, and accompanied with iron-pyrites, &c. in mica ſlate. In Bohemia gold occurs in quartz.

Spain is probably very rich in gold; certain it is that conſiderable gold mines were worked there in former times, and, according to Diodorus Siculus, as far back as the time of the Phœnicians, after whom the Romans undertook to work them; and Pliny informs us, that thoſe nations derived great profit from them. Aſturia was the province which furniſhed moſt of this metal. After the diſcovery of America theſe mines were entirely given up and loſt. The Tagus and ſome other rivers of Spain are likewiſe auriferous.

France has no gold mine that is worthy to be worked; the firſt diſcovery of gold in that country was made in 1781, at la Gardette, in the valley of Oyſans, in the preſent department of the Iſere: the mine was worked for ſix years, but the produce in gold and accompanying minerals was too ſmall to compenſate for the expence of obtaining them, and, indeed, the loſs amounted to upwards of 21,000 livres. It occurs there, with rock cryſtals and iron pyrites, in gneiſs. The ſand of ſeveral rivers of France is auriferous, ſuch as that of the Arrieze near Mirepoix, the Gardon and Ceze in the Cévennes, the Rhone in the Pays de Gex, the Rhine between Straſburg and Philipſburg, the Salat in the neighbourhood of St Giron, in the Pyrenees, the Garonne near Toulouſe, and the Hérault at Montpellier. Alſo moſt of the black ſand and of the bog-iron found in the neighbourhood of Paris is ſaid to contain a ſmall quantity of gold.

In Piedmont veins of auriferous pyrites and quartz are found near Macugnaga, at the foot of Monte Roſa: which mountain conſiſts of veined granite in horizontal beds. The veins of pyrites and quartz have upon the whole a perpendicular direction, but in ſome parts they croſs each other, and where this takes place, *gruppi*, or neſts, are found which contain the greateſt proportion of gold. The proprietor of theſe mines extracted out of ſuch neſts, in no more than twenty-two days, 189 marcs of pure gold, although a hundred weight of the ore yields no more than from 10 to 12 grains of that metal. Formerly upwards of a thouſand workmen were employed in theſe gold-mines; and the proprietors ſtill poſſeſs 86 mills, by which from 10 to 12 pounds (of 12 ounces) of mercury inpregnated with gold are produced per day. Twelve pounds of mercury contain two marcs of gold. There are likewiſe ſeveral auriferous rivers on the S. ſide of the Apennine Alps, between mount Roſa and the valley of Aoſta, ſuch as the Avanſon, which runs from the valley of Challant into the Doire, and where ſome gold-mines were alſo worked by the Romans; the Orco, &c.

Sweden has a gold mine at Edelfors in Smoland: the gangue, a browniſh quartz, is ſaid to be in a kind of hornblende ſlate, which alſo contains the metal diſſeminated.

Gold has alſo been found in Great Britain: in Cornwall; at Lead-hills, in Scotland, diſſeminated in quartz; at Wicklow, in Ireland, under the ſoil, and in a ſtream which runs over rocks of clay-ſlate with veins of quartz. It belongs to the deep yellow variety.

Aſia.—The gold-ores of Siberia are partly of the light coloured, but principally of the deep coloured variety: that of Berezof, which occurs in pyrites, or rather brown iron ſtone, and iron ſhot quartz, and in the rock which ſerves as gangue to the red lead ore, belongs to the latter. Patrin mentions a ſpecimen of gold in ſpangles on hornſilver, found in one of the ſilver mines of Schlangenberg.

The geognoſtic relation of the gold found in ſeveral parts of India, in Japan, the Philippine and Maldive iſlands, Sumatra, Borneo, &c. is not known; all the ſpecimens from India, that have come under our inſpection, were in the form of ſmall rounded and amorphous particles in quartz, and belonged to the deep yellow variety.

Africa.—Of the occurrence of gold in this part of the world we know ſo much, that the greateſt part, at leaſt of that which comes to Europe, is deep yellow and in grains. African travellers have made us acquainted with a few of its localities, but not with any particulars relating to its geognoſtic habitudes. Though the commerce of gold-powder extends almoſt over the whole of Africa, yet, according to Heeren, there is none to be found in its northern parts. Among the principal African gold mines are thoſe of Kordoſan, between Darfur and Abyſſinia, mentioned by Browne. The ancients, ſays Brongniart, appear to have been acquainted with theſe mines: they conſidered Ethiophia as a country rich in gold; and we find in Herodotus, that the king of that country exhibited to the ambaſſadors of Cambyſes all the priſoners of war fettered with chains of gold.

A ſecond moſt conſiderable diſtrict for gathering gold-powder appears to be ſouthward of the great deſart of Zahara, in the weſt of Africa, at the foot of thoſe lofty ridges of mountains on which originate, among many ſmaller rivers, the Senegal, the Gambier, and Niger. The country of Bambouk, at the N.E. of theſe mountains, is, according to Golberry, that which furniſhes the greateſt quantity of gold which is ſold on the weſt coaſt of Africa, from the mouth of the Senegal to the Cape Palmas. This gold is found in ſpangles and ſmall lumps, principally near the ſurface of the earth, in the beds of rivulets, and always in a ferruginous ſoil. In ſome parts of the country the negroes ſink ſomething like ſhafts, but without giving any ſupport to the ſides of the pit; nor are they wont to follow up the vein, if any ſhould appear, or to make galleries. The metal is obtained by repeated waſhing of the earth that includes it. The ſame country furniſhes likewiſe the greateſt part of the gold carried to Morocco, Fez, and Algiers, by the caravans which, from Tombuctoo, travel through the great deſart of Zahara. The gold which is brought to Cairo and Alexandria from Senaar comes likewiſe from theſe. See Parke's travels, where alſo an intereſting account is to be found of the gold in Manding, and of the proceſs by which the negroes obtain it.

The third principal diſtrict of Africa, for collecting gold, is on the S.W. coaſt between 15° and 22° S. lat. oppoſite Madagaſcar. This gold comes principally from the country of Sofala. According to the relation of ſome travellers in this part of the world, the gold is found there not only in powder, but likewiſe in veins. Some are of opinion that the country of Ophir, from whence Solomon obtained gold, was ſituated on this coaſt.

America.—The gold of this part of the world, as far as we are acquainted with it, is ſo equally the production of the ſand of rivers and of alluvial land; but it is alſo, though rarely, found in veins. South America, particularly Braſil, Choco, and Chili, are the countries that yield moſt; but ſome is alſo found in North America, particularly in Mexico, where it occurs along with ſilver-ores. The annual produce of theſe Mexican mines is valued at from 12 to 1500 kilograms. All the rivers of the Caraccas, 10° north lat. are auriferous.

The gold of Chili, according to Frezier, is lodged in the alluvial formation.

The Peruvian gold occurs in ferruginous quartz; that of Choco, the richeſt province in gold in South America, is found as grains in alluvial country, and in rocks belonging to the neweſt fletz-trap formation. Almoſt all we know reſpecting the geognoſtic ſituation of the gold of Spaniſh America, we owe to M. de Humboldt.

Braſil furniſhes gold in abundance, and it is from thence that the greateſt part actually ſeen in commerce is brought to Europe. There are, however, properly ſpeaking, no gold-mines in that country; the gold is not found there in veins, but diſſeminated in ſand and other alluvial depoſitions, out of which it is obtained in the uſual manner.

The gold that has been furniſhed by Braſil within 120 years, may be valued (according to Correa) at 2,400,000,000 of French livres; and, according to other authors, the amount is calculated to be 24,000,000 per annum. Brongniart. See ORES.

Obſervations.—1. It would appear that moſt writers who adopt Werner's diſtinction between gold-yellow and braſs-yellow gold, have miſtakenly deſcribed the one ſub-ſpecies for the other, and ſome even ſpeak of "grey-yellow gold from Tranſylvania." The ſub-diviſion alluded to may be deemed inadmiſſible; but if it be at all adopted, by far the greater part of the native gold of Tranſylvania and Hungary, and conſequently almoſt all cryſtallized gold, muſt neceſſarily be referred to the light-coloured, and that found in the ſand of rivers to the deep-coloured ſub-ſpecies; and this not on account of their colour only, uſually indicative of differences in the chemical compoſition of metals, but principally on account of the geognoſtic relations under which they reſpectively occur, and on which great ſtreſs appears to be laid by Werner.

2. Iron pyrites, containing not unfrequently a conſiderable portion of gold, in moſt caſes inviſibly diſperſed and diſguiſed, has by ſome been conſidered as a ſpecies of gold ore; a diſtinction to which (though ſuch auriferous pyrites are often ſubjected to metallurgical treatment for extracting that metal, as will be ſeen hereafter) it cannot be conſidered as entitled. See PYRITES, *Auriferous*.

The brown cubic cryſtals from Bereſof, in Siberia, which contain grains of gold, are conſidered by ſome as decompoſed, by others as hepatic pyrites, and by ſome as brown iron ſtone in ſuppoſititious cryſtals. Whatever they may be, they are certainly not what Werner means by hepatic pyrites.

3. The native gold of Tranſylvania is often accompanied, and ſometimes incruſted, by particles of a pale yellow earthy ſubſtance, which was conſidered by Hacquet as an oxyd of gold. Muller and others have deſcribed it as iron-ochre, from which, however, it appears to differ both in colour and conſiſtence. It is almoſt always to be met with in the ſpecimens of native gold from Vereſhpatak, but ſometimes in ſuch fine particles as to appear merely as a tarniſh on the metal. It is to this duſt probably that the gold ore, called Spaniſh ſnuff, owes its mat, yellowiſh-brown colour. It deſerves further examination.

4. The grey metallic ſubſtance occurring as acicular indeterminate cryſtals, along with the gold of Siberia, in quartz, and which has been deſcribed as tellurium, as grey copper ore, &c. appears to be native biſmuth.

For the *chemical characters* of gold, and the *uſes* to which it is applied, ſee the ſequel of this article.

Extraction of Gold.—This metal is obtained ſeparate from foreign ſubſtances, with which it is mixed by amalgamation with quickſilver. After it has been freed, by pounding and waſhing, from the ſtony matter, it is triturated with about ten times its weight of mercury. The more fluid part of the amalgam is forced through leather, while that which is more conſiſtent, and which contains the chief part of the gold, remains. This is ſubjected to diſtillation, the quickſilver is ſeparated and evaporated, and the gold remains in a ſtate of fuſion. When this metal is found in other ores, they are firſt roaſted, to diſperſe the volatile principles, and to oxidize the other metals. The gold, which is but little ſubject to oxydation, is extracted by amalgamation, by cupellation, or other methods adapted to each ore, according to its properties or conſtituent parts. The metal obtained in theſe ways is always more or leſs alloyed, particularly with ſilver and copper. The firſt ſtep in its purification is the proceſs of *Cupellation*, to which article in our Cyclopædia the reader is referred for accurate information on this part of the ſubject.

The gold, after it has been ſubmitted to this proceſs, is often alloyed with ſilver, which, being nearly as difficult of oxydation, is not removed by the action of lead, and hence the neceſſity of the operations denominated *Parting* and *Quartation*, which may be explained in a few words.

In *Parting*, the metal is rolled out very thin, and cut into ſmall pieces, which are digeſted in diluted nitric acid moderately hot. The acid has an action upon, and diſſolves the ſilver, leaving the gold undiſſolved in a porous maſs. When, however, the proportion of ſilver is very ſmall in compariſon of the gold, the latter ſometimes protects the former from the action of the acid; in ſuch caſes the previous ſtep of *Quartation* is employed, which is ſo named on account of the proportion of materials employed, *viz.* three parts of ſilver, with one of gold, and then ſubjecting the alloy, rolled out, to the operation of the acid. Sometimes they are melted together, and ſulphur thrown in, the ſulphur combines with the ſilver, and the gold falls to the bottom. It is obſerved by Lagrange, that rolling and annealing are operations very neceſſary to the ſucceſs of the parting proceſs, and which require ſome precautions. 1ſt. The plate muſt not be too thin, leſt it ſhould break in conſequence of the motion communicated to it by the action of the acid; if it is too thick the acid could not penetrate to its centre. 2dly. The annealing of the plate, at the ſame time that it gives pliability, facilitates its being rolled without cracking; it alſo opens the pores of the metal, which the rolling may have preſſed together, and by theſe means favours the action of the acid.

The proceſs recommended by Bergman is this: firſt to diſſolve it in nitro-muriatic acid; the ſilver is depoſited ſpontaneouſly in the form of muriate of ſilver, which is inſoluble; the gold is precipitated in fine powder by the ſulphate of iron. Each of the above-mentioned proceſſes is performed in ſuch a manner as to lead to an eſtimate of the quantity of gold, and alſo of the different metals with which it is alloyed.

Gold, it is ſaid, by ſome able French chemiſts, as Le Sage and Rouelle, exiſts in the vegetable kingdom, it having, in experiments inſtituted for the purpoſe, been extracted from the aſhes of certain plants; the quantity, however, being, of courſe, too trifling to be ſought after for practical purpoſes, it is ſufficient merely to mention the fact in this place.

Gold, *Chemical Properties of.*—Gold melts at the temperature of 32° of the ſcale of Wedgewood; and what is very remarkable is, that it is more difficult of fuſion in the ſtate of filings and grains, than in larger maſſes; and that the ſmall fragments, even after they are fuſed, remain in ſeparate globules: and in order to make them run into one maſs, a little nitre or borax is thrown into the crucible. Gold, which has only been ſubjected to a degree of heat barely neceſſary for its fuſion, is brittle after cooling. To preſerve its ductility, which, as will be ſeen farther on, is one of the more important mechanical properties of gold, the temperature muſt be raiſed much higher. It is brittle alſo when it is too ſuddenly cooled after fuſion. By an increaſe of temperature while the gold is in fuſion, it becomes convex on the ſurface, and when it cools, it ſinks, circumſtances which are aſcribed to the expanſion and contraction of the metal. When it is gradually and ſlowly cooled, it cryſtallizes in the form of quadrangular pyramids, or regular octahedrons. If the heat be continued while it is in perfect fuſion, it ſeems to undergo a kind of ebullition. This circumſtance was noticed by Homberg and Macquer, as well in the application of the burning-glaſs, as when a ſmall globule of the metal was acted on by the blow-pipe. Macquer aſſerts that it roſe in vapour to the height of five or ſix inches, and attached itſelf to the ſurface of a ſilver plate, which it completely gilded.

The ſtrongeſt heat of a furnace, which has been applied to gold in fuſion, has been found incapable of producing the ſmalleſt change or the leaſt tendency to oxydation; but, by the action of a very powerful burning-glaſs invented by Tſchirnhauſen, and which has been deſcribed under the article Burning-glass, Homberg found that gold, placed in its focus, not only roſe in vapour, but that it was covered with a violet-coloured vitreous oxyd. The experiment was frequently repeated, ſo as to aſcertain the fact moſt completely. The ſame thing has been done by means of the electric diſcharge, by which gold-leaf, placed between two cards, has been converted into a violet-coloured powder. Theſe inſtances of real oxydation were, at firſt, regarded, by ſome who witneſſed the experiments, as merely minute mechanical diviſions of the metal, but this apparent objection has been removed by the experiments of Van Marum on the combuſtibility of gold by means of the large electrical machine at Haerlem. A ſtrong electrical ſhock was paſſed through a golden wire ſuſpended in the air. It kindled, burned with a perceptible green flame, and was reduced to fine powder, which was diſſipated in the air. A ſimilar oxydation has been obſerved to take place on the gilding in the inſide of houſes, or on the furniture which has been ſtruck with lightning. The purple oxyd of gold, thus obtained, contains five or ſix *per cent.* of oxygen. By precipitation from ſome of its ſaline combinations, a yellow oxyd has been obtained, in which the proportion of oxygen amounts to ten *per cent.* The oxyd in both inſtances may be decompoſed, and the oxygen completely expelled, by an elevation of temperature not much ſuperior to that of ignition.

The attraction of gold to oxygen is ſo weak, that it is ſcarcely affected by the greater number of acids. It was formerly ſuppoſed to be perfectly inſoluble in the nitrous and nitric acids, which in general part with oxygen with ſo much facility, and when gold leaf is put into the acid cold, it ſeems to ſuffer no change, but when nitric or nitrous acid is boiled on gold, it is capable of diſſolving a ſmall portion of it. The quantity diſſolved is, however, ſo inconſiderable, and depends on ſo many conditions, which it is needleſs to enumerate, that the accuracy of the proceſſes of aſſaying can ſcarcely be affected by it.

When gold is diſſolved in the nitro-muriatic acid, or in a mixture of equal parts of nitric and muriatic acids, an efferveſcence takes place, and the ſolution becomes of a yellow colour. In this proceſs the nitric acid is decompoſed, its oxygen combines with the gold, and the oxyd, as it is formed, is diſſolved in the muriatic acid. By adding lime-water a precipitate is formed, which is the yellow oxyd of gold, conſiſting of from eight to ten parts of oxygen in the hundred. There is no action between gold and azote, hydrogen, carbon, or ſulphur: but the oxyds of gold are readily decompoſed by hydrogen, as will be ſoon ſeen.

Phoſphorus combines with gold by heating together in a crucible a mixture of one part of gold in filings, with two parts of phoſphoric glaſs, and an eighth part of charcoal. Great part of the phoſphorus is ſeparated from the acid, and driven off, but there remains a ſmall quantity united with the gold, forming a phoſphuret of gold. It may be done alſo by adding phoſphorus to gold in a red heat in a crucible. It is, in this ſtate, pale coloured, granulated, brittle, and a little more fuſible. The proportion of phoſphorus is not more than one part in twenty-four; and the ſubſtance may be decompoſed by being kept in fuſion; the phoſphorus is driven off in the ſtate of vapour, and inflamed. Bergman has arranged the affinities of gold and its oxyds in the following order:

Gold.	*Oxyds of Gold.*
Mercury,	Muriatic-acid,
Copper,	Nitric,
Silver,	Sulphuric,
Lead,	Arſenic,
Biſmuth,	Fluoric,
Tin,	Tartaric,
Antimony,	Phoſphoric,
Iron,	Pruſſic.
Platina,	
Zinc,	
Nickel,	
Arſenic,	
Cobalt,	
Mangeneſe.	

Salts of Gold.—Theſe are the nitrate and muriate.

1. *Nitrate of Gold.* When concentrated nitric acid is ſeveral times ſucceſſively poured upon gold, boiled and diſtilled to dryneſs, the gold is diſſolved, and the ſolution aſſumes a yellowiſh colour. This ſolution is more readily effected in proportion to the quantity of gas or nitrous gas which the acid contains. Gold-leaf, according to Fourcroy, is diſſolved in nitric acid, impregnated with nitrous oxyd, and he ſuppoſes that it is owing to the nitrous oxyd that the gold is oxydated, this oxyd being ſo much more eaſily decompoſed than the nitric acid. The acid which, at firſt, is deprived of its colour by the oxydation of the gold, as this oxyd is diſſolved, aſſumes an orange-yellow colour, holding in ſolution the nitrate of gold with an exceſs of acid. The nitrate cannot be obtained in cryſtals, and it is decompoſed by heat or by being expoſed to the light of the ſun; it is alſo decompoſed by the alkalies, or by introducing a plate of tin or ſilver into the ſolution, and the purple oxyd is precipitated in the form of powder; and likewiſe by muriatic acid, which at the inſtant of combination converts the orange-colour to a pure yellow.

2. *Muriate of Gold.*—Muriatic acid of itſelf has no action on gold, or on its purple oxyd, but gold is immediately oxydated and then diſſolved in oxymuriatic acid: or if nitric acid be added to the muriatic in certain proportions, the ſolution of gold in the mixture is readily effected: hence the nitro-muriatic acid was diſtinguiſhed by the name of "aqua regia," becauſe it diſſolved gold, which was regarded by the alchemiſts as the king of metals. The nature of the chemical action is thus explained. Gold is oxydated with great difficulty, but it is effected by oxymuriatic acid, which readily parts with its oxygen, or by the addition of the nitrous to the muriatic, the former of which is decompoſed, giving out its oxygen to the gold, which being now oxydated is diſſolved in the muriatic acid, forming with it a muriate of gold. This ſolution of the muriate of gold is of a deep yellow colour, extremely acrid and cauſtic; has an aſtringent metallic taſte, and ſtains the ſkin of a deep purple colour, which becomes darker by expoſure to the air and light. It produces a ſimilar effect on all vegetable and animal matters, and on marble and ſiliceous ſtones. By evaporating the ſolution to one half, nitric acid is diſengaged, and cryſtals are obtained. Theſe aſſume a red colour by the action of ſtrong light. They attract moiſture from the air, and ſpontaneouſly become liquid. When oxymuriatic acid is uſed, the oxygen of this acid being retained even by a weaker affinity than the nitric acid, the gold attracts it, and combines with the muriatic acid. In this caſe the ſolution is ſlow, and but a very ſmall quantity of gold can be diſſolved, partly from the oxymuriatic acid not being in a very concentrated ſtate, and partly, it is ſuppoſed, from the quantity of oxygen preſent not being ſuch as to form a ſufficient quantity of oxyd to ſaturate the acid. It ought, however, to be obſerved, that if the late diſcoveries of profeſſor Davy be eſtabliſhed, which make the oxy-muriatic acid a ſimple ſubſtance, and even poſſeſſing no oxygen whatever, then a new theory muſt be introduced to account for the facts above-ſtated. In oxy-muriatic gas, gold-leaf is inſtantly fuſed with inflammation, and diſſolved.

Gold cannot be diſſolved by the other acids when in its metallic ſtate, but its oxyds may be combined with them, and a number of the ſalts of gold be formed. The ſulphate and nitrate alſo, as we have ſeen, do not cryſtallize: the phoſphate of gold may be fuſed, and in this ſtate it forms a fine red glaſs. We ſhall now briefly notice ſome of the properties of the muriate of gold. In connection with this ſubject, we muſt not omit the experiments of Mrs. Fulhame, which ſhe announced in an "Eſſay on Combuſtion," with a view to a new art of dyeing and painting, &c. in the year 1794, and which were, at that period, expected to lead to ſome important practical reſults.

The muriate of gold is very ſoluble in water, and is decompoſed in hydrogen gas. If a piece of ſilk be moiſtened with a ſolution of muriate of gold, the ſalt is decompoſed, and the gold, reduced to the metallic ſtate, attaches itſelf to the ſilk. It is decompoſed alſo by phoſphorus. If a ſtick of phoſphorus be introduced into a ſaturated ſolution of muriate of gold, the ſalt is decompoſed, and the gold, being reduced to the metallic ſtate, forms a cylindrical covering to the phoſphorus, which may be ſeparated by diſſolving the latter in hot water. A ſimilar effect is produced by burning ſulphur, by ſulphurated and phoſphorated hydrogen gaſes, and by ſulphurous acid. If a ſolution of muriate of gold be cautiouſly added to ſulphurous acid, a fine pellicle of gold appears on the ſurface, which is inſtantly precipitated in the form of ſmall grains. Theſe, and many other experiments equally curious and intereſting, were firſt deſcribed by the lady above-mentioned, and the rationale of the ſubject is thus explained. All the ſubſtances which have been enumerated have a ſtronger affinity for oxygen than gold, ſo that the oxyd of gold, in combination with the acid, is decompoſed; the oxygen combining with the hydrogen, and forming water, or with the phoſphorus or ſulphur, and forming ſulphuric or phoſphoric acid.

The muriate of gold is ſoluble in ether, and forms with it a ſolution of a golden yellow colour, which floats on the top of the fluid. By the addition of ether to a ſolution of gold, and agitating the mixture, as ſoon as it is left at reſt, the two liquids ſeparate, the ether riſes to the top, and aſſumes a yellow colour, while the nitro-muriatic acid remains below and becomes white. By a proceſs of this kind a tincture of gold was prepared, called "potable gold." The ſolution of gold in ether is not permanent: it is quickly reduced to the metallic ſtate, and is ſometimes found cryſtallized on the ſurface. The etherial ſolution is uſed by Mr. Stodart for defending lancets, and other ſurgical inſtruments, from injury by a moiſt atmoſphere.

The muriate of gold is decompoſed by all the alkalies and earths, and is reduced to the ſtate of yellow oxyd.

Moſt of the metals decompoſe the muriate of gold: copper, iron, zinc throw down the gold in its metallic ſtate: other metals, as ſilver or lead, in the ſtate of purple oxyd. The precipitate obtained by means of tin is valued for the beauty of the colour which it gives to glaſs or enamel. This preparation is known to artiſts by the name of the "Purple powder of Caſſius," and it may be obtained by various proceſſes. That which is commonly reſorted to, is to diſſolve pure gold in a nitro-muriatic acid, which is compoſed of three parts of nitric and one of muriatic acid. A ſolution of tin is to be prepared by diſſolving the metal, in ſmall portions at a time, in an acid containing two parts of nitric and one of muriatic acid, previouſly diluted with an equal weight of water. This ſolution, after it is ſaturated, is largely diluted, perhaps with a hundred parts of diſtilled water: to this the ſolution of gold equal in quantity to half the quantity of ſolution of tin, is added, and the precipitate is obtained after it is allowed to ſubſide, which is to be waſhed and dried. This is the only known preparation capable of giving a red colour to glaſs; and if the experiment be performed with accuracy and judgment, the glaſs ſo treated ſerves as a capital imitation of the ruby. The proceſs is, however, attended with conſiderable difficulty, owing to the colour of the precipitate being various, from circumſtances not eaſily diſcovered. According to Pelletier, it is a compound of oxyds of tin and gold; and its formation is owing to the ſtrong attraction of the tin for the oxygen, with which it is diſpoſed to combine in large quantities. When the ſolutions, above deſcribed, are mixed, the oxyd of tin, which is nearly at the minimum of oxydizement, attracts part of the oxygen of the oxyd of gold: the two oxyds thus brought to ſtates of oxydizement, different from thoſe in which they exiſted in the ſeparate ſolutions, and probably likewiſe exerting mutual affinities, are no longer ſoluble, and are precipitated in combination. Muriate of gold is decompoſed by ſome other metallic ſalts, in conſequence of ſimilar actions; the oxygen of the oxyd of gold being attracted by the oxyd of the other metal, which hence paſſes to a higher ſtate of oxydizement. Thoſe which have a ſtrong tendency to exiſt in ſuch a ſtate, are capable even of completely de-oxydizing the oxyd of gold. Example.—If a ſolution of the green ſulphate of iron be added to the ſolution of muriate of gold, the gold is precipitated in very minute particles in the metallic ſtate, while the iron paſſes to the ſtate of a red ſulphate. A ſolution of muriate of gold, when concentrated by evaporation, yields beautiful yellow cryſtals, not unlike topazes.

Gold, as we have ſeen, does not combine with ſulphur by fuſion, and on this is founded a method of freeing it from ſilver or other metals, the alloy being fuſed with ſulphur, the ſilver, &c. unite with the ſulphur, leaving the gold ſeparate. But gold and ſulphur may be united by the medium of an alkali. Example.—Let a ſulphuret of potaſh be fuſed with one-eighth of its weight of gold-leaf, and the combination is even ſoluble in water, the ſolution being of a green colour.

Alloys of Gold.—Gold forms alloys with the greater number of the metals, which produce on the metal ſo alloyed a very particular change in its properties. An extenſive and accurate ſeries of experiments on theſe alloys was made by Mr. Hatchet, with the view of determining ſome important and intereſting facts relating to the uſe of gold as a coin. Of theſe we ſhall give a brief abſtract, referring our readers for a more particular account to the Tranſactions of the Royal Society for the year 1803.

The chief enquiry of Mr. Hatchet, as connected with the alloys of gold, was, whether ſoft and ductile gold, or gold made as hard as is compatible with the proceſs of coining, ſuffers moſt by wear. His experiments were intended to examine the effects which various metals produce upon gold, when combined with it in given proportions, beginning with $\frac{1}{12}$th, which is the ſtandard proportion of alloy, and gradually decreaſing to $\frac{1}{1920}$ part of maſs. The reſults drawn from the trials were, that fine gold, alloyed with ſilver, with copper, and with tin, did not ſuffer any loſs during the experiment. The gold alloyed with lead only loſt three grains, chiefly by vitrification; with iron it loſt 12 grains, which formed ſcoria; with biſmuth it loſt 12 grains, chiefly by vitrification; with zinc it loſt a pennyweight by volatilization; and with arſenic, it not only loſt the whole quantity of alloy, but alſo two grains of the gold which were carried off in conſequence of the rapid volatilization of the arſenic. Hence it was inferred that only two metals are proper for the alloy of gold coin, namely, ſilver and copper; as all the others either conſiderably alter the colour, or diminiſh the ductility of gold. In reſpect to the latter quality, the different alloys employed in this ſeries of experiments appear to affect gold nearly in the following decreaſing order: 1. Biſmuth. 2. Lead. 3. Antimony. 4. Arſenic. 5. Zinc. 6. Cobalt. 7. Manganeſe. 8. Nickel. 9. Tin. 10. Iron. 11. Platina. 12. Copper, and, 13. Silver. The three firſt have nearly the ſame effect on gold, and biſmuth is found to render gold brittle when the proportion of that metal is to gold only as 1 to 1920; even the vapour ariſing from biſmuth, lead, and antimony in fuſion, produces theſe changes.

The alloy with platina is of a yellowiſh white colour, very ductile, and of a conſiderable ſpecific gravity. The alloy with ſilver in the ſtandard proportion, or 1 to 12, approaches, as we have ſeen above, the neareſt to the ductility of fine gold of any alloy, and its ſpecific gravity differs but little from the mean ſpecific gravity of the two metals. When the ſilver amounts to $\frac{1}{5}$th, the colour of the alloy approaches to green, and forms the green gold of the goldſmiths. In combination with copper, gold has its colour rather heightened than impaired; its hardneſs is increaſed and its ductility very little leſſened, when the ſtandard proportion of 1 part in 12 is not exceeded. This alloy of 22 carats fine is generally uſed, when gold is fabricated into plate or ornaments, and likewiſe forms the gold coin of the country. With quickſilver, gold unites with great facility, making with it an amalgam which will be deſcribed hereafter. The alloy with iron is much harder than gold, very ductile and malleable; but the colour is debaſed to a dulliſh grey, inclining to white. Tin was formerly regarded as the metal which rendered the alloy with gold the moſt brittle of all the alloys, but the experiments of Mr. Bingley and Mr. Hatchet have ſhewn that this notion is to a certain extent erroneous, and that the effects produced by the mixture of tin with gold, ought probably to be aſcribed to other metals, with which the tin was contaminated, ſuch as biſmuth, antimony, lead, and zinc. The alloy, conſiſting of equal parts of zinc and gold, is very hard and ſuſceptible of a fine poliſh, and not being ſubject to much alteration from the air, it is recommended for the fabrication of the mirrors of teleſcopes. The alloy of gold with ſilver, in which there is only $\frac{1}{70}$th part of ſilver, changes the colour of the gold very ſenſibly; and the alloy is employed for ſoldering gold, being more fuſible than this metal.

Gold, *Phyſical properties of.* *Gold*, *aurum*, a yellow metal, heavy, pure, ductile, malleable, and ſhining; and on thoſe accounts, the moſt valuable of all metals. In fuſibility it ranks between ſilver and copper; it is not oxydable by fuſion in atmoſpheric air; nor is it acted upon by any of the acids, except the oxymuriatic and nitro-muriatic.

The yellow colour of gold is rendered paler by fuſion with borax; but this may be prevented or corrected by fuſion with nitre, or ſal ammoniac. The colour of gold is heightened by an alloy of copper, and this property of copper has given riſe to ſundry proceſſes for exalting the colour of this noble metal. Other metals render it paler. The alchemiſts call gold, *ſol*, the ſun; to denote its pre-eminence over the other metals, which are called by the names of the planets. Its ſymbol, or character, is ☉; which, in their hieroglyphical way of writing, denotes perfection, ſimplicity, ſolidity, &c.

The weight of gold is to that of water, according to ſome ſtatements, as 19.637 to 1000. Fine gold, immerſed in water, weighs nearly one nineteenth part leſs than in air, and conſequently it is upwards of nineteen times heavier than its own volume of water. However, the ſpecific gravity of gold, or its comparative weight with an equal volume of water, has been variouſly aſſigned: ſome have made it 19.637, others 19.640, and in the Swediſh Tranſactions it is made no leſs than 20.000; that of water being 1000. Others again have made it as low as 18.75. But from the experiments of Mr. Ellicot, it does not appear to have exceeded 19.207; and from thoſe of Dr. Lewis, on the pureſt gold, well hammered, its gravity is ſtated between 19.300 and 19.400. In all experiments of this kind, the reſult ſhould be ſpecified with an account of the ſenſibility of the balance, and the quality and warmth of the water. An increaſe of heat rarefying water more than it does gold, the gold muſt turn out proportionably heavier than an equal volume of the expanded fluid; and this difference is more conſiderable than it has generally been ſuppoſed. From freezing to boiling water, or by an augmentation of heat equivalent to 180° of Fahrenheit's thermometer, Dr. Lewis found that a rod of gold was lengthened about one part in 700, and conſequently its volume increaſed about one part in 233, while the volume of water is increaſed one twenty-ſixth or more; hence it appears, that by an augmentation of 40° of the thermometer, or from a little above freezing to the ſummer heat, the volume of gold, if its expanſion be uniform, is increaſed one part in 1048, and that of water one in 117; and the gravity of gold, weighed in the water ſo warmed and expanded, ſhould be greater than when the gold and water are 40° colder, in the proportion of about 19.265 to 19.400: and this calculation gives a difference, in the gravity, of 0.034 for every 10° of the thermometer; but ſome trials ſeemed to make it greater. It has been imagined, that the comparative gravity of gold to braſs weights, which are more than double in volume to an equal weight of gold, muſt be ſo far influenced by the variable gravity of the atmoſphere, that there muſt be an advantage in buying gold by weight when the air is lighteſt. But Dr. Lewis obſerves, that this difference appears too inconſiderable to be regarded in a commercial view. For the loſs of weight of the two metals in the air being as much leſs than their loſs in water, as air is lighter than water; and air, if we admit the accuracy of the concluſion deduced from an experiment of Mr. Hawkſbee, being in its lighteſt ſtate about a 937th, and in its heavieſt ſtate about an 848th part of the weight of water; it will be found, on calculation, that the gold preponderates above the braſs, in the heavieſt more than in the lighteſt air, only by one part in 145.000, or one grain in about 302 ounces; which is a difference too minute to be ſenſible in the niceſt balance. If the mean gravity of gold be reckoned 19.300, as a cubic inch of water weighs about 254 grains, a cubic inch of gold will conſequently weigh about 4902 grains, or 10 ounces, 102 grains. The pound weight, or twelve ounces Troy, of gold, is divided into twenty-four carats. Dr. Lewis ſtates the ſpecific gravity of fine gold at 53° Fahrenheit, to be 19.376. According to Briſſon the ſpecific gravity of fine gold in ingot is 19.258, and when hammered 19.361. The ſpecific gravity of gold made ſtandard by Britiſh copper, was found by Mr. Hatchett (ſee Phil. Tranſ. for 1803) to be 17.281, when caſt in an iron mould; but when the ſame was caſt in ſand, it was only 16.994. (See *Specific* Gravity.) The ſoftneſs of gold, for it is nearly as ſoft as tin, and its toughneſs, adapt it for receiving the impreſſions of dies, and of courſe to be reduced to the ſtate of coin, and for various other purpoſes in the arts. It is but ſlightly elaſtic and ſonorous. With regard to tenacity, it is inferior to iron, copper, platina, and ſilver, and therefore the aſſertions of former chemiſts and philoſophers have been contradicted by later experiments, for gold has been uſually repreſented as the moſt tenacious as well as the moſt ductile of all metals. Its malleability and ductility are ſufficiently evinced by the Gold-*leaf* and Gold-*wire*, which ſee. See alſo Ductility.

The value of gold to that of ſilver, was anciently only as twelve to one. Indeed, this proportion varies as gold is more or leſs plentiful: for Suetonius relates, that Cæſar brought ſuch a quantity of gold from Italy, that the pound of gold was only worth ſeven pounds and a half of ſilver. In our coinage, the value of fine gold to fine ſilver is nearly as 15$\frac{1}{5}$ to 1. (See Coin and Standard.) Sir Iſaac Newton obſerves, in a repreſentation to the lords of the treaſury in the year 1717, that in the mints of Spain and Portugal the value of gold is ſixteen times that of ſilver; but that in thoſe countries, payments in ſilver bearing generally a premium of ſix per cent. the proportion may be conſidered as fixed by commerce at $15\frac{1}{15}$ to 1; that in the other parts of Europe, the value of gold is at moſt fifteen, and in China and Japan but nine or ten times that of ſilver; ſo that gold is rated higher in England than in any other part of Europe, and higher in Europe than in the Eaſtern countries. Hence, in great meaſure, ariſe the profits of exchanging gold for ſilver in one place, and re-exchanging them in another; and hence the greater diſparity between the relative quantities of gold and ſilver in one commercial nation than in another; this metal being brought in moſt abundance which is rated higheſt in proportion to the other, and that which is rated loweſt being drained away. There are various ways of determining the fineneſs of gold; or the proportion of alloy which it contains. Thoſe who are uſed to this buſineſs can judge nearly the proportion of alloy from the colour of any given maſs, provided that the ſpecies of alloy be known. For the method of doing this, ſee Touch-*needles*. The great exceſs of the weight of gold, above that of the metals uſed for its alloy, affords another method of determining the quantity of alloy in any given maſs, where the ſpecies of alloy is known. Thus fine gold loſes in water one grain in every 19.3 nearly; and fine ſilver loſes one grain in about eleven; from whence it is eaſy to find the loſs of any number of grains of each, and conſequently of any aſſignable mixture of the two metals. Thus, fifty grains of gold will loſe above $2\frac{1}{2}$, and fifty grains of ſilver ſomewhat more than $4\frac{1}{2}$; ſo that a mixture of equal parts of the two will loſe above ſeven in a hundred, or one in fourteen. A mixture of gold with half its weight of ſilver will loſe one part in 15.4; with a third of ſilver, one in 16.2; with a fourth, one in 1.67; and with an eleventh of ſilver, which is the ſtandard proportion of alloy, one in 18.1. On this principle, the ſpecific gravity or proportional loſs in water, of gold alloyed with different quantities of ſilver, copper, and mixtures of both, may be computed and formed into tables for uſe. The accuracy of this method, it ſhould be obſerved, depends on the ſuppoſition that each of the two metals, that are melted together, retains its own proper gravity, which is the caſe in mixtures of gold and ſilver; but gold and copper, melted together, are ſpecifically lighter than if they were weighed ſeparately; or the ſpecific gravity of the alloy is leſs than that of the mean of its ingredients; the caſe is the ſame with the alloys of nickel and gold, of lead and gold, of iron and gold; but the reverſe happens in mixtures of gold with zinc, biſmuth, and tin. It appears, therefore, that the hydroſtatic balance cannot diſcover, with certainty, the exact fineneſs of gold, unleſs when ſilver is the metal mixed with it.

There are various methods of ſeparating gold from gilt works: it may be ſeparated from the ſurface of ſilver, either by ſpreading over the gilt ſilver a paſte made of powdered ſal ammoniac moiſtened with aquafortis, and heating it till the matter ſmokes, and is nearly dry; throw it into water, and the gold will eaſily come off by rubbing it with a ſcratch bruſh: or, by putting the gilt ſilver into common aqua regia, nearly boiling, and turning the metal frequently, till it becomes all over black; then waſh it with water, and rub it with the ſcratch bruſh, which will diſengage the gold left by the aqua regia. See Gilding.

Gold may be ſeparated from gilt copper, by applying a ſolution of borax to the gilt parts with a pencil, and ſprinkling over the place thus moiſtened a little powdered ſulphur; when the piece is made red-hot and quenched in water, the gold may be wiped off with a bruſh.

Gold may be recovered from wood, gilt on a water ſize, by ſteeping it for a quarter of an hour in a quantity of very hot water, ſufficient to cover it; then ſcrub the wood in a little warm water, with ſhort ſtiff briſtle bruſhes of different ſizes: boil the whole mixture of water, ſize, gold, &c. to dryneſs; make the dry matter red-hot in a crucible to burn off the ſize, and grind the remainder with mercury. The gold will be more eaſily laid hold of by the mercury, by the addition of ſome clean ſand.

Gold, *Alchemical Hiſtory of*. See Philosopher's *Stone*, and Transmutation.

Gold, *Amalgam of*, is a preparation of gold much uſed by the gilders (ſee Gilding); and it is made by heating ſome pure quickſilver in a clean crucible, and adding to it, when it is nearly boiling, about a ſixth of its weight of fine gold in thin plates that are hot; after this mixture has been kept hot for a few minutes, it becomes an homogeneous ſubſtance; and when cold, it is put into a piece of ſoft leather, and which is gradually preſſed till the fluid part of the amalgam, conſiſting almoſt wholly of mercury, is forced through the pores of the leather; while the gold, combined with about twice its weight of mercury, will remain in the ſtate of a yellow ſilvery maſs, of the conſiſtence of ſoft butter; when this maſs has been bruiſed in a mortar, or ſhaken in a phial, with repeated portions of ſalt and water, till the water receives no foulneſs from it, it is fit for uſe, and may be preſerved for any time in a corked phial. For the purpoſes of gilding it is of great importance, that this amalgam ſhould be formed of pure materials, as any portion of lead or biſmuth would deteriorate the colour of the gold, and tarniſh it with black ſpecks. The mercury ſhould therefore be previouſly diſtilled from the red precipitate (nitrous red oxyd of mercury), either alone or mixed with a little charcoal powder. See Amalgam and Mercury.

Gold-*beating*, and Gold-*beater's ſkin*. See Gold-*leaf*.

Gold, *Burniſhed*, is that which is poliſhed with a ſteel inſtrument, called a burniſher, if it be wrought gold, or gilding on metal; or with a wolf's tooth, if it be gilding in water. See Gilding.

Gold *Chain*. See Chain.

Gold *Coin*, or *ſpecies of gold*. See Coin and Coinage.

Gold *Colour on Glaſs and China*. See Gems, Glass, Gilding, and Porcelain.

Gold-*coloured Glazing*. See Glazing.

Gold-*coloured Metal* is produced by melting zinc with copper. According to the purity of the zinc and copper, the proportions in which they are mixed, and the intimacy of their union, the compound metal proves more or leſs malleable, and approaches more or leſs to the colour of gold. Some direct the zinc to be taken only in a fifth or ſixth part of the weight of the copper, and others in an equal weight or more. Dr. Lewis obſerves, from the reſult of many experiments, that both with the ſmalleſt and largeſt of theſe quantities of zinc, the metal proves more like gold than with the intermediate proportions.

The colour of theſe compounds is improved by a ſmall mixture of ſome other metallic bodies. Cramer recommends the addition of a ſmall quantity of pure tin to copper, melted with a fourth or ſixth part of zinc, which forms a compound metal, that acquires, on being well cleaned, and laid in the air for ſome days, a ſuperficial colour of fine gold. Geoffroy ſays that iron has the beſt effect: with the proportions of ten parts of zinc, eight of copper, and one of iron-filings, he produced a metal of a fine ſmooth grain, compact, hard, and bright, and of a beautiful gold colour. By making the copper firſt into braſs, and then melting it with a ſuitable quantity of zinc, a metal may be obtained of ſuperior quality to that produced either by melting the copper and zinc, or by impregnating the copper with zinc, by cementation and fuſion with calamine; which is a method ſometimes practiſed. A very ingenious artiſt, ſays Dr. Lewis, who now prepares a gold-coloured metal in great perfection, has a fine kind of braſs made on purpoſe for this uſe. The union of the copper and zinc in fuſion, ſucceeds beſt and with leaſt loſs of the zinc, according to Dr. Lewis, by uſing a mixture of black flux and borax, or a compoſition of twelve parts of green glaſs powdered, ſix parts of potaſh, two of borax, and one of powdered charcoal: when this flux is fuſed in the crucible, the copper and zinc are dropped into it; and when they appear perfectly melted, they are to be well ſtirred together with an iron rod, and expeditiouſly poured out. The ſame flux will ſerve for melting ſeveral freſh quantities of the metal. Dr. Hooke gives the following receipt for making a gold-coloured metal: eight parts of diſtilled verdigris, *i. e.* of verdigris purified by ſolution in diſtilled vinegar and cryſtallization, and four parts of Alexandrian tutty, with two of nitre, and one of borax, are directed to be mixed with oil to the conſiſtence of pap; then melted in a crucible, and poured into a flat mould firſt well warmed. A compoſition of this kind is called *aurum ſophiſticum*.

The following method is recommended by Homberg for giving a gold colour to copper, without the addition of zinc; make an amalgam of one part pure copper, and three parts quickſilver; boil this in river-water for two hours, then diſtil off the quickſilver in a retort, and cohobate it once; take out the copper and fuſe it, and it will be found of a beautiful gold colour, more ductile than common copper, and extremely well fitted for watch-work, gilding, and the finer machines and utenſils. The celebrated Mr. Pott affirms that a gold-coloured metal may be made from a mixture of copper and tin, and directs it to be compounded in the following manner: Take one half ounce of tin aſhes, and four half ounces of copper; melt them well together in a cloſe luted crucible, with a ſtrong fire; or take one half ounce of the pureſt tin cut in pieces, and ſixteen half ounces of pure copper beaten into thin plates; lay the tin between the copper-plates, lute the crucible cloſe, and melt with a ſtrong fire. See *Prince's* METAL and TOMBAC.

Silver is tarniſhed ſuperficially, by certain vapours, as that of putrified urine, to a colour ſo like that of gold, that ſeveral edicts have been iſſued in France to prevent frauds of this kind with regard to wire and laces.

GOLD-*coloured Pigments.* See PIGMENTS.

GOLD-*coloured Varniſh.* See LACQUER.

GOLD, *Crown,* See COIN and STANDARD.

GOLD, *Dutch*, is a kind of leaf uſed in gilding, &c. which is copper gilt, or braſs beaten into leaves like the genuine gold-leaf. It is ſaid to be made from copper-plates, by cementation with calamine, without ſubſequent fuſion. The thickneſs, compared with that of leaf-gold, is as nineteen to four, and under equal ſurfaces it is conſiderably more than twice as heavy as the gold.

GOLD, *Farthing of.* See FARTHING.

GOLD, *Fine* or *Pure*, is that purged by the fire of all its impurities, and all alloy. The Latins call it *aurum purum, aurum primum, aurum obrizum, aurum coctum.*

The moderns frequently call it *gold of twenty-four carats*; but, in reality, there is no ſuch thing as gold ſo very pure; and there is always wanting at leaſt a quarter of a carat. Gold of twenty-two carats has one part of ſilver, and another of copper: that of twenty-three carats has half a part, *i. e.* half a twenty-fourth of each.

Bouteroue maintains, that the electrum of the ancients was gold of nineteen carats; or four parts gold, and a fifth ſilver.

From an ordinance of king John of France, it appears that the gold then ſtruck at Paris was of nineteen carats one-fifth; and yet it is added that it was the beſt and fineſt gold then known on earth. See STANDARD.

GOLD, *Fulminating*, *aurum fulminans*, a precipitate of gold from its nitro-muriatic ſolution by ammonia, which poſſeſſes a moſt remarkable exploſive property. See AURUM.

It is prepared by diluting a ſolution of muriated gold with ſix or eight times its bulk of diſtilled water, adding drop by drop liquid ammonia, till the precipitation ceaſes; then let the yellow powder thus obtained be ſeparated by a filter, well waſhed in hot water, and afterwards dried. The fulminating gold, thus procured, will exceed the weight of the original gold by about 33 parts in 100. If a ſmall quantity, *e. g.* half a grain, of this powder be held over a candle, in a ſpoon or on the blade of a knife, it preſently explodes with a very loud report. This powder ſhould be very cautiouſly uſed; the temperature requiſite for its exploſion is ſtated at above 250 of Fahrenheit. Before it explodes, its yellow colour changes to black, and at the moment of its decompoſition an inſtantaneous flaſh is obſerved. The principal energy in exploſion is directed downwards, inſomuch that two or three grains of it exploded on a moderately thick ſheet of copper will burſt a hole in it. This ſalt is decompoſed by an electrical ſhock, but it cannot be ignited by a ſpark from electricity or from flint and ſteel. It will vehemently explode by ſudden friction, and therefore, in order to avoid dangerous accidents of this kind, it ſhould never be kept in a ground-ſtoppered bottle. The facility of its exploſion is very much increaſed by high drying; ſo that if it be heated till it becomes black, and is immediately removed from the fire, it will frequently go off by a mere touch. If the fulminating gold be mixed with four or five times its weight of chalk, or ſulphat of potaſh, or with any pulverulent ſubſtance neither fuſible nor decompoſable at a moderate temperature, and expoſed gradually to a low heat, it will be quickly decompoſed, leaving merely the purple oxyd of gold. The ſame effect may be produced by very cautiouſly heating the fulminating gold without any addition, removing it from the fire when it has changed its colour, and when cold heating it again, and proceeding in this way till the powder becomes purple, in which ſtate it will have entirely loſt its exploſive faculty. A ſimilar change occurs by melting ſulphur at the loweſt poſſible heat, and dropping in the fulminating gold by half a grain at a time, well mixing it; the ſulphur may then be burnt off without danger, and minute grains of metallic gold will be left behind. “The true theory of the decompoſition of fulminating gold was partially diſcovered by Bergman, and has ſince been fully illuſtrated by Berthollet. The former of theſe able chemiſts ſhewed that this ſalt when decompoſed in cloſe veſſels was reduced to gold, partly in the metallic ſtate and partly in that of purple oxyd, and at the ſame time a gas was extricated in bulk about a thouſand times as great as that of the original fulminating ſalt, and which extinguiſhed flame and animal life, was not abſorbed by water, and gave no precipitate with lime-water. Berthollet, by decompoſing the ſame ſubſtance in a copper tube, connected with a jar inverted in mercury, obtained azotic gas and a few drops of water, and the gold was reduced to the metallic appearance. Now as ammonia is compoſed of hydrogen and azot, and as the affinity of gold for oxygen is very ſlight, it is manifeſt that the decompoſition and exploſion, under the circumſtances already mentioned, are occaſioned by the oxygen of the gold and the hydrogen of the ammonia combining to form water, and to the liberation of the azot and its ſudden aſſumption of the gaſeous ſtate." Aikin's Dict.

Gold, *Leaf*, or *beaten gold*, is gold beaten with a hammer into exceedingly thin leaves. It is aſtoniſhing to conſider the fineneſs to which a body of gold is thus reduced. In an experiment of Reaumur's, forty-two ſquare inches and three tenths of gold-leaf weighed one grain Troy; and Mr. Boyle found that fifty and ſeven tenths weighed but a grain. As a cubic inch of gold weighs 4902 grains, the thickneſs of the gold-leaf examined by the one was the 207355th, and of that by the other only the 248532nd part of an inch. See Ductility *of Gold*.

This gold is beat on a ſmooth block of black marble, from two hundred to ſix hundred pounds in weight, and about nine inches ſquare on the upper ſurface, fitted into the middle of a wooden frame, about two feet ſquare, ſo as that the ſurface of the marble and frame form one even plane. Three of the ſides are furniſhed with a high ledge, and the front, which is open, has a leather flap faſtened to it, which the gold beater uſes as an apron, for preſerving the fragments of gold that fall off. Three hammers are employed in this buſineſs, having two round and ſomewhat convex faces: the firſt, called the cutch hammer, is about four inches in diameter, and weighs fifteen or ſixteen pounds: the ſecond, called the ſhodering hammer, weighs about twelve pounds, and is about the ſame diameter: the third, called the gold or finiſhing hammer, weighs ten or eleven pounds, and is nearly of the ſame width. The French uſe four hammers, differing both in ſize and ſhape from thoſe of our workmen.

The gold beaters alſo uſe three kinds of animal membranes; ſome of which are laid between the leaves to prevent their uniting together, and others over them to defend them from injury by the action of the hammer. For the outſide cover, they uſe common parchment made of ſheep ſkin; for interlaying with the gold, firſt, the ſmootheſt and cloſeſt vellum made of calves ſkin; and afterwards, the much finer ſkins of ox-gut, ſtript off from the large ſtraight gut ſlit open, prepared on purpoſe for this uſe, and hence called *gold-beater's ſkin*. The general proceſs of their preparation, is ſaid to conſiſt in applying one upon another, by the ſmooth ſides, in a moiſt ſtate, in which they readily cohere and unite inſeparably, ſtretching them on a frame, and carefully ſcraping off the fat and rough matter, ſo as to leave only the fine exterior membrane of the gut; beating them between double leaves of paper, to force out the remaining unctuoſity; moiſtening them once or twice with an infuſion of warm ſpices, and laſtly, drying and preſſing them. It is ſaid, that ſome calcined gypſum, or plaſter of Paris, is rubbed with a hare's foot, both on the vellum, and ox-gut ſkins, which fill up their pores, and prevent the gold leaf from ſticking. Theſe ſkins, after ſeventy or eighty repetitions, become unfit for uſe; but their virtue may be reſtored by interlaying them with leaves of paper moiſtened with vinegar or white wine, beating them for a whole day, and afterwards rubbing them over with plaſter of Paris: and even holes in them may be repaired by the dextrous application of freſh ſkins.

Gold, *the manner of preparing and beating*. They firſt melt a quantity of the pureſt gold in a black-lead crucible, with ſome borax, in a wind furnace, and pour it into an iron ingot mould, ſix or eight inches long, and ¾ of an inch wide, previouſly greaſed and heated; the bar of gold is made red-hot and forged on an anvil into a long plate, which is farther extended, by being paſſed repeatedly between poliſhed ſteel rollers, till it becomes a ribband, as thin as paper. This ribband is divided by compaſſes, and cut with ſhears into equal pieces, which are forged on an anvil till they are an inch ſquare, and afterwards well annealed. Two ounces of gold, which is the quantity melted at a time, make a hundred and fifty of theſe ſquares, ſo that each of them weighs ſix grains and two fifths; and as 4902 grains of gold make a cubic inch, the thickneſs of the ſquare pieces is about the 766th part of an inch. All theſe ſquares are interlaid with leaves or vellum, three or four inches ſquare; one leaf being laid between every two of them, and about twenty more of the leaves are laid on the outſides: over theſe is drawn a parchment caſe open at both ends, and over this another, in a contrary direction, ſo that the vellum and gold leaves are kept tight and cloſe. The whole is then beaten with the heavieſt hammer, till the gold is ſtretched to the extent of the vellum: the pieces taken out of this caſe or mould, are cut in four with a ſteel knife; and the ſix hundred pieces thus produced are interlaid, in the ſame manner, with pieces of the ox-gut ſkins, five inches ſquare. The beating is repeated with a lighter hammer, till the golden plates have acquired the extent of the ſkin; when they are divided into four, by a piece of cane cut to an edge. The whole number of leaves is then divided into four parcels, which are interlaid, as before, and beaten ſeparately, till they are ſtretched for the third time to the ſize of the ſkins. The French repeat the diviſion and beating once more. After the laſt beating, the leaves are taken up by the end of a cane inſtrument, and being thrown flat on a leathern cuſhion, are cut to a ſize, one by one, with a ſquare frame of cane made of a proper ſharpneſs, or with a frame of wood edged with cane. They are then fitted into books of twenty-five leaves each, the paper of which is well ſmoothed, and rubbed with red bole to prevent their ſticking to it. The ſize of the French gold leaves is from ſomewhat leſs than three inches to 3¾ ſquare; that of our's from three inches to 3⅕. We ſhall here obſerve, that the gold uſed for the above purpoſe is never pure, becauſe pure gold is too ductile to be worked between the gold-beater's ſkins. The neweſt ſkins will work the fineſt gold, and make the thinneſt leaf, becauſe they are the ſmootheſt. Old ſkins, being rough or foul, require coarſer gold. The fineſt gold for this purpoſe has three grains of alloy in the ounce, and the coarſeſt 12 grains. In general the alloy is ſix grains, or one eightieth part. The alloy of leaf-gold is ſilver, or copper, or both, and the colour is produced of various tints accordingly. Two ounces and two pennyweights of gold are delivered by the maſter to the workman, who, if very ſkilful, returns 2000 leaves, or 80 books, of gold, together with one ounce and ſix pennyweights of waſte cuttings. Hence one book weighs 4.8 grains; and as the leaves meaſure 3.3 inches in the ſide, the thickneſs of the leaf is one two hundred and eighty-two thouſandth part of an inch.

The French prepare what is called green gold-leaf, from a compoſition of one part of copper and two of ſilver, with eighty of gold; but Dr. Lewis obſerves, that ſuch an admixture gives no greenneſs to gold, and that this kind of leaf is made from the ſame fine gold as the higheſt gold-coloured ſort, the greeniſh hue being a ſuperficial teint given to the gold in ſome part of the proceſs: this leaf is chiefly uſed for the gilding of books. A kind of leaf, called *party-gold*, is formed by laying a thick leaf of ſilver, and a thinner one of gold, flat on one another; they are then heated and preſſed together, ſo as to unite and cohere: and being beaten into fine leaves, as in the foregoing proceſs, the gold, though only in quantity a fourth of that of the ſilver, extends over it and every where covers it.

Gold, *Million of*, a phraſe often uſed to ſignify a million of crowns.

Gold *Money*. See MONEY and COIN.

Gold, *Moſaic*, is gold applied in pannels on proper ground, diſtributed into ſquares, lozenges, and other compartments; part of which is ſhadowed to raiſe or heighten the reſt. See MOSAIC.

Gold *Plates for Enamelling* are generally made of ducat gold, whoſe fineneſs is from $23\frac{1}{2}$ to $23\frac{3}{4}$ carats: and the fineſt gold is the beſt for this purpoſe, unleſs where ſome parts of the gold are left bare and unpoliſhed, as in watch-caſes, ſnuff-boxes, &c. for which purpoſe a mixture of alloy is neceſſary, and ſilver is preferred to copper, becauſe the latter diſpoſes the plates to tarniſh, and turn green. See ENAMELLING.

Gold, *Potable, aurum potabile.* See AURUM *Potabile*, and GOLD.

Gold *Powder*, for the purpoſes of gilding, may be made by grinding gold leaf with honey, or thick gum-water, (ſee *Shell*-GOLD): by diſtilling to dryneſs a ſolution of gold in aqua regia: by evaporating the mercury from an amalgam of gold, taking care well to ſtir the maſs near the end of the proceſs with a glaſs rod or tobacco pipe; or by precipitating gold from its ſolution in aqua regia by applying to it a ſolution of common green vitriol in water, or ſome copper, &c.

Gold *Precipitate with Tin*, called alſo, from its ſuppoſed diſcoverer, *calx Caſſii*, is prepared with great care both in diſſolving the tin, and diluting the ſolution. For this purpoſe, a mixture of two parts of aquafortis, and one of ſpirit of ſalt, is ſuppoſed to be the beſt menſtruum for the tin. Into this mixture ſome fine block tin, granulated, is to be let fall, grain by grain, waiting till one grain is diſſolved before another is dropped in, that the diſſolution may go on ſlowly, without any heat or diſcharge of fumes. The gold is diſſolved in common aqua regia; and a few drops of this ſolution being mixed with ſome ounces of pure water, as many drops of the ſolution of tin are added. If the mixture changes immediately to a clear bright purpliſh red colour, the due degree of dilution has been determined; if the colour appears dull, a greater quantity of water muſt be added for the reſt of the ſolutions. After the mixture has depoſited its red matter, and become clear, a little more of the tin ſolution is to be dropped in, for diſcovering and precipitating any gold that may ſtill remain in it; the liquor being then poured off, the precipitate is waſhed and dried. Lewis's Com. Phil. Techn. p. 176. See *Ruby* GLASS.

Gold, *Queen*. See QUEEN *gold*.

Gold, *Shell*, is that uſed by the gilders and illuminers, and with which gold letters are written. It is made by grinding gold leaves, or gold beater's fragments, with a little honey, and afterwards ſeparating the honey from the powdered gold by means of water. When the honey is waſhed away, the gold may be put on paper, or kept in ſhells; whence its name. When it is uſed, it is diluted with gum-water, or ſoap-ſuds. The German gold-powder, prepared from the Dutch gold leaf in the ſame manner, is generally uſed, and when it is well ſcoured with varniſh, anſwers the end in japanner's gilding, as well as the genuine. See GILDING.

Gold-*ſize* for burniſhed gilding, is prepared of one pound and a half of tobacco-pipe clay, half an ounce of red chalk, a quarter of an ounce of black lead, forty drops of ſweet oil, and three drams of pure tallow; grind the clay, chalk, and black-lead ſeparately, very fine in water; then mix them together; add the oil and tallow, and grind the mixture to a due conſiſtence; or it may be more ſimply prepared by grinding together ſome ſtrongly calcined red ochre with the thickeſt and oldeſt drying oil that can be procured; and, previouſly to uſe, mixing it with a little oil of turpentine for giving it a proper conſiſtence. See *Oil* GILDING.

Gold-*ſize of Japanners* may be made by pulverizing gum animi and aſphaltum, of each one ounce; red-lead, litharge of gold, and umbre, of each one ounce and a half, mixing them with a pound of linſeed oil, and boiling them, obſerving to ſtir them till the whole be incorporated, and appears, on growing cold, of the conſiſtence of tar; ſtrain the mixture through a flannel, and keep it ſtopped up in a bottle, for uſe. When it is uſed, it muſt be ground with as much vermilion as will give it an opaque body, and diluted with oil of turpentine, ſo that it may be worked freely with the pencil. A ſimple preparation conſiſts of one pound of linſeed oil, and four ounces of gum animi; powder the gum, and mix it gradually with the boiling oil: let it continue to boil, till it becomes of the conſiſtence of tar; ſtrain it through a coarſe cloth, keep and uſe it as the other.

Gold-*ſmith*, or as ſome chooſe to expreſs it, *ſilver-ſmith*, the artiſt who makes veſſels, utenſils, and ornaments in gold or ſilver. The goldſmith's work is either performed in the mould, or beat out with the hammer or other engine. All works that have raiſed figures are caſt in moulds, and afterwards poliſhed and finiſhed; plates or diſhes of ſilver or gold are beat out from thin flat plates, and tankards and other veſſels of that kind are formed of plates ſoldered together, and their mouldings are beat, not caſt. The buſineſs of the goldſmith formerly required much more labour than it does at preſent, for they were obliged to hammer the metal from the ingot to the thinneſs they wanted: but there are now invented flatting-mills, which reduce metal to the thinneſs that is required, at a very ſmall expence. The goldſmith is to make his own moulds, and for that reaſon ought to be a good deſigner, and have a taſte in ſculpture: he alſo ought to know enough of metallurgy to be able to aſſay mixed metals, and to mix the alloy.

The goldſmith in London employs ſeveral hands under him for the various articles of his trade. In this great city there are always hands that excel in every particular branch of the trade, and there is commonly employment enough for every one in his particular branch. The jeweller, the ſnuff-box and toy-maker, the ſilver turner, the gilder, the burniſher, the chaſer, the refiner, and the gold-beater, are all employed by and under the goldſmith.

Gold-*ſmith, Company of, in London.* See COMPANY.

Gold *Thread*, or *ſpun gold*, is a flatted gilt wire, wrapped or laid over a thread of yellow ſilk, by twiſting it with a wheel and iron bobbins. By means of a curious but complex machinery, a number of threads is thus twiſted at once by the turning of one wheel. The principal art conſiſts in ſo regulating the motion, that the ſeveral circumvolutions of the flatted wire, on each thread, may juſt touch one another, and form, as it were, one continued covering. At Milan, it is ſaid, they make a ſort of flatted wire, gilt only on one ſide, which is wound upon the thread, ſo that only the gilt ſide appears. There is alſo a gilt copper wire, made in the ſame manner as the gilt ſilver, chiefly at Nuremberg: and the ordinances of

France require it to be ſpun on flaxen or hempen threads. The Chineſe, inſtead of flatted gilt wire, uſe ſlips of gilt paper, which they interweave in their ſtuffs, and twiſt upon ſilk threads.

Gold, *Tun of*, is a kind of money of account, formerly uſed by the Dutch, and in ſome other countries, containing a hundred thouſand florins.

A hundred pounds of, or in, gold, is found to weigh two pounds ten ounces: the ſum in ſilver weighs twenty-ſix pounds four ounces. Twenty-two pence in copper farthings and half-pence, weigh one pound avoirdupois. A tun of gold, at 4*l.* the ounce, amounts to 96,000*l.* A tun of ſilver, at 5*s.* 2*d.* the ounce, to 6200*l.* A pound ſterling of gold to 48*l.* An ounce is worth 4*l.* The penny-weight 4*s.* One grain, 2*d.* A pound of ſterling ſilver amounts to 3*l.* 2*s.* An ounce is worth 5*s.* 2*d.* The penny-weight, 3*d.* and ſomething more; one grain a half-penny. A pound of ſilver avoirdupois comes to 3*l.* 5*s.* 3*d.* half-penny.

Gold, *Virgin*, is pure gold, juſt as it is taken out of the mines, before it has undergone any action or preparation of fire; whence the Greeks call it απυρος.

Such is the αμμοχρυσος, or gold-duſt, and that got by lotion in the lavaderos in Chili: it is added, that there are maſſes or lumps of pure gold found in the mines, particularly thoſe of Hungary. Accordingly, in the emperor's collection, are ſtill preſerved ſeveral plates of gold, ſaid to have been thus found.

Virgin gold is ſometimes very pale, and ſo ſoft, that it may be moulded into any figure with the hand; it even takes an impreſſion from a ſeal, like the ſofteſt wax. To harden it, as alſo to heighten its colour, they mix emery with it.

Gold, *White*. See Platina.

Gold *Wire* is a cylindrical ingot of ſilver, above an inch thick, two feet in length, and weighing about twenty pounds, ſuperficially gilt, or covered with gold at the fire, and afterwards drawn ſucceſſively through a great number of little round holes of a wire-drawing iron, each leſs than the other, till it be ſometimes no bigger than a hair of the head. There is very little wire made entirely of gold, and this chiefly for one particular purpoſe, that of filligree work.

It is amazing to what degree of fineneſs the gold is here drawn; and yet it ſtill keeps firm together, and never ſhews the leaſt ſigns of the ſilver underneath it. The reader may ſee a computation hereof, as alſo a more particular account of the manner of proceeding, under the article Ductility *of gold*.

Gold *Wire flatted*, is the former wire flatted between two rollers of poliſhed ſteel, to fit it to be ſpun in ſilk, or to be uſed flat as it is without ſpinning, in certain ſtuffs, laces, embroideries, &c.

Manner of forming Gold Wire and Gold thread, both round and flat.—The firſt object, which is of the utmoſt conſequence, is the choice of the pureſt gold; for on this chiefly depends the beauty and durability of the colour of the laces, brocades, and other commodities prepared from it. To a difference in this reſpect, the boaſted ſuperiority of the French laces to the generality of thoſe made in England, till of late, has been wholly owing. With regard to the ſilver that forms the body of the wire, it is ſaid that there is an advantage in its being alloyed. The French ſilver for gilding is ſaid to be alloyed with five or ſix penny-weight, and ours with twelve penny-weight of copper, in the pound Troy. The gold is employed in thick leaves, which are applied all over the ſilver rod, and preſſed down ſmooth with a ſteel burniſher. Several of theſe leaves are laid over one another, as the gilding is required to be more or leſs thick. The ſmalleſt proportion allowed by act of parliament, is 100 grains of gold to a pound, or 5760 grains of ſilver. The largeſt proportion for the beſt double gilt wire was formerly 120 grains to a pound; but the proportion of gold has been of late increaſed to about 140 grains. The firſt part of the drawing proceſs, as well as the preparation and gilding of the ſilver rod, is performed by the refiner, who uſes plates of hardened ſteel, with a piece of tough iron welded on the back, to prevent the ſteel from breaking. The holes in theſe plates are conical, being larger in the back part than in the ſteel, that the rod may not be ſcratched againſt the outer edge, and that they may contain bees-wax, which makes the rod paſs more freely, and preſerves the gold from being rubbed off. One end of the rod, made ſmaller than the reſt, is puſhed through a hole that will admit it, when the plate has been properly ſecured, and laid hold of by ſtrong pincers, called clamps, adapted to the purpoſe; to theſe pincers, which are ſo contrived, that the force which pulls them horizontally, ſerves at the ſame time to preſs them together, a rope is faſtened by one end, and the other end goes round a capſtan with croſs bars, which requires the ſtrength of ſeveral men to turn it. The rod, thus drawn through, is well annealed; it is then paſſed through the next hole; and the annealing and drawing are repeated, till, being reduced to about the ſize of a large quill, it is delivered in coils to the wire-drawers. The remainder of the proceſs requires plates of a different quality, which are brought from Lyons in France, and are formed of a metallic maſs, whoſe prevailing ingredient is iron: the holes are drilled in them here. Theſe plates are of two ſorts; ſome of conſiderable thickneſs, for the wire in its larger ſtate, and others about half as thick, for the finer wire. In the uſe of theſe plates, furniſhed with a variety of holes, the dexterity of the workman principally conſiſts in adapting the hole to the wire: for this purpoſe he uſes a braſs plate, called a ſize, on which is meaſured, by means of notches, like ſteps cut at one end, the increaſe which a certain length of wire ſhould gain in paſſing through a freſh hole; and if the wire is found to ſtretch too much or too little, the hole is widened or contracted. Slits of different widths, in thick poliſhed iron rings, ſerve alſo as gages for meaſuring the degree of fineneſs of the wire.

The wire-drawer's proceſs begins with annealing the large wire received from the refiner, which he does, by placing it, coiled up, on ſome lighted charcoal, in a cylindrical cavity, called the pit, under a chimney, and throwing more burning charcoal over it. When it is cooled by being quenched in water, one end is paſſed through the firſt hole in the thick plate, and faſtened to an upright wooden cylinder ſix or eight inches in diameter; in the top of which are two ſtaples, and through theſe is paſſed the long arm of a handle, by which the cylinder is turned on its axis by ſeveral men. By this proceſs, called *degroſſing*, the wire is frequently annealed and quenched, after paſſing through every hole, or every other hole, till it is brought to about the ſize of the ſmall end of a tobacco pipe, and then cut into portions for the fine wire-drawer. In this laſt part of the wire-drawing proceſs, annealing is not neceſſary, but the wire is waxed at every hole. The contrivance for drawing the wire through the plate in this caſe, when leſs force is needful, is a kind of a wooden wheel placed horizontally, having in its upper ſurface ſmall holes at different diſtances from the axis, into one or other of which, according to the force required, is inſerted the end of an upright handle, whoſe upper end is received in a hole made in a croſs bar above. From this the wire is wound off upon a ſmaller cylinder, called a rochett, placed on the ſpindle of a ſpinning-wheel; and this cylinder being placed behind the plate, the wire is again drawn through upon the firſt, and being brought to the proper fineneſs, it is annealed for the flatting-mill. In this annealing, the wire is wound on a large hollow copper bobbin, ſet upright, including ſmall-coal, and encompaſſed with lighted charcoal or ſmall-coal, communicating a gradual heat. The wire, in this ſtate, muſt be watched and removed from the heat, when it appears of the proper colour. The next operation is that of the flatting-mill, which conſiſts of two perfectly round and exquiſitely poliſhed rollers, formed internally of iron, and welted over with a plate of refined ſteel: theſe rollers are placed with their axes parallel, and their circumferences nearly in contact; they are both turned with one handle; the lowermoſt is about ten inches in diameter, the upper little more than two, and their width or thickneſs is about an inch and a quarter. Theſe rolls are ſometimes repoliſhed with putty, prepared by calcining a mixture of lead and tin. The wire, unwinding from a bobbin, and paſſing between the leaves of a book gently preſſed, and through a narrow ſlit in an upright piece of wood, called a ketch, is directed by a ſmall conical hole in a piece of iron, called a guide, to any particular part of the width of the rollers, ſome of the beſt of which are capable of receiving, by this contrivance, forty threads. When the wire is flatted between the rollers, it is wound again on a bobbin, which is turned by a wheel, fixed on the axis of one of the rolls, and ſo proportioned, that the motion of the bobbin juſt keeps pace with that of the rolls. Dr. Halley ſtates that ſix feet in length of the fineſt gilt wire before flatting will counterpoiſe no more than a grain; and as the gold is not quite 1-57th of the whole, a ſingle grain of gold thus extended will be 345.6 feet long. By flatting, the length of the wire is increaſed about one-ſeventh, and its weight is equal to 1-96th of an inch; hence the ſurface occupied by one grain is equal to 98.7 ſquare inches, with a thickneſs of 1-490444th of an inch. (See Ductility.) See on the ſubject of the preceding articles, Macquer's Dict. of Chemiſtry, Eng. edit. 1777. and particularly Dr. Lewis's Philoſophical Commerce of Arts, *paſſim.* See alſo Aikin's Dictionary.

Gold, in *Medicine* and *Chemiſtry*. The chemiſts make ſeveral preparations of gold for medicinal uſes; as ſalts, mercuries, and tinctures of gold; but it is a point not yet well agreed on, whether gold has any real property whereby it may be of uſe in medicine.

Some mechanical phyſicians have had a notion, that if the particles of gold could be rendered fine enough, ſo as to circulate with the blood, that it would prove more effectual in the cure of diſeaſes than mercury. But this is a mere hypotheſis. The *aurum fulminans* has been uſed, and other preparations of gold are to be met with in authors; but they ſeem to meet with little credit among modern practitioners.

Gold, in *Heraldry*, is one of the metals, more uſually called by the French name, Or.

Gold-*finch*, in *Ornithology*, is the Fringilla *carduelis* of Linnæus; which ſee.

Gold-*fiſh*, in *Ichthyology*, is the Cyprinus *auratus* of Linnæus; which ſee.

Gold-*fiſh* is alſo a name by which ſome authors have called the *alauſa*, *aloſa*, or *ſhad*, from the yellow colouring it frequently has on the covering of the gills. See Clupea *Aloſa.*

Gold *of Pleaſure*, in *Botany*. See Myagrum.

Gold *Coaſt*, or, as it is ſometimes called, *Guinea proper*, a country of Guinea, on the S.W. coaſt of Africa, bordering on that part of the Atlantic which is called the gulf of Guinea, and extending between three and four degrees from the river Ankobar, or, as others ſay, from the Coſta, or the Aſſinoe, to the Volta, and deriving its name from the quantity of gold which it produces. It is bounded on the north by Kongo or Congo, on the eaſt by the Slave coaſt, on the weſt by the Ivory coaſt, and on the ſouth by the gulf of Guinea. It comprehends a number of petty ſtates or kingdoms, *viz.* Adomir, called likewiſe Saku and Avena, Axim, Ankobar, Adom, likewiſe called Little Inkaſſan, or Warſher, Jabi or Jabo, Commendo or Guaſſo, Fetu, Sabo, Fantin, Acron, Agonna or Anguirra, Amra or Aquamboe, Lableade, and Ningo or Lambi. Each of theſe provinces or kingdoms contains one, two, or more towns or villages on the ſea-coaſt, between, or under the European forts and ſettlements. Eight of theſe are real monarchies, having their own proper kings; the reſt are republics, governed by magiſtrates, who are ſubject to the laws and periodical changes. Upon the river Ankobar, or Cobre, which ſome reckon the firſt proper county of the Gold Coaſt, there is a number of towns, which compoſe three different provinces of Ankobar or Ancober, Aborrel or Abocro, and Eguira, at which latter place the Dutch had formerly a fort, and carried on a conſiderable trade in gold. Eight leagues E. of cape Apollonia ſtands the town of Axim, called by ſome Achembone. (See Achembone and Axim.) See Acron, Adom, Adomir, Anta, Commendo, &c. &c. The country throughout the Gold Coaſt abounds in hills, adorned with high and beautiful trees, among which are the palm, the cocoa-nut, the papay, and the banana. The vallies between the hills are wide and extenſive, and fit for the plantation of all ſorts of fruit; and if they were as well cultivated as watered, they would ſupply half the coaſt with proviſions. The ſoil produces in great abundance very good rice, the richeſt ſort of millet with red grain, yams, potatoes, and other roots, all good in their kind. The ſugar-cane grows here plentifully, and larger than any where elſe on the Coaſt of Guinea. Palm-wine and oil are very good, and very abundant; the country alſo has plenty of tame cattle and wild beaſts. The domeſtic animals are bulls, cows, ſheep, and goats, the laſt of which are numerous and their fleſh is excellent; neither the mutton nor beef is good; but of all animal food dog's fleſh is moſt preferred by the negroes. The wild animals are elephants, tygers, jackalls, boars, deer of various ſizes, cats, porcupines, monkies, rats, mice, &c. &c. Among the birds are pheaſants, parrots, maccaws, turtle-doves, and ſeveral others. The reptiles are numerous; ſuch as ſnakes, ſerpents, vipers, lizards, ſcorpions, ſpiders, &c. The coaſts, lakes, and rivers abound with fiſh, and likewiſe with alligators and gunas, an amphibious animal, reſembling the crocodile, and four feet in length. The climate is very hot from October to March, but during the other months tolerable. The natives are generally healthy; but to Europeans the climate is inſalubrious, and often fatal, eſpecially in the months of July and Auguſt.

It is obſerved that of all the countries on the coaſt of Weſtern Africa, the Gold Coaſt experiences the moſt intenſe heat. Iſert, a modern traveller, near Rio Volta, has ſeen Fahrenheit's thermometer as high as 95½ in his chamber, and 134° in the open air; ſurpaſſing by 26° the greateſt heat obſerved by Adanſon on all the banks of the Senegal. Although this traveller advanced only 10 miles from Chriſtianburg on this coaſt, his journey is curious.

The countries he viſited during his ſhort excurſion in the interior, are repreſented as very beautiful, fertile, and populous; they are, in general, woody, but, nevertheleſs, more healthy than the ſhores; they are agreeably intermingled with mountains, vallies, and hills. Freſh water, which is ſcarce and bad on the coaſt, is here excellent and abundant. About five miles from Chriſtianburg Iſert obſerved a chain of mountains covered with tall trees, and compoſed of large grained granite, of gneiſs, and of quartz.

The native negroes of the Gold Coaſt are in general tall, ſtraight, and well-proportioned, with oval faces, ſparkling eyes, regular, white teeth, mouths of a moderate ſize, and lips tinged with a better colour and thinner than thoſe of the negroes of Angola. As to the qualities of the mind, they have a quick apprehenſion and ready memory, accompanied with an aſtoniſhing preſence of mind, and equanimity; but they are generally ſo indolent that mere neceſſity puts them upon exerting the faculties they poſſeſs. In general, they are crafty, fraudulent, and treacherous; thieves, gluttons, and drunkards, and equally incontinent and covetous. When they obtain a victory over their enemies, they return home dancing and ſinging, and when defeated do the ſame round the graves of their friends and fellow-ſoldiers. Alike inſenſible of grief or joy, they ſing till they die, and dance into the grave. The women are proportionably handſomer than the men, ſtraight, ſlender, and well-limbed; their cheſts high, their mouths ſmall, and their eyes indicating vivacity and ſpirit. They are quick, cheerful, and loquacious; gay in their diſpoſition, and looſe in their principles as to gallantry, but temperate in their diet. When the men and women overcome their natural indolence, they are laborious, induſtrious, and ingenious; and apply with activity and diligence to agriculture or fiſhing, ſo far as they are excited by poverty or avarice. Their dreſs is various according to their rank and circumſtances; but the rage of dreſs is chiefly prevalent among the women, who are fond of adorning all parts of their bodies with gold, coral, and ivory trinkets; and this rage they derived from the Portugueſe and Dutch; as before their arrival men and women went naked to the age of maturity. They are fond of frequent ablutions, and being accuſtomed to the uſe of water, they are excellent ſwimmers and divers from their youth. Beſide the natural inhabitants of the Gold Coaſt, there is a great number of Mulattoes, a mixed progeny, ariſing from the commerce of Europeans with the black women. This ſpurious race forms gangs of thieves and plunderers, void of decency, honour, honeſty, or principle in their dealings with each other, with the Negroes, or the Europeans. Theſe call themſelves Chriſtians, although they are the groſſeſt of all idolaters, and moſt of their women proſtitute their bodies publicly to Europeans, and privately to the Negroes. The towns and villages of this coaſt conſiſt of a multitude of little huts or cabins, diſperſed in groups, without order or deſign, and communicating with each other by narrow crooked roads, which terminate in the centre of the town or market place.

It is obſervable that the further you remove from the ſea-coaſt, the more civilized do the natives appear, at leaſt ſo far as relates to their mode of building and of living. The common food of the Negroes, in this part of Africa, is a pot of millet boiled to the conſiſtence of bread, yams, and potatoes, over which they pour ſome palm-oil, and garniſh the diſh with herbs and putrid fiſh. This is their meſs on common days; and on holidays they feaſt upon beef, mutton, and fowls. They begin the day with drinking brandy, and conclude the evening with palm-wine, mirth, riot, and tobacco, of which they are extravagantly fond. In eating they are temperate, but very profuſe in drinking. Their marriages are encumbered with few ceremonies, and without any previous courtſhip; and they are as eaſily diſſolved as contracted. Polygamy is allowed among them; and the women are generally doomed to the moſt laborious offices; they are obliged to cultivate the ground, ſow millet, plant yams, and provide ſubſiſtence for the huſband, who is idly ſpending his time in goſſiping, drinking, and ſmoaking. The rich, however, have two wives, who are exempted from labour and all ſervile employments; and to them the management of the houſe is intruſted, and a ſort of authority over all the other women is committed. It is ſaid to be no uncommon expedient among Negroes to marry, in order to obtain a livelihood by the proſtitution of their wives. As the wealth of the Negroes conſiſts chiefly in the number of their family, they are anxious for multiplying their children; and a pregnant woman is treated with great tenderneſs and reſpect. A child, as ſoon as it ſees the light, is conſecrated by the prieſt, and has three names given to it. Circumciſion, it is ſaid, though practiſed in other parts of Africa, is hardly known on the Gold Coaſt, except at Acra, where it is performed at the time of baptiſm or conſecration. Beſides their lawful wives, the Negroes often keep concubines, who are preferred to their wives, and more tenderly treated; nevertheleſs their children are reckoned illegitimate. But legitimate children never inherit any paternal fortune, in any kingdom on the Gold Coaſt, except at Acra. In the countries of Eguira, Axim, Ancobar, Anta, and Adom, there are certain women who never marry, but are dedicated by profeſſion to the public uſe, and initiated in their vocation in a formal manner. Among the Negroes there is a variety of mechanical arts, in which they are expert; ſuch as the making of wooden and earthen veſſels and plates, chair-mattings, copper ointment boxes, bracelets, necklaces, rings, and ear-rings of gold, ſilver, or ivory; and alſo all ſorts of weapons and inſtruments of war. Their tools, which are rude and ſimple, conſiſt only of a ſtone for an anvil, a pair of tongs, a pair of bellows, a file, a ſaw, and a hammer. They can finiſh with extraordinary exactneſs ſteel-wire, and materials of gold, braſs, and copper. In building canoes, which are of various ſizes, from 30 to 14 feet in length, and three or four feet in breadth, the Negroes are very ingenious, and they are no leſs dextrous in the uſe of them. With regard to the huſbandry of the Negroes, they ſow in the rainy ſeaſon, the ſoil at other times being unmanageably hard: and they adapt their ground to the nature of the grain; ſowing maize in elevated and dry ſituations, and rice or millet in low marſhy lands, ſubject to inundations. The natives of the coaſt, finding it eaſy to diſpoſe of all their grain, have eſtabliſhed corn markets in every village, and the price of grain, in gold-duſt, cowries, &c. is rated by certain officers of police, appointed by the king. Hither the men and women meet from conſiderable diſtances, bearing heavy burdens; and the women eſpecially ſubmit to great labour and fatigue in this way, that they may exchange their heavy loads for European commodities, ſuch as looking-glaſſes, bracelets, ear-rings, glaſs-beads, and other female trinkets, ſuited to their taſte for dreſs and finery. The markets are exempted from all duties and impoſts. Beſides theſe frequent markets, they have alſo fairs twice a year for European wares. All the diverſions among the Negroes conſiſt of dances, to which they are exceſſively addicted, muſic, and mock combats, which often terminate tragically. The principal muſical inſtruments among the Negroes are horns, made of ivory, trumpets, drums of different ſizes, and a kind of harp, with ſix or eight ſtrings.

The honour of the firſt diſcovery of the Gold Coaſt is conteſted between the French and Portugueſe; the French pretend that they were acquainted with Nigritia and Guinea above 100 years before the Portugueſe began their diſcoveries, or about the year 1346 or 1364, but little credit is attached to theſe accounts of French writers. The Portugueſe, it is ſaid, fitted out a ſhip at Liſbon, under the protection of Don Henry, for the ſole purpoſe of making diſcoveries along the coaſt of Africa. At this time Alphonſo I. reigned in Portugal. The navigators, it is further ſaid, were driven on an iſland in the gulf of Guinea, which they called St. Thomas, and where they made a long ſtay, laying the firſt foundation of a colony in this iſland. Having repaired their veſſel, they returned to Liſbon, and arrived there in 1454. The Portugueſe ſoon equipped a fleet, and puſhed their diſcoveries as far as Benin, and in proceſs of time arrived in the road of Acra, on the Gold Coaſt, where they procured a quantity of gold. A number of adventurers from the iſland of St. Thomas arrived at Elmina four years after the departure of the French. Purchas relates, that Alphonſo, having little leiſure for purſuing diſcoveries towards the latter end of his reign, gave an excluſive privilege for five years to Fernando Gomez, a citizen of Liſbon, to ſail to the coaſt of Africa: and a perſon, deputed by him, ſays Purchas, diſcovered Elmina; and during this period, were alſo diſcovered the iſlands of St. Thomas, St. Matthew, Annobon, and del' Principe. In 1481 John II. encouraged the commercial ſpirit of his ſubjects, and projected further diſcoveries; and it was probably upon this occaſion, notwithſtanding the aſſertions of French writers, that fort St. George de la Mina, or Elmina, had its firſt riſe. John, the ſucceſſor of Alphonſo, conferred many privileges on this new colony. A few years after, the ſame prince eſtabliſhed a Guinea company, with excluſive privileges. In the reign of Henry III. of France, after the termination of the civil wars, the French began to renew their voyages to the Grain and Gold Coaſt. From this period the credit of the Portugueſe began to decline, and other Europeans began to open a commerce with the Coaſt of Guinea. Among others the Dutch engaged in the warfare, which had been proſecuted between the Portugueſe and other Europeans; and by perſeverance they made themſelves maſters of the forts of Elmina and Axim; obtaining, by their courage, that ſecurity, which the Portugueſe had loſt by their inſolence and cruelty. The firſt Dutchman who led the way to Guinea, was one Bernard Erick, in 1595. Running along the Gold Coaſt, he eſtabliſhed a correſpondence with the natives, treated them with civility, and alienated their affections from the Portugueſe. At length, by their intrigues with the king of Sabo, the Dutch obtained permiſſion to build a fort, three leagues E. of Cabo Corſo, or Cape Coaſt. This fort was finiſhed in 1624, and the Dutch power founded in Guinea, at the time when the States were engaged in a war with Philip IV. of Spain. In the year 1637 they ſucceeded, after much reſiſtance, in taking the fort of St. George d'Elmina, and in the year 1642 the fort of Axim alſo fell into their hands. The Dutch, having thus far been ſucceſsful, proceeded to attack the Engliſh ſettlements. In tracing the firſt Britiſh eſtabliſhments on the Coaſt of Guinea, we may begin with obſerving, that a trade here had been carried on by ſome private adventurers, without the aid or protection of the government. In 1585 and 1588, queen Elizabeth granted two patents to certain rich merchants of England; one for an excluſive trade to the coaſt of Barbary, and another for that of Guinea. In 1592 a third patent was obtained by the ſame body of merchants. In 1651 the republic of England encouraged the African trade; and in 1662 Charles II. granted a charter to a body of merchants, under the name of the Royal Company of England trading to Africa, extending their limits from the mouth of the Straits to the Cape of Good Hope. The affairs of this company falling into diſorder, the king erected another corporation, called the "Royal African Company," which has ſubſiſted to this day. This charter bears date, Sept. 27, 1672. This company, with a ſmall capital, was diligent and ſucceſsful; Cape Coaſt was enlarged and beautified; the forts of Acra, Dixſcove, Winebaw, Sukkonda, Commendo, and Anamaboa, were built or repaired, all of them on the Gold Coaſt, and ſeveral within muſket-ſhot of the Dutch ſettlements. They bought Frederickſburg of the Danes, and built a new fort in Whidah. See *African* COMPANY.

GOLD *Cronach*, a town of Germany, in the principality of Bayreuth, which had formerly a gold mine; 5 miles N. of Bayreuth.

GOLDAPP, a town of Pruſſian Lithuania; 68 miles E. S. E. of Konigſberg.—Alſo, a river of Pruſſia, which runs into the Rominte; 6 miles N. of Goldapp.

GOLDAST, MELCHIOR HEIMENSFELD, in *Biography*, a learned writer of the 16th century, was a native of Switzerland. He ſtudied the civil law at Altdorf, but he is better known as a man of letters. His works, though not marked for originality, were highly eſteemed by the learned of the period in which he flouriſhed: the principal of theſe are, 1. "Monarchia Sancti Imperii Romani," in three volumes folio, publiſhed in 1611-14. Theſe volumes conſiſt of a collection of treatiſes on the civil and eccleſiaſtical juriſdiction of the empire. "Alemaniæ Scriptores," three volumes folio, 1730. "Commentarius de Bohemiæ Regno," 4to. "Informatio de ſtatu Bohemiæ quoad Jus," 4to. "Sybilla Francica," being a quarto collection of pieces relative to the maid of Orleans: "Scriptores Rerum Suevicarum." "Collectio Conſuetudinum et Legum Imperialium." "Politica Imperialia," and a collection of letters, written to him by ſeveral men of learning. This laſt work was printed at Frankfort in 1688. Mr. Goldaſt was of a capricious temper and of changeable habits, which prevented him from riſing in the world. He died in 1635, having long ſtruggled with poverty. Moreri. Bayle.

GOLDBERG, in *Geography*, a town of Sileſia, in the principality of Lignitz, deriving its name from a gold-mine in its vicinity, which was formerly very rich. The earth, called ſigillata terra, is dug near it; and the inhabitants are employed in the woollen and linen manufactures; 12 miles S.W. of Lignitz. N. lat. 51° 4'. E. long. 15° 53'.—Alſo, a town of the duchy of Mecklenburg; 15 miles E. of Wiſmar.

GOLDECK, a town of the archbiſhopric of Salzburg; 28 miles S. of Salzburg.

GOLDEN, ſomething that has a relation to gold, or conſiſts of gold, is valuable like gold, or the like.

GOLDEN *Bull*, *Bulla Aurea*. See BULL.

GOLDEN *Calf* was a figure of a calf, which the Iſraelites caſt in that metal, and ſet up in the wilderneſs to worſhip, during Moſes's abſence in the mount, and which that legiſlator, at his return, burnt, ground to powder, and mixed with the water the people were to drink of, as related Exod. xxxii.

The commentators have been greatly divided on this article: the pulverizing of gold, and rendering it potable, is an operation in chemiſtry of the laſt difficulty; and it is hard to conceive how it ſhould be done at that time, before chemiſtry was ever heard of, and in a wilderneſs too! Many, therefore, ſuppoſe it done by a miracle; and the reſt, who allow of nothing ſupernatural in it, advance nothing but conjectures as to the manner of the proceſs.

Moſes could not have done it by a ſimple calcination, nor amalgamation, nor antimony, nor calcination: nor is there one of thoſe operations that quadrates with the text.

Mr. Stahl has endeavoured to remove this difficulty. The method Moſes made uſe of, in making his *aurum potabile*, according to this author, was the ſame with that which now obtains; only, inſtead of tartar, he made uſe of the Egyptian natron, which is common enough throughout the Eaſt.

Golden *Cape*, in *Geography*, a cape of England, on the W. coaſt of Dorſetſhire. N. lat. 50° 43′. W. long. 2° 50′.

Golden *Cups*, a name by which ſome call the ranunculus, or crow-foot.

Golden *Eye*, in *Ornithology*, the Anas *Clangula*. See Duck.

Golden *Eye*, a ſpecies of fly. See Chrysopis.

Golden *Fleece*, in the *Ancient Mythology*. See Argonautic.

Golden *Fleece*, *Order of the*, is a military order, inſtituted by Philip the Good, duke of Burgundy, in 1429.

It took its denomination from a repreſentation of the golden fleece, borne by the knights on their collars, which conſiſted of flints and ſteels. The king of Spain is now grand maſter of the order, in quality of duke of Burgundy: the number of knights is fixed to thirty-one.

It is uſually ſaid to have been inſtituted on occaſion of an immenſe profit which that prince made by wool; though others will have a chemical myſtery couched under it, as under that famous one of the ancients, which the adepti contend to be no other than the ſecret of the elixir, written on the fleece of a ſheep.

Golden *Flower*, in *Botany*. See Chrysanthemum.

Golden *Flower-gentle*, a name ſometimes given to ſeveral ſpecies of the amaranth.

Golden *Head*, in *Ornithology*, a water-fowl, otherwiſe called *anas arctica*. See Duck.

Golden *Iſland*, in *Geography*, a ſmall iſland at the entrance of the gulf of Darien, in Terra Firma, S. America. N. lat. 8° 20′. W. long. 72° 32′.

Golden *Lake*, a lake of the iſland of Borneo. N. lat. 3° 55′. E. long. 115° 45′.

Golden *Lung-wort*, in *Botany*. See Hieracium.

Golden *Maiden-hair*. See Adiantum *aureum*, and Polytrichum.

Golden *Mouſe-ear*. See Hieracium.

Golden *Number*, in *Chronology*. See Cycle *of the Moon*, and Number.

Golden *Prebendary of Hereford*. See Prebendary.

Golden *River*, in *Geography*, a river of America, which runs into the Miſſiſippi, N. lat. 43° 20′. W. long. 92° 2′.

Golden *River*, or *Rio del Oro*, a river of America, which runs into the Spaniſh Main, N. lat. 14° 44′. W. long. 82° 55′.

Golden *Rod*, or *Saracen's Wound-wort*, *virga aurea*, in *Botany*. See Solidago.

Golden *Rod Tree*. See Bosea.

Golden *Rule*, in *Arithmetic*, a rule or praxis of great uſe and extent in the art of numbers, whereby we find a fourth proportional to three quantities given. The Golden Rule is alſo called the Rule of Three and Rule of Proportion. See its nature and uſe under the article Rule *of Three*.

Golden *Samphire* is a ſpecies of the inula or elecampane. (See Inula.) It grows naturally on the ſea-coaſts in many parts of England, and is ſometimes ſold in the London market for the true ſamphire, though entirely deſtitute of its warm aromatic taſte. See Samphire.

Golden *Saxifrage*. See Chrysoplenium.

Golden *Stole*, *order of the*. See Stole.

Golden *Sulphur of Antimony*. See Antimony.

Golden *Thiſtle*, in *Botany*. See Scolymus.

GOLDENSTEIN, in *Geography*, a town of Moravia, in the circle of Olmutz; 32 miles from Olmutz.

GOLDENSTETT, a town of Germany, in the country of Diepholz; 11 miles N. of Diepholz.

GOLDENTRAUN, a town of Upper Luſatia; 16 miles S.E. of Gorlitz. N. lat. 50° 27′. E. long. 15° 26′.

GOLDINGEN, a town of the duchy of Courland, ſituated near the river Weta, defended by an old caſtle, and containing two churches; 48 miles W.N.W. of Mittaw. N. lat. 56° 51′. E. long. 21° 44′.

GOLDLAUTER, a town of Germany, in the county of Henneberg, 12 miles N.E. of Meinungen.

GOLDMAN, Nicholas, in *Biography*, a mathematician, was born at Breſlaw, in Sileſia, in the year 1623, and died at Leyden in 1665. The works by which he is generally known are "Elementa Architecturæ Militaris," 1643. "De Uſu Proportionarii Circuli." "De Stylometricis," 1662, and another treatiſe "On Architecture," publiſhed in 1696, with numerous engravings, and the life of the author. Moreri.

GOLDONI, Charles, was born at Venice in the year 1707. Almoſt from his infancy he gave indication of a humorous character, and a propenſity to dramatic performances. Before he could well read he became an author, and wrote the plan of a comedy by the time he was eight years old. This piece poſſeſſed ſo much merit, that it required the teſtimony of reſpectable witneſſes to verify its being the production of a child. He received the elements of education at Venice, from this city he went to the Jeſuits' college at Perugia to ſtudy rhetoric, and afterwards he ſtudied philoſophy at Rimini. His mind was, however, too deeply engaged in theatrical exhibitions to make the ſyſtem of Ariſtotle a predominant purſuit. Every leiſure moment he ſpent at the theatre, till at length he paſſed from the pit to the ſtage, and joined a company of players. This, by his own account, was an error, which drew after it many ſerious conſequences. He had been intended by his father for the profeſſion of phyſic, which he was unable to ſtudy: he was then ſolicited to prepare himſelf for the bar, and was engaged, after many changes, in practice at the courts of Venice. After this he was appointed ſecretary to the Venetian reſident at Milan, where he became acquainted with the manager of the theatre, and wrote a farce for him, entitled "The Venetian Gondolier," which was performed and printed: by degrees he became united to the company, and compoſed many pieces for them. He now turned his thoughts towards reforming the Italian ſtage, and ſo earneſt was he in his projects, that it is ſaid in a ſingle year he wrote ſixteen new comedies, beſides forty-two other pieces for the theatre, and among theſe are reckoned ſome of his beſt productions. The firſt edition of his works was publiſhed in 1753 in 10 vols. 8vo. After this he publiſhed many additional pieces under the title of the "New Comic Theatre." He had compoſed 59 other pieces ſo late as the year 1761, and here cloſes the literary life of Goldoni in Italy. He now repaired to Paris, and was as zealous in his endeavours to reform the Italian theatre there as he had been in his own country. His firſt attempt was in a piece called the "Father of Love," but the bad ſucceſs of this comedy was a ſufficient warning to him to deſiſt from his undertaking. He continued, during the remainder of his engagement, to produce pieces agreeable to the general taſte, and publiſhed twenty-four comedies. At the end of two years he was preparing to return to Italy, when he was ſuddenly urged to become Italian maſter to the princeſſes, aunts to the reigning monarch. During this engagement he loſt his ſight, which he never after completely recovered, and at the end of three years he received a very inadequate recompence for his labour and the time ſpent at court, namely, 100 louis in a gold box, and the grant of a penſion of four thouſand livres per ann. This, with what he was enabled to make by his works, was amply ſufficient for all his wants. When he had attained his 62d year he began to publiſh comedies in the French language, which were well received, and ſome of them became extremely popular. After the death of Lewis XV. Goldoni was appointed Italian teacher to the princeſs Clotilde, the preſent princeſs of Piedmont, and after her marriage, he attended the unfortunate princeſs Elizabeth in the ſame capacity. His laſt work was the "Volponi," written after he had retired from court. It was his misfortune to live to ſee his penſion taken away by the revolution, and, like thouſands in a ſimilar ſituation, he was obliged to paſs his old age in poverty and diſtreſs. He died in the beginning of the year 1793, at a period when the Briſſotines had the ſway in the national councils, and when Goldoni would, for a ſhort time at leaſt, have received every attention that a grateful country could have afforded. As a comic poet, Goldoni is reckoned among the beſt of the age in which he flouriſhed. His works were printed at Leghorn in 1788-91, in 31 vols. 8vo. He has been reckoned the Moliere of Italy, and he is ſtyled by Voltaire "The painter of Nature." "Goldoni," ſays his biographer, "is one of thoſe authors whoſe writings will be reliſhed in the moſt remote countries, and by the lateſt poſterity. His profound knowledge of the human heart, his extenſive deſcription of the vices and virtues of men, in all ages and ſtations, will juſtify my concluding this imperfect eulogy with applying to him the following lines of Horace from his firſt Epiſtle:

> "Æque pauperibus prodeſt, locupletibus æque
> Æque neglectum pueris, ſenibuſque nocebit."

Monthly Magazine. vol. v.

His principal works are comedies in proſe, for declamation, of which the exact number is not known; but they at leaſt amounted to 120 before he left Italy at the deſire of Louis XV. to write for the "Theatre Italien" at Paris, for which theatre he compoſed at leaſt 30.

This fertile, natural, and pleaſing writer, was ambitious at firſt of treating ſerious and tragic ſubjects; but finding, as he tells us himſelf in his life and prefaces, that Metaſtaſio was arrived at as high a point of perfection in his ſerious operas as that ſpecies of drama was capable of, he pointed his thoughts wholly to comedy, which had been long treated in ſuch a buffoon and farcical manner, as to ſtand in great need of reformation.

But though he had determined not to attempt ſerious pieces for muſic, yet Galuppi prevailed upon him, much againſt his inclination, to furniſh him with three ſerious operas for the theatre at Venice; theſe were, Orontes, king of Scythia; Guſtavus Adolphus; and Statira. But though they had great ſucceſs, Goldoni never thought them worthy of publication. He was not more vain of his comic operas. However, he produced at different times and places 40 or 50, which, without his conſent or knowledge, were collected and publiſhed in 6 vols. 12mo.; they are not very eſtimable works, being on the old burletta model, full of buffoonery, and a broad kind of Italian humour, taſted in no other country, though ſuffered for the ſake of the muſic, which is often ingenious, imitative, and ſometimes graceful, but more frequently groteſque.

Goldoni is, perhaps, the only author of comic operas in Italy, who has given them a little common ſenſe, by a natural plot, and natural characters; and his celebrated comic opera of the "Buona Figliuola," ſet by Piccini, and firſt performed in London Dec. 9th, 1766, rendered both the poet and compoſer, whoſe names had ſcarcely penetrated into this country before, dear to every lover of the Italian language and muſic, in the nation. This admirable production, before it was brought hither, had ſaved the *impreſario* of the opera at Rome from ruin, and been performed in the principal cities of Italy. In the year 1760, Piccini, paſſing through Rome, in his way to Milan, was entreated to compoſe a comic opera for the Teatro delle Dame in that city, which had lately been very unfortunate. No *libretto* was ready, and application having been made to the poet Goldoni, at this time in Rome, he furniſhed the muſical drama of "La Bouna Figliuola," from his comedy of "Pamela," in a few days. Several of the original performers were now in London, particularly the firſt buffo, Lovattini, and the ſerious man Savoi, with the *buffo caricato* Morigi. And though females are not allowed to appear on the ſtage at Rome, yet ſignora Guadagni had previouſly performed the part of Cecchina in ſeveral cities of Italy, with great and well-deſerved applauſe before his arrival here.

After the great ſucceſs of the "Buona Figliuola," the public was diſpoſed to hear with partiality any productions by the ſame authors; and when the "Buona Figliuola Maritata," (or Pamela in high life), was brought out, the crowd at the opera-houſe was prodigious; but expectation, as uſual, was ſo unreaſonable as to ſpoil the feaſt; to gratify it was impoſſible. Some aſcribed their diſappointment to the compoſer, ſome to the performers, but none to themſelves. The muſic was excellent, full of invention, fire, and new effects; but ſo difficult, particularly for the orcheſtra, that the performers forgot it was winter. The principal part of the Marcheſa was given to Zamparini, a very pretty woman, but an affected ſinger. Muſic ſo difficult to perform was not eaſy to hear; and this drama was never ſufficiently repeated for the public to be familiarly acquainted with it. They were glad, as well as the performers, to return to the "Buona Figliuola" for their own eaſe and relief from a too ſerious attention.

In France, Goldoni wrote ſeveral very ſucceſsful comedies for declamation in the French language, but we are not acquainted with any dramas which he produced for muſic in that country. Poor Goldoni was in ſuch favour with the royal family of France before the revolution, that he was never allowed to return to his own country; but died at Paris in the year of *terror*, 1793, at the age of 83.

GOLDSBOROUGH, in *Geography*, a poſt town of America, in Hancock county and ſtate of Maine, incorporated in 1789, and containing 379 inhabitants; 47 miles E. of Penobſcot. N. lat. 44° 19′.

GOLDSINNY, in *Ichthyology*, a fiſh diſcovered on the coaſt of Cornwall, in the whole form of the body, lips, teeth, and fins, reſembling the *wraſſe*, which is ſaid never to exceed a palm in length; near the tail is a remarkable black ſpot; the firſt rays of the dorſal fin are tinged with black. See LABRUS *Cornubius*.

GOLDSMITH, OLIVER, in *Biography*, was born in the county of Longford, Ireland, in 1731, though, according to other accounts, this event took place at Elphin, in 1729. He was the ſon of a clergyman, who gave him a literary education, and ſent him early to Dublin college. Being deſigned for the profeſſion of medicine, he was removed to Edinburgh in 1751, where he continued till 1754, when he left that place to avoid a proceſs againſt him for debts incurred, probably to adminiſter to his diſſipation. He was intercepted at Sunderland, and thrown into confinement, from which he was releaſed by the kindneſs of two fellow-collegians. After this, he determined to viſit the continent, embarked for Holland, travelled through Flanders and part of Germany, paſſed ſome time at the univerſities of Straſburg and Louvain; at the latter place he took his degree of bachelor of phyſic, and thence accompanied an Engliſh gentleman to Geneva. Here he engaged himſelf as travelling tutor to a young man who had become poſſeſſed of a large fortune, but whoſe mind was ill adapted to do credit to the gifts of Providence. They diſagreed in the ſouth of France, and Goldſmith was left to contend with the hardſhips of indigence in a foreign country. He returned in 1758, and had in moſt of his peregrinations truſted for his ſupport to his own caſual efforts. His learning enſured him a favourable reception at the monaſteries, and his German flute ſeldom failed to procure him a meal and a night's lodging from the peaſantry, who were delighted with ſtrains which a politer audience would have treated with diſdain. His arrival at London with a few pence in his pocket, was not likely to be the termination of his pecuniary diſtreſſes. He attempted to get into the employ of an apothecary, but his appearance being againſt him, his application was treated with diſdain. He at length was admitted as uſher to Dr. Milner, who kept an academy at Peckham. Here he remained but a ſhort time, and then reſolved to follow the profeſſion of an author in London. He obtained ſome employment in the Monthly Review, and furniſhed papers for the public Ledger. He publiſhed a weekly pamphlet, entitled "The Bee," and "An Enquiry into the ſtate of Polite Learning in Europe." After he had been ſome time exerciſing his pen in obſcurity, he became on a ſudden celebrated as a poet, by the publication of his "Traveller, or a Proſpect of Society." This work had lain by him in MS. ſome years, and it was at the inſtigation of Dr. Johnſon that he prepared it for the preſs. That great critic declared it as his opinion, that there had not been ſo fine a poem ſince the days of Pope. In this deciſion the public concurred, and the author was, almoſt immediately, introduced to the moſt eminent literary characters of the age. In the following year was publiſhed his novel of the "Vicar of Wakefield," which had been ſold to a bookſeller ſome years before, but had been kept back as the work of an unknown writer, and exciting no expectations of ſucceſs. It was, however, received with unbounded applauſe, and has ever ſince borne a diſtinguiſhed rank among ſimilar compoſitions. His next work was a "Hiſtory of England," in a ſeries of letters from a nobleman to his ſon, in two volumes 12mo. a work that ſtill continues to be read with great delight. His poetical fame reached its ſummit in 1770, by the publication of his "Deſerted Village," which was univerſally admired. For this he obtained of his bookſeller 100*l.* a ſum which appeared to the author ſo exorbitantly great, that he refuſed to take it; but the ſale of the work convinced him that he might fairly appropriate the ſum out of the profits. As an author of comedy, he produced in 1768 "The Good-natured Man," which was not very ſucceſsful; and in 1772 another play, entitled "She Stoops to Conquer, or the Miſtakes of a Night." From this Goldſmith cleared a large ſum, and it is ſtill occaſionally repreſented to applauding audiences. Notwithſtanding the ſucceſs of his pieces, by ſome of which it is aſſerted he cleared 1800*l.* in a ſingle year, his circumſtances were never very proſperous, which was partly owing to the liberality of his diſpoſition, and partly to an unfortunate habit which he had contracted of gaming; the arts of which he knew very little of, and conſequently became the prey of thoſe who were baſe enough to take advantage of his ſimplicity. Beſides the works already treated of, Dr. Goldſmith, as he was called, though he had only taken a bachelor's degree, compiled an Engliſh hiſtory in four volumes, and a Roman and Grecian hiſtory in two volumes each; and "A Hiſtory of the Earth and Animated Nature," in eight volumes 8vo. Such was the confidence which he acquired in his ſkill at compilation, that he formed a plan for a much greater work, *viz.* "A Dictionary of Arts and Sciences," but this and other ſchemes which he had planned were cut off by his untimely death. A deſpondence of mind, probably occaſioned by the conſciouſneſs of the bad ſtate of his affairs, had been ſecretly preying upon him, when in March 1774 he was attacked with the ſymptoms of a low fever, under which he ſunk on the 4th of April. He was buried in the Temple churchyard without much attendance, but a monument has ſince been erected to his memory in Weſtminſter abbey, with a Latin inſcription by Dr. Johnſon.

Goldſmith, as a man, was rather admired for his genius, and beloved for his benevolence, than ſolidly eſteemed. The beſt part of his moral character was a warmth of ſenſibility, which made him in all fortunes ready to ſhare his purſe with the indigent, and rendered him in his writings the conſtant advocate of the poor and oppreſſed. The worſt feature was a malignant envy and jealouſy of ſucceſsful rivals, which he ſometimes diſplayed in a manner not leſs ridiculous than offenſive.

As a writer, no one of his time was poſſeſſed of more true humour, or was capable of more poignancy in marking the foibles of individuals. This laſt talent he diſplayed in a very amuſing manner in his poem entitled "Retaliation," written as a retort to the jocular attacks made upon him in a club of which he was a member. His literary fame ſtands higheſt as a poet, in which character a place may be given him perhaps at the head of the minor claſs, the term minor being applied with relation to the quantity, rather than the excellence of compoſition. "It would not be eaſy," ſays his biographer, "to point out in the whole compaſs of Engliſh poetry, pieces that are read with more delight than "The Traveller;" and "The Deſerted Village." The elegance of the verſification, the force and ſplendour yet ſimplicity of the diction; the happy mixture of animated ſentiment with glowing deſcription, are calculated to pleaſe equally the refined and the uncultivated taſte. The moral and philoſophical views of ſociety they exhibit are, indeed, objectionable; yet upon the whole they exert a favourable influence over the heart. In addition to theſe capital works, his pleaſing ballad of "The Hermit," and ſome ſhort humorous and miſcellaneous pieces, complete the catalogue of his performances in verſe. As a proſe writer he deſerves high praiſe for ſtyle, which he adapts with great felicity to his ſubject, and which, whether elevated or plain, is always clear, pure, and unaffected. Life prefixed to his poems. Europ. Mag. Ann. Regis.

GOLDWIN, John, an eccleſiaſtical compoſer, was brought up under Dr. William Child, and, in 1697, ſucceeded him as organiſt at the free chapel of St. George at Windſor. In 1703 he was appointed maſter of the choiriſters there, in both which ſtations he continued to the time of his death in 1719. Dr. Boyce, out of a great number of anthems by this compoſer, ſelected one for four voices, "I have ſet God always before me," which he has inſerted in the ſecond volume of his "Collection of Cathedral Muſic," and well characterized it with reſpect to the modulation, by ſaying that "it is ſingular and agreeable."

GOLDYLOCKS, in *Botany*. See Chrysocoma and Gnaphalium.

GOLEEAH, in *Geography*, a town of Bengal; 18 miles E. of Rangur. N. lat. 22° 28′. E. long. 85° 51′.

GOLETTA, a fortreſs of Africa, ſituated on a canal, in the kingdom of Tunis; 25 miles N. of Tunis.—Alſo, a narrow channel between the lake of Tunis and the ſea, defended on each ſide by a caſtle.

GOLF, or Goff, the name of a diverſion or exerciſe, much uſed in Scotland, and played upon the lawns or links, as they are there called.

It conſiſts of driving a ball with clubs, between two goals or holes, half a mile or a mile aſunder. He who can do this with the feweſt ſtrokes of his club is the conqueror.

GOLFO Triste, in *Geography*, a bay on the coaſt of South America, in the government of Caraccas. N. lat. 10° 30′. W. long. 68° 20′.

GOLGAM, a town of Hindooſtan, in Dowlatabad; 15 miles N. of Beder.

GOLGOM, a town of the iſland of Ceylon; 48 miles N.W. of Candy.

GOLGOTHA. See Calvary.

GOLIATH, in *Scripture Hiſtory*, a famous giant of Gath, who defied the armies of Iſrael, and was ſlain by David. 1 Sam. xvii. 4, &c.

GOLICH, in *Geography*, a town of Ruſſia, in the government of Irkutſch, on the Lena; two miles S. of Orlenga.

GOLINDA, a ſmall iſland near the N. coaſt of Cuba. N. lat. 23° 20′. W. long. 80° 4′.

GOLISANO, a town of Sicily, in the valley of Demona; 9 miles S. of Cefalu.

GOLITZ, a town of Nubia, on the left ſide of the Nile; 45 miles W.N.W. of Dongola.

GOLIUS, James, in *Biography*, was born at the Hague in 1596; but he purſued his ſtudies at Leyden with the moſt unremitting diligence and ardour, and became diſtinguiſhed for his deep knowledge of the learned languages, antiquities, philoſophy, and mathematics. In 1622 he accompanied an embaſſador of the United Provinces to Morocco, where he excited the admiration of the emperor Muley Zeidan, with whom he had frequent interviews. After his return to his native country he ſucceeded to the Arabic profeſſorſhip on the death of Erpenius, under whom he had formerly ſtudied. In 1625 he obtained permiſſion to travel in the Levant, and paſſed more than a year at Aleppo, whence he made various excurſions into Arabia and Meſopotamia. On his return he viſited Conſtantinople, where he obtained very diſtinguiſhed notice from the learned in that capital, by whoſe means he had acceſs to the beſt libraries. During his abſence he was appointed profeſſor of mathematics, and returned to Leyden in 1629, and applied himſelf to the duties of his office. He died in 1667, having occupied with much credit the arduous ſituation of profeſſor for more than forty years, and paſſed through all the academical honours. As an author he publiſhed the "Saracen Hiſtory of Elmacin," which had been begun by Erpenius: alſo a life of the great Tamerlane, written by an eminent Arabian author: "The aſtronomical Elements of Alfergan," with a new verſion and learned commentaries: "An Arabic Lexicon;" a "Perſian Dictionary," which was printed in London. Bayle. Moreri.

Golius, Peter, brother of the preceding, entered when very young among the Carmelites; like his brother he excelled in the knowledge of the Arabic language, and taught it in the ſeminary belonging to his order at Rome, where thoſe monks were educated who were intended to be ſent on miſſions into the Eaſt. Golius was deſtined to this ſervice, and having viſited every part of Syria and Paleſtine, founded a monaſtery of his order on mount Libanus, over which he preſided till he was recalled to Rome. Here he was employed as one of the principal aſſiſtants of Sergius Riſius, archbiſhop of Damaſcus, in preparing his edition of the Arabic bible, which was publiſhed in 1671 by the direction of the college "De Propaganda." After it was completed, Golius was appointed viſitor of the miſſions of the Eaſt Indies. He died in this employment at Surat about the year 1673. He was author of tranſlations into Arabic of Thomas à Kempis' imitation of Jeſus Chriſt: of ſermons on the Evangeliſts: an "Hiſtoric diſcourſe of St. Gregory of Decapolis:" ſeveral ſmall devotional pieces, and a tranſlation from Arabic into Latin of a "Collection of Parables and Proverbs." Moreri.

GOLLI, or Colli, in *Geography*, a town of Africa, near the river Grande, the inhabitants of which trade in ſlaves, ivory, and cotton.

GOLLING, a town of the archbiſhopric of Salzburg, on the Sulza; 14 miles S.S.E. of Salzburg.

GOLLOSING, a town of Bengal; 70 miles W. of Midnapour.

GOLNITZ, a town of Hungary, on a river of the ſame name; 14 miles S.E. of Kapſdorff.

GOLNOW, a town of Anterior Pomerania, formerly Hanſeatic, ſituated on the Ihna; 12 miles N. of Stargard. N. lat. 53° 37′. E. long. 24° 57′.

GOLO, a river of Corſica, which riſes nearly in the centre of the iſland, and purſuing a N.E. courſe, runs into the ſea; 12 miles S.S.E. of Baſtia. It gives name to one of the two departments into which the iſland is divided; the other being Liamone. Golo comprehends the northern diviſion of Corſica, in N. lat. 42° 30′, and containing 165 ſquare leagues, and 103,466 inhabitants, is ſubdivided into three circles, *viz.* Baſtia, whoſe inhabitants are 47,842; Calvi, having 20,282 inhabitants; and Corte containing 35,342 inhabitants. There are ſeveral lofty mountains near the centre of a chain that traverſes the iſland longitudinally. The moſt conſiderable lakes are Ino and Creno, the former of which is of unknown depth. The ſoil is tolerably fertile, yielding barley, millet, olives, cheſnuts, wine, fruits, &c. On the hills are foreſts and excellent paſtures. See Corsica.

GOLOBGUNGE, a town of Bengal; 10 miles E. of Silhet.

GOLPHINGTON, the chief town of Waſhington county and ſtate of Georgia, in America, ſituated near the head of Ogeechee river, about 26 miles E.S.E. of Oconee town.

GOLPS, in *Heraldry*, are roundles, or torteaux, of a purple colour.

GOLTBERGENSIS Terra, in the *Materia Medica*, a whitiſh earth, uſed in the ſhops of Germany and Italy as an aſtringent, a cordial, and a ſudorific, but little known among the Engliſh apothecaries. It is dug in many parts of Germany, as Goldberg and Strigaw, and Lignitz in Sileſia; but particularly at this time in the neighbourhood of Haſſelt, in the biſhopric of Liege, in the circle of Weſtphalia. It is taken up there in conſiderable quantities, and uſually is ſealed with the impreſſion of an eagle, and with its old name Goltbergenſis terra under it. It was imagined to contain ſome particles of ſilver, and thence to derive ſome of its virtues: on this account Montanus called it *axungia lunæ;* but experience ſhews that it doth not contain a particle of that metal. It is a denſe compact earth of a dull greyiſh white, ſoft and friable, and adheres firmly to the tongue; and makes no efferveſcence with acids.

GOLTIAVINA, in *Geography*, a town of Ruſſia, in the government of Tobolſk; 188 miles E. of Eniſeik. N. lat. 58° 20′. E. long. 98° 14′.

GOLTPACH, a town of Pruſſia, in the palatinate of Culm; 8 miles N.E. of Thorn.

GOLTVA, a town of Ruſſia, in the government of Kiev; 112 miles S.E. of Kiev. N. lat. 49° 15′. E. long. 33° 14′.

GOLTZEN, a town of Lower Luſatia; 10 miles W. of Lubben. N. lat. 51° 58′. E. long. 13° 30′.

GOLTZIUS, Hubert, in *Biography*, a painter, who was born at Venlo in 1520, and ſtudied under Lambert Lombard. Becoming enamoured of the antique by having copied ſeveral works of that claſs, he reſolved to cultivate his taſte by viſiting the more important Greek works preſerved at Rome; and therefore travelled to that city, where he reſided ſome time, and thence drew an ample ſtock of materials for his future progreſs in the art he profeſſed.

He lived principally at Antwerp, where he painted the hiſtory of Jaſon; but as he was engaged in a variety of ſtudies, his pictures are rare. Among other things he inveſtigated coins and medals, and publiſhed a collection of them with critical annotations. He died at the age of 63.

Goltzius, Henry, an artiſt of conſiderable talent, who practiſed both painting and engraving. As a painter, he drew his reſources from the ſtudy of the antique, of Raphael, Polidoro, and Michael Angelo; the laſt of whom appears to have been his favoured Apollo in the art, but whoſe faults he exaggerated in an outrageous manner, ſeldom attaining any of his beauties. Hence his ſtyle of deſign is inflated and caricature; and his expreſſions participate of the ſame taſte; but his ſenſe of hue in colour is rich, vigorous, and tranſparent. He died in 1617, aged 59.

GOLUB, in *Geography*, a town of Pruſſia, in the territory of Culm; 24 miles S.E. of Culm.

GOLUBENSKA, a town of Ruſſia, in the country of the Coſſacks, on the Don; 200 miles E.N.E. of Azoph.

GOMAHNY, a town of Hindooſtan, in the circar of Mohurgunge; 45 miles N.W. of Harriopour.—Alſo, a town of Bengal; 8 miles S.S.E. of Goragot.

GOMAR, Francis, in *Biography*, celebrated as the great opponent of Arminius, and from whom the Calviniſtic party in Holland received the name of "Gomariſts," was born about the year 1563 at Bruges. His parents had been brought up in the Roman Catholic religion, but having embraced the Proteſtant doctrines, they retired into the palatinate in 1578, for the ſake of profeſſing their principles in peace and ſecurity. Their ſon Francis was ſent to Straſburg for his education, and purſued his ſtudies there under the celebrated John Sturm, after which he went to Newſtadt, whither the profeſſors of Heidelberg had been obliged to retire by the elector Lewis, becauſe they were the opponents of the Lutheran faith. In 1582 he took a journey to England, and attended the divinity lectures at the univerſities of Oxford and Cambridge. He was admitted to the degree of B.D. in the year 1584. By great aſſiduity he became very deeply learned in the Greek and Hebrew languages, and in 1587 he ſettled with a Dutch congregation at Frankfort, and continued to diſcharge his miniſterial functions, in that connection, until the year 1593, when his flock was entirely diſperſed by perſecution. In the following year he was invited to accept the theological profeſſorſhip at Leyden, and having taken his degree of D.D. he entered upon the duties of his new ſtation. In 1603 Arminius was appointed his colleague, and openly and zealouſly oppoſed the gloomy doctrines maintained by John Calvin, and made many converts in the univerſity. This rouſed the attention of Gomar, who declared himſelf his opponent, diſputed with him in the ſchools of Leyden, and publiſhed treatiſes to excite the orthodox to make a firm ſtand againſt his doctrines, which he repreſented to be profane and impious; he went much farther, and endeavoured to provoke againſt him the indignation of the States of Holland, before whom the two combatants diſputed twice in the year 1608. On one occaſion, when Barnevelt exclaimed that he was grateful to God that their controverſies did not affect the fundamental articles of the Chriſtian religion, Gomar proteſted "that he could not appear before the throne of God with Arminius's errors," thus vainly ſetting limits to the mercy of the moſt high and moſt merciful God. In 1611, ſeeing that his opponents increaſed in numbers and in ſtrength, Gomar reſigned his office, and retired to Middleburg. After this, he accepted the profeſſorſhip of divinity, firſt at the academy of Saumur, and then at the univerſity of Groningen, and at the latter place he was employed as the Hebrew profeſſor, in addition to that of theology. He was preſent at the ſynod of Dort, and took an active part in procuring the infamous decrees by which the Arminians were condemned and proſcribed as corrupters of the true faith, and enemies to their country. He died at Groningen in 1641, leaving a diſtinguiſhed character for ſound learning, particularly in the Oriental languages, but it cannot, and it ought not to be concealed, that he diſgraced the character of a Chriſtian miniſter by his bigotry and intolerance. As an author, he publiſhed many treatiſes, but chiefly on controverſial ſubjects, which were collected and printed at Amſterdam in the year 1645. He was alſo concerned in reviſing the tranſlation of the Old Teſtament, printed at Leyden with notes in the year 1637. Moreri. Bayle.

GOMASTAHPOUR, in *Geography*, a town of Bengal, 42 miles N.W. of Nattore.

GOMAUN, or Kemaoon, the name of mountains of Aſia, called alſo thoſe of Sewalic; an extenſive ridge, which ſeems to form the exterior barrier of the Thibetian Alps in Sirinagur, &c.

GOMBAULD, John Ogier De, in *Biography*, a French poet of the ſeventeenth century, was the younger ſon of a gentleman of the Proteſtant religion, to which he adhered. He was educated at Bourdeaux, and came to Paris about the time of the death of Henry IV., and frequented the court of Mary de Medicis. Of her he obtained a penſion of 1200 crowns, which was but ill-paid, and which was ſoon reduced nominally to one-third of that ſum, ſo that, notwithſtanding his high patrons, he paſſed much of his life in a ſtate little above indigence. He was elected one of the firſt members of the French Academy, and was ſo extremely zealous for its great object, the purity of the language, that he once propoſed to the academicians that they ſhould bind themſelves by oath to uſe no words but ſuch as were approved by the majority of the ſociety. He lived to a good old age, and died in 1666. He was author of many tragedies, tragi-comedies, paſtorals and romances, ſonnets, epigrams, &c. He alſo engaged in theological controverſy, and wrote "Treatiſes and Letters concerning Religion," in favour of the Proteſtants. Gombauld was very ready at repartee, and his wit did not leave him even in old age, for his lateſt publication was a collection of epigrams. Moreri. Bayle.

GOMBERT, Nicolas, a diſciple of Juſquin, who publiſhed two books of motets for many voices in 1552. He ſet to muſic a Latin epitaph on his maſter Juſquin;

quin; and at this time compoſers being ſcarce, he gained ſome reputation among thoſe of Flanders, with very little genius. For after performing the tedious taſk of ſcoring the muſic of the nænia on Juſquin, we found its chief merit to conſiſt in imitations of his admirable maſter. This compoſition was in the third eccleſiaſtical mode of E, with a minor ſecond, as well as third; which M. Blainville ſome years ago wiſhed to paſs on the public for a third or new key, different from the major and minor, which compriſe all ſecular muſic at preſent. And it is extraordinary, that this pretenſion ſhould have had any abettors in a Roman Catholic country, where old compoſitions in this mode are daily performed in cathedrals and collegiate churches. However, it was a matter of wonder and debate, during ſome time, in France. See Mercure de France, 1751, and Dict. de Muſ. par Rouſſeau, art. *Mode*.

GOMBERVILLE, MARIN LE ROI, *Sieur de*, a man of letters, was born at Chevreuſe, in the dioceſe of Paris. He became diſtinguiſhed at the age of fourteen by a collection of quatrains in honour of old age. In 1635 he was ſo much diſtinguiſhed for a literary reputation, that he was of the number aſſembled by cardinal Richlieu for the purpoſe of founding the French academy. He had publiſhed romances and works of a light nature, of which he afterwards ſeemed to be aſhamed, for at the age of forty-five he formed the reſolution of conſecrating his pen to religion. He even adopted a penitentiary courſe of life, and is mentioned by ſome of his contemporaries as having joined the Chriſtian virtues to thoſe of morality. He died in 1674, leaving behind him many works, of which perhaps the beſt is a "Diſcours ſur les Vertus et les Vices de l'Hiſtoire et de la Maniere de bien écrire." This is deemed a ſenſible and very judicious performance. Moreri.

GOMBEY, in *Geography*, a town of Africa, in Botonga, on the Zambeze. S. lat. 18°. E. long. 36° 3'.

GOMBEZCALA, a town of Perſia, in the province of Farſiſtan; 100 miles N.N.W. of Schiras.

GOMBIN, GAMBIN, or *Gabin*, a town of Poland, in the duchy of Warſaw, ſituated on the river Bſura; 34 miles N.N.E. of Rawa.

GOMBRON. See GAMBRON.

GOMER, in *Scripture Hiſtory*, the ſon of Japheth (Gen. x. 2.) and, according to Joſephus, father to the people of Galatia. The ancient inhabitants of that country were called Gomares before the Galatians ſeized poſſeſſion of it. The Chaldee places Gomer in Africa; Bochart in Phrygia, becauſe Phrygia, in Greek, has the ſame ſignification (a coal) as Gomer, in Hebrew and Syriac. Others are of opinion that the ancient Cimbri, or Cimmerians, ſprung from Gomer, and probably from them the Welſh, called Cymri. It is not improbable, that Gomer, or the Gomerites, his deſcendants, peopled likewiſe Germany and Gaul; the name German not differing much from Gomerim. Cluvier (Germ. Antiq. l. i. c. 5. 6.) conjecturing that the ancient Celtica comprehended Illyria, Germany, Gaul, Spain, and the Britiſh iſles, as all theſe people anciently ſpoke the ſame language, farther ſuppoſes, that Gomer, or his family, peopled the countries in Aſia, between the Paropamiſus and mount Imaus, and between the confluence of the Oxus and Oby; whence theſe people are called Gomares by Ptolemy (l. vi. c. 17.) and Mela (l. i. c. 2.).

GOMER, or *Omer*, an Hebrew meaſure. See CORUS.

GOMERA, or VELEZ DE PEGNON, in *Geography*, a caſtle of Africa, in the country of Fez, built on a rock near the coaſt of the Mediterranean. Before this fortreſs there was anciently a city, called "Bedis," ſuppoſed to have been founded by the Carthaginians. The Arabs called it Belis and Velis, whence Veles. Theſe two places, ſurrounded by mountains and foreſts, were ſupported by the building of ſhips for fiſhing and piracy, before they were taken by the Spaniards.—Alſo, a river of Fez, which runs into the ſtraits of Gibraltar, near the above-mentioned fortreſs.

GOMERA, or *Gomara*, one of the Canary iſlands, about 20 miles long and 10 broad, having a capital of the ſame name, ſituated on the eaſt coaſt, with a good harbour. The iſland is fertile and well cultivated, and produces ſugar-canes and vines in abundance, as well as ſilk, together with ſufficient corn for the ſupply of the inhabitants, who amount to about 7000; 18 miles S.W. of Teneriffe. N. lat. 28° 6'. W. long. 17° 8'.

GOMETRA, one of the weſtern iſlands of Scotland. This is a ſmall iſland at the weſt end of Ulva, tolerably fertile, but without wood.

GOMEZ DE CIVIDAD REAL, ALVAREZ, in *Biography*, a modern Latin poet, was born in 1488 at Guadalaxara in Spain. He was page of honour to archduke Charles, afterwards emperor. As an author, which entitles him to a place in this work, he poſſeſſed a great facility in writing Latin verſe, which is ſeen by his "Thalia Chriſtiana," or the triumph of Jeſus Chriſt, in twenty-five books: "Muſa Paulina," or the epiſtles of St. Paul, in elegiac verſe: the Proverbs of Solomon, and other works of a ſimilar kind. His work on the order of the Golden Fleece, entitled "De Principis Burgundi Militia quam Velleris aurei vocant," is reckoned his maſter-piece. The ſubject which he choſe in this inſtance was more favourable to poetry than the others. Moreri.

GOMEZ DE CASTRO, ALVAREZ, a native of St. Eulalia, near Toledo, was educated at Alcala, where he obtained a high character for diligence and real learning. He was patronized by Philip II., who engaged him to prepare an edition of the works of Iſidore, which death prevented him from completing. He was author of many works; but the chief, and that which is moſt eſteemed, is a "Life of Cardinal Ximenes," inſerted in a collection of the writers on Spaniſh hiſtory. Gomez died in 1580, at the age of 65. Moreri.

GOMEZ, MAGDALEN-ANGELICA POISSON, born at Paris in 1684, was the daughter of Paul Poiſſon, an actor. Her fertile pen produced a great variety of romances and other works of the entertaining kind. The principal are, "Les Journées Amuſantes," in eight volumes. "Anecdotes Perſanes," two vols. "Hiſt. Secrete de la Conquête de Grenade." "Hiſtoire du Comte d'Oxford avec celle d'Euſtache de St. Pierre." "Les cent Nouvelles." She died in 1770, at the age of 86.

GOMEZ, SEBASTIANO, a Mulatto ſlave of the Spaniſh painter Murillio, who employed his leiſure hours in painting, and obtained conſiderable ſucceſs. The city of Seville is, or was, adorned with many of his works: the moſt conſpicuous among them were a "Madonna with the Infant," in the portico of Los. Mercenarios Deſcalxos, and the "Flagellation of Chriſt," at the Capuchins. It is not known at what period he died; but he is ſaid to have ſurvived his maſter, whoſe deceaſe happened in the year 1685.

GOMGAH, in *Geography*, a town of Hindooſtan, in the circar of Surgooja; 22 miles S.W. of Surgooja.

GOMI, a town of the province of Guriel, on the Black ſea.

GOMMERN, a town of Saxony, on the Elbe; 8 miles E. of Magdeburg.

GOMNIALPAR, a town of Hindooſtan, in the circar of Guntoor; 15 miles E. of Innaconda.

GOMORA, a ſmall iſland in the Eaſt Indian ſea, near the weſt coaſt of Oby. S. lat. 1° 52′. E. long. 128°.

GOMORRHA, in *Ancient Geography*, a town of Paleſtine, and one of the principal cities of the Pentapolis, conſumed by fire from heaven. It was probably the moſt northern of the five cities. Gen. xix. 24.

GOMOZIA, or GOMEZIA, in *Botany*. See NERTERIA.

GOMPHIA, from γομφος, *a nail* or *knob*, alluding to the form of the receptacle of the fruit. Schreb. 291. Willd. Sp. Pl. v. 2. 569. Mart. Mill. Dict. v. 2. (Jabotapita; Plum. Gen. 41. t. 32. Ochna; Gærtn. t. 70. Juſſ. 282.) Claſs and order, *Decandria Monogynia*. Nat. Ord. *Magnoliæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of five lanceolate, ſharpiſh, ribbed, coloured, deciduous leaves, two of which have a membranous margin at each ſide, one on one ſide only, and two are deſtitute of any. *Cor.* Petals five, ſpreading, longer than the calyx, rather unequal; the claws are ſhorter than the calyx, each gradually widening into a roundiſh, flat, entire border. *Stam.* Filaments ten, very ſhort, thick and angular; anthers erect, ſhorter than the calyx, ſquare, tapering upwards, burſting at the top, on the outſide, by two pores. *Piſt.* Germen placed on a ſhort fleſhy angular receptacle, with five angles and five diviſions; ſtyle longer than the ſtamens, marked with five furrows; ſtigma acute. *Peric.* Drupas from one to five, moſt generally two, ovate, obliquely attenuated at the baſe, ſomewhat compreſſed, obtuſe, erect, ſtanding on a very large globoſe receptacle, which is undivided, if the berry be ſolitary, lobed if there be more, one lobe being appropriated to each berry. *Seeds* ſolitary, ovate.

Eſſ. Ch. Calyx five-leaved, inferior. Petals five, with claws rather unequal. Anthers nearly ſeſſile, ſquare, opening by two pores. Drupas ſtanding on a rounded fleſhy receptacle.

Vahl and Swartz deſcribe five ſpecies, all trees, natives of tropical climates. The chief and original one is G. *Jabotapita*, (Ochna Jabotapita; Linn. Sp. Pl. 732. Jabotapita pyramidato flore luteo, fructu rubro; Plum. Ic. 147. t. 153.) This is a native of South America, flowering in December and January. The *wood* is ſoft and tough. *Leaves* ſimple, as in the whole genus, alternate, ſtalked, ovate, acute, ſerrated. *Flowers* in terminal cluſters, yellow, fragrant, compared by Marcgrave to thoſe of a Wall-flower in figure, or rather colour, but he ſays their ſcent is ſweeter. The *fruit* and its receptacle are black, juicy, aſtringent.

This genus is certainly very nearly related to *Ochna*, both in habit and character.

GOMPHIASIS, from γομφος, *a nail*, a diſorder of the teeth, in which they become looſe and painful. The connection of the derivative with the Greek is imputable to the circumſtance of the teeth being fixed in their ſockets, like nails in a piece of wood.

GOMPHOCARPUS, in *Botany*, from γομφος, any thing ſwelling upwards from a narrow baſe, as a nail, wedge, or club, and καρπος, *fruit*, alluding to the tumid follicles. Brown Aſclepiad. (from the Wernerian Society's Tranſactions) 26. The genus is confounded by Linnæus under his *Aſclepias*. Claſs and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juſſ. *Aſclepiadeæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, ſmall, in five acute, permanent ſegments. *Cor.* of one petal, regular, in five deep, reflexed ſegments, deciduous. Nectary of five hooded leaves, ſimple within, furniſhed with a tooth at each ſide, placed on the top of the united filaments. *Stam.* Filaments five, cohering; anthers of two cells, terminated by a membrane, and producing two compreſſed maſſes of pollen, which attach themſelves by a taper point to the ſtigma, and remain pendulous there. *Piſt.* Germens two, ſuperior, ovate, ſtyles two, very ſhort, ſtanding cloſe together; ſtigma common to the two, dilated, horizontal, flat, with five angles to receive the maſſes of pollen. *Peric.* Follicles two, inflated, ovate, pointed, clothed with ſoft ſpines. Receptacles membranous, longitudinal, linear, at length ſeparate. *Seeds* numerous, imbricated, pendulous, crowned with ſilky down.

Eſſ. Ch. Corolla in five deep reflexed ſegments. Nectary of five hooded leaves, ſimple, with a ſingle tooth on each ſide, crowning the filaments. Anthers terminated by a membrane. Stigma depreſſed, pointleſs. Follicles inflated, prickly. Seeds hairy.

This genus is ſeparated from *Aſclepias* by Mr. Brown, (whoſe eſſay on the whole order, and whoſe diſcovery of the mode in which the pollen is projected by the anthers upon the ſtigma, do him the higheſt honour,) on account of the inflated prickly fruit, and the ſingular horns which in *Aſclepias* grow out from the bottom of the nectaries. It conſiſts of *Aſclepias arboreſcens*, Linn. Mant. 216; *fruticoſa*, Linn. Sp. Pl. 315; and *ſetoſa*, Vahl. Symb. v. 1. t. 8; and, as Mr. Brown ſuſpects, of *criſpa*, Linn. Mant. 215. Suppl. 170. A. *pubeſcens*, Linn. Mant. 215, is, as he juſtly obſerves, on the authority of the late excellent Mr. Dryander, borrowed from the Linnæan herbarium, the ſame plant as *arboreſcens*, with a ſynonym from Plukenet (t. 139. f. 1.) and Moriſon, which is preſumed to be *criſpa*.

GOMPHOLOLIUM, ſo named by the writer of the preſent article, from γομφος, *a wedge*, *club*, or any thing ſwelling upwards from a narrow baſe, and λοβος, *a pod*, or *legume*, expreſſive of its tumid fruit. Sm. Tr. of Linn. Soc. v. 4. 220. Ann. of Bot. v. 1. 505.—Claſs and order, *Decandria Monogynia*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, coriaceous, ſhort, bell-ſhaped, in five deep, oblong, pointed, unequal ſegments. *Cor.* papilionaceous. Standard very large, inverſely heart-ſhaped, carinated at the back, recurved, with a ſhort claw. Wings ſhorter than the ſtandard, parallel, horizontal, with a prominent lobe on one ſide near the baſe. Keel the length of the wings, of two half-ovate, tumid, clawed petals, with a reverſed tooth at the upper edge of each. *Stam.* Filaments ten, concealed in the keel, awl-ſhaped, diſtinct, aſcending, rather unequal in length; anthers vertical, roundiſh, two-lobed. *Piſt.* Germen ſtalked, oblong, ſomewhat cylindrical; ſtyle awl-ſhaped, aſcending, as long as the ſtamens; ſtigma ſimple, acute. *Peric.* Legume on a ſtalk, nearly globular, inflated, of one cell, crowned with the ſtyle. *Seeds* ſeveral, roundiſh, ranged along the upper ſuture on ſhort ſtalks.

Eſſ. Ch. Calyx bell-ſhaped, ſimple, in five deep ſegments. Corolla papilionaceous. Stigma ſimple. Legume inflated, globoſe, of one cell, with many ſeeds.

Five ſpecies of this genus are defined in the Tranſactions of the Linnæan Society, v. 9. 249, G. *grandiflorum*, Exot. Bot. t. 5:—*latifolium*, (*fimbriatum*; Exot. Bot. t. 58:) *ſcabrum*, a ſpecies communicated by Mr. Menzies: *minus*, very near the laſt, except in the acute recurved points of the leaves: and *pinnatum*, a ſmall ſpecies from Port Jackſon, remarkable for its pinnate leaves, and zig-zag herbaceous ſtem. Probably the ſubſequent volume of Mr. Brown's Prodromus will add more to this number.

The habit of *Gompholobium* is marked by the compound (ternate or pinnate) leaves, and a certain aſpect of rigidity and ſmoothneſs. The ſtipulas are not intrafoliaceous as in

Pultenæa, but ſtand on each ſide of the baſe of the common footſtalk, being a pair of acute flat cloſe-preſſed leaves, extremely minute, and often altogether wanting. The flowers are yellow, generally numerous, large and handſome; in G. *ſcabrum* they are purple when dried, but this is ſuſpected to be an alteration of their original hue, and they are judged, from the analogy of *Davieſia*, to be yellow, with crimſon keel and wings, when freſh.

All the ſpecies, as far as hitherto known, are natives of New Holland. S.

GOMPHOSIS, in *Anatomy*, from γομφος, *a nail*, denotes the manner in which the fangs of the teeth are fixed in their ſockets.

GOMPHRENA, in *Botany*, a name adopted by Linnæus from Dalechamp, and which is perverted from the *Gromphena* of Pliny. Linnæus made it claſſical by an alluſion to γομφος, *a nail*, *wedge*, or *club*, which can but obſcurely apply to the round head of flowers. See Gromphena.—Linn. Gen. 123. Schreb. 172. Willd. Sp. Pl. v. 1. 1321. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 1. 318. Juſſ. 88. Lamarck. Illuſtr. t. 180. Gærtn. t. 128. (Amaranthoides; Tournef. t. 429.)—Claſs and order, *Pentandria Digynia*. Nat. Ord. *Holeraceæ*, Linn. *Amaranthi*, Juſſ.

Gen. Ch. reformed. *Cal.* Perianth inferior, coloured, membranous, permanent, double; the outer of two large, compreſſed, keeled leaves, cohering by their inner margins, and one ſmaller; inner in five deep, awl-ſhaped, upright, downy ſegments. *Cor.* of one petal, tubular, cylindrical, the length of the inner calyx; its margin equally five-cleft, ſpreading. *Stam.* Filaments five, very ſhort, inſerted into the orifice of the corolla, betwixt its ſegments; anthers erect, roundiſh, cloſing the mouth of the corolla. *Piſt.* Germen ovate, pointed, ſuperior; ſtyles ſhort, cohering at their bottom part; ſtigmas ſimple, obtuſe, ſcarcely reaching to the ſtamens. *Peric.* Capſule roundiſh, membranous, of one cell, burſting all round. *Seed* ſolitary, large, roundiſh, with an oblique point.

Eſſ. Ch. Calyx coloured, the outer of three unequal leaves; inner in five deep ſegments. Corolla cylindrical, five-toothed, bearing the ſtamens at its orifice. Capſule burſting all round. Seed ſolitary.

The ſpecies of *Gomphrena* come under the denomination of Everlaſtings, or Amaranths, on account of the permanent nature of their calyx when dried, which retains its original colour and ſplendour.

G. *globoſa*, Globe Amaranth, a native of India, is commonly raiſed on a hot-bed, and planted out in our borders, like other tropical annuals. It is alſo frequently kept in pots to decorate the ſtove or green-houſe. The original crimſon ſort is much more handſome than the paler variegated variety.

G. *perennis*, figured in Dill. Hort. Elth. t. 20, a native of Buenos Ayres, is ſcarcely cultivated but in curious gardens, having ſmall heads of yellowiſh flowers of no remarkable beauty.

There are eight ſpecies beſides in Willdenow, of which the *arboreſcens*, Linn. Suppl. 173, is by far the moſt remarkable. This was not ſent to Linnæus by Mutis from New Granada, as erroneouſly aſſerted by the younger Linnæus in the *Supplementum*, but by Vandelli, who received it from Brazil, and who has deſcribed it under the name of *Bragantia*, in his Faſc. Plant. p. 6. The *ſtem* is woody, round, leafy, clothed with rigid, prominent, brown hairs, as are alſo the *leaves*, which are oppoſite, obovate, obtuſe, entire, about three inches long, and half as broad. *Heads* terminal, ſolitary, the ſize of an African Marigold or *Tagetes*, pale red or whitiſh, compoſed of innumerable flowers, the ſegments of whoſe calyxes are above an inch long, linear, acute and chaffy, clothed in their lower part with long denſe ſilky hairs. We know of no figure of this fine plant.

Mr. Brown, Prodr. Fl. Nov. Holl. v. 1. 416, adds four new ſpecies to *Gomphrena*, while he removes from it the *braſilienſis* and *vermicularis*, which, with two new ones from the tropical part of New Holland, he forms into a new genus, *Philoxerus*. He conſiders what we term corolla in *Gomphrena*, as the tube of the united filaments

Gomphrena, in *Gardening*, contains a plant of the flowery annual kind, of which the ſpecies cultivated is, the annual globe amaranth (G. globoſa.)

It is a fine flowering plant, the heads of which at their firſt appearance are globular, but as they increaſe in ſize become oval, and, according to Martyn, the flowering heads are extremely beautiful, and, if gathered before they are too far advanced, retain their beauty ſeveral years.

There are varieties with fine bright purple heads, with white or ſilvery heads, which never alter from ſeeds, with mixed colours, with purple and with white heads, which two laſt are much ſmaller and rounder than the others; the plants alſo grow much larger and ſpread more into branches, and are later before they flower; theſe are called batchelor's buttons in America.

Method of Culture.—It may be increaſed by ſowing the ſeeds annually, in pots of light freſh mould, in the early ſpring months, and plunging them in the bark hot-bed. When the plants are up, they ſhould be watered often with care; and, after they have attained ſome growth, be removed with balls about their roots into other pots, and replunged in the hot-bed. When they have had ſome growth in this ſituation, they ſhould be removed into a deep frame, being placed in a freſh hot-bed, to bring them up tall and handſome. Afterwards they ſhould be often refreſhed with water, and have air admitted freely as the ſummer advances, till they are capable of bearing it without injury; when about Auguſt they may be ſet out during the daytime, being protected in the night, and from wet weather. At this period they ſhould be watered three or four times a week at leaſt, in a rather ſparing manner.

They afford a good effect when ſet out in the principal ſituations about the houſe, in aſſemblage with other plants of the potted kinds.

GOMRAPENDY, in *Geography*, a town of Hindooſtan, in the Carnatic; 25 miles N. of Madras.

GOMS, one of the ſeven independent dixains or commonwealths of the Upper Vallais, in Switzerland; called *dixain*, becauſe the Upper and Lower Vallais comprehend 10 diſtricts, each being a dixain or tenth of the whole. Goms is ſituated at the foot of mount Grimſel, and extends along the bank of the Rhône; and is ſo called from a town, 33 miles E. of Sion. See Vallais.

GOMUT, a river of Bengal, which runs into the Magna, near Chandpour.

Gomut *Peperee*, a town of Hindooſtan, in Dowlatabad; ſix miles N. of Amednagur.

GOMUTTRA Selagitta, in *Natural Hiſtory*, the name given by the Indians to a kind of foſſil, found in great plenty on the mount Vindy in the Eaſt Indies, in places, as they obſerve, where the cows frequently urine. It is a bituminous ſubſtance, and after calcination the reſiduum is given in caſes of internal ulcers and in gonorrhœas. The Indians ſuppoſed it formed by the drying up of the cow's urine.

GONAGRA, compoſed of γονυ, *knee*, and αγρα, *captura*, *ſeizing*, in *Medicine*, the gout in the knee. See Gout.

GONAMBOUCH, in *Ornithology.* See Emberiza *Griſea.*

GONANPILLY, in *Geography*, a town of Hindooſtan, in the circar of Ellore; 18 miles N.E. of Ellore.

GONAPI, one of the ſmaller Banda iſlands, in the centre of which is a volcano. The only inhabitants are wild hogs, cows and ſerpents. S. lat. 4° 10′. E. long. 130° 34′.

GONARCHA, a term in the ancient dialling. Mr. Perrault, in his notes on Vitruvius, lib. ix. cap. 9. takes the gonarcha to have been a dial drawn on divers ſurfaces or planes; ſome of which being horizontal, others vertical, oblique, &c. formed divers angles.

Whence the appellation, from γονυ, *knee*, or γωνια, *angle.*

GONARY, in *Geography*, a town of Hindooſtan, in the Myſore; 12 miles S. of Rydroog.

GONAVE, La, an iſland ſituated on the weſt ſide of St. Domingo, about 14½ leagues in length, and about three in breadth. This is called Grand Gonave by way of diſtinction from Petit Gonave, another ſmall iſland about two miles in each direction, ſeparated from the S.E. corner of the former, by a channel three miles wide. Gonave is 13½ leagues W. by N.W. from Port au Prince. N. lat. 18° 51′. W. long. 73° 40′. See St. Domingo.

GONAVES, a ſea-port in the above-mentioned iſland, at the head of a bay of its own name, on the N. ſide of a bay of Leogane. The harbour is excellent; the town has a medicinal ſpring, and in 1772 both were erected with lodging-houſes for the accommodation of thoſe who reſort to it, and an hoſpital for ſoldiers and ſailors. It lies on the great road from Port de Paix to St. Mark, 16 leagues S.E. of the former. N. lat. 19° 22′. W. long. 73° 20′.

GONCANAMA, a town of S. America, in the audience of Quito; 20 miles S.W. of Loxa.

GONCELIN, a town of France, in the department of the Iſere, and chief place of a canton, in the diſtrict of Grenoble; 13 miles N.N.W. of Grenoble. The place contains 1558, and the canton 10,259 inhabitants, on a territory of 197½ kiliometres, in 14 communes.

GONDAR, the metropolis of Abyſſinia, is ſituated upon a hill, elevated 8440 feet above the ocean, and conſiſts of about 10,000 families in times of peace. The houſes are chiefly conſtructed with clay, and the roofs are thatched in a conical form, which is the mode of building within the tropical rains. On the weſt end of the town is the king's houſe, formerly a ſtructure of conſiderable importance; it was a ſquare edifice, flanked with ſquare towers; formerly four ſtories high, and the top of it afforded a magnificent view of the whole country S. of the lake Tzana. Although the greateſt part has been burnt at different times, there is ample lodging in the two loweſt floors of it; the audience chambers being above 120 feet long. Annexed to this ruined palace are apartments, conſtructed by ſucceeding kings, alſo of clay, according to the faſhion of their own country; for the palace itſelf, ſays Bruce (Travels, vol. iii.) was built by maſons from India in the time of Facilidas, and by ſuch Abyſſinians as had been inſtructed in architecture by the Jeſuits, without embracing their religion, and afterwards remained in the country, unconnected with the expulſion of the Portugueſe, during this prince's reign. The palace and its contiguous buildings are ſurrounded by a ſtone wall, 30 feet high, with battlements upon the outer wall, and a parapet roof between the outer and inner, by which you may paſs along the whole and have a view of the ſtreet. There never appear to have been any embraſures for cannon; the four ſides of this wall are above 1½ Engliſh mile in length. The mountain, on which the town is ſituated, is encompaſſed on every ſide by a deep valley, which has three outlets; the one to the ſouth, to Dembea, Maitſhaw, and the Agows, the ſecond to the N.W., towards Sennaar over the high mountain Debra Tzai, or the mountain of the Sun, at the foot of which Koſcam, the palace of the Iteghé, is ſituated, as are alſo the low countries of Walkayt and Waldubba; the third is to the N. to Woggora, over the high mountain Lamalmon, and ſo on through Tigré to the Red ſea. The river Kahha, coming from the mountain of the Sun, runs through the valley, and covers all the ſouth of the town; the Angrab, falling from Woggora, ſurrounds it on the N.N.E.: theſe rivers join at the bottom of the hill, about a quarter of a mile S. of the town. On an eminence oppoſite to Gondar, on the other ſide of the river, is a large town of Mahometans, conſiſting of about 1000 houſes. They are all active and laborious, and are employed in taking care of the baggage and field-equipage of the king and nobility, when they take the field and return from it; but they never fight on either ſide. N. lat. 12° 34′ 30″. E. long. 37° 53′.

GONDEBAUD, in *Biography*, third king of the Burgundians, celebrated as a legiſlator among the barbarians over whom he reigned as ſovereign. He obtained the crown in 491, and almoſt immediately, under pretence of aſſiſting Odoacer againſt Theodoric, entered Italy, carrying fire and ſword through Æmilia and Liguria, and made a great number of captives, many of whom he liberated without ranſom, at the requeſt of Epiphanius biſhop of Pavia. He aſſembled, in 499, a council at Lyons, in order to effect a reconciliation between the Catholics and Arians. He was himſelf an Arian, from habit and education; but he was unable to effect ſo laudable a purpoſe. About this time he was attacked and defeated by Clovis king of the Franks; who made the Burgundian monarch his tributary. Clovis returned to his own country, and Gondebaud revenged himſelf upon his brother Godegeſil, who had joined Clovis, ſurpriſed him, and put him to death. From this period he reigned in peace over his people, whom he rendered flouriſhing by the arts of civilization, and by a regular ſyſtem of laws. Theſe, ſays the hiſtorian, were in general founded on equity, and diſplay much ſagacity in preventing all cauſes of diſpute; nevertheleſs, they enjoin the barbariſm of judicial combats, which the legiſlator juſtified as an inference from the admitted doctrine of the interference of a particular providence in human affairs. The Burgundian code, called "La loi Gombrette," has been publiſhed in ſeveral collections of ancient laws. This prince died in 516, leaving behind him, as memorials, letters upon theological ſubjects to Avitus, biſhop of Vienne. Univer. Hiſt.

GONDEGAMA, or Gondlacomma, in *Geography*, a river of Hindooſtan, which forms the nominal boundary of the Carnatic, and diſcharges itſelf into the ſea at Medipelly. Combam, or Commum, is near its ſource. It is ſometimes called Gilligama, and Gunta-camma.

GONDICOTTA, a town of Hindooſtan, in Marawar; 33 miles N. of Trumian.

GONDOLA, a little flat boat, very long and narrow, chiefly uſed at Venice to row on the canals.

The word is Italian, *gondola.* Du Cange derives it from the vulgar Greek κουνδελας, *a bark*, or *little ſhip*; Lancelot deduces it from κονδυ, a term in Athenæus for a ſort of vaſe.

The middle-ſized gondolas are upwards of thirty feet long, and four broad; they always terminate at each end in a very ſharp point, which is raiſed perpendicularly to the full height of a man.

The addreſs of the Venetian gondoliers, in paſſing along their narrow canals, is very remarkable; there are uſually two to each gondola, and they row by puſhing before them. The fore-man reſts his oar on the left ſide of the gondola: the hind-man is placed on the ſtern, that he may ſee the head over the tilt or covering of the gondola, and reſts his oar, which is very long, on the right ſide of the gondola.

GONDOLA is alſo the name of a paſſage-boat of ſix or eight oars, uſed in other parts of the coaſt of Italy.

GONDOLA-*ſhell*, in *Natural Hiſtory*, a name given by authors to a peculiar kind of *concha globoſa*, ſuppoſed, in ſome degree, to repreſent the ſhape of a Venetian boat. It is of the genus of the *dolium*, and there are ſeven ſpecies of it. See DOLIUM and CONCHOLOGY.

GONDOMAR, in *Geography*, a town of Spain, in Galicia; 6 miles E. of Bayona.

GONDRECOURT, a town of France, in the department of the Meuſe, and chief place of a canton, in the diſtrict of Commercy. The place contains 1113, and the canton 8973 inhabitants, on a territory of 340 kiliometres, in 24 communes.

GONDUFEE, a town of Africa, in the kingdom of Kong; 100 miles S E. of Kong.

GONDWARRAH, a town of Bengal; 15 miles S.S.W. of Purneah.

GONESSE, a town of France, in the department of the Seine and Oiſe, and chief place of a canton, in the diſtrict of Pontoiſe, nine miles N. of Paris. The place contains 2400, and the canton 14,811 inhabitants, on a territory of 182½ kiliometres, in 22 communes.

GONET, JOHN BAPTIST, in *Biography*, was born at Beziers in the year 1616. He embraced the eccleſiaſtical life when he was young, and was admitted to the degree of doctor of divinity by the univerſity of Bourdeaux in the year 1640. He was at the ſame time elected to the profeſſorſhip of theology in that univerſity, an office which he held with great dignity till the year 1671, when he was appointed provincial among the Dominican friars. In 1675 he reſumed his labours as profeſſor, which he continued about two years, and then retired to his native place, where he died in 1681. He was author of a ſyſtem of divinity, entitled "Clypæus Theologiæ Thomiſticæ, contra novos ejus impugnatores," firſt publiſhed at Bourdeaux in 1666, in eighteen volumes 12mo., but it was afterwards enlarged, and printed in five volumes folio. He was likewiſe author of a "Manuale Thomiſtarum, ſeu brevis Theologiæ Curſus," which has paſſed through different editions, of which the beſt was publiſhed at Lyons in 1681: and "Diſſertatio Theologica de Probabilitate." Moreri.

GONFALON, or GONFANON, a kind of round tent, borne as a canopy, at the head of the proceſſions of the principal churches at Rome, in caſe of rain; its verge or banner ſerving for a ſhelter, where there is not a great deal of attendance.

GONG, a Chineſe metalline, muſical inſtrument of percuſſion, in the form of a flat baſon, with a ridge round it, and beaten by a mallet covered with ſeveral folds of woollen cloth. It is carried on a pole by two men, and beaten by the hindmoſt. In the march of an army, it is uſed as a military inſtrument to regulate the ſteps of the ſoldiers; when ſtruck with great force, it is ſufficiently loud to be heard at a mile's diſtance; but ſo confuſed is the ſound, that no diſtinct tone can be aſcertained. Yet by reiterated gentle ſtrokes on the ſame part of the bottom of the baſon a muſical tone may be produced; but different parts of the circle produce tones of different gravity and acuteneſs

It is uſed in proceſſions, and at court on days of ceremony and feſtivals, in concert with other inſtruments, as a double drum. On the water, in veſſels that are rowed, this inſtrument regulates the ſtrokes of the oars.

It is formed of braſs or bronze, and called Lu by the Chineſe, who, from hearing it only on great occaſions, regard it with reverence.

GONGA, in *Geography*, a town of European Turkey, in Romania, near the ſea of Marmora; 36 miles N.E. of Gallipoli.

GONGA, or *Bain Gonga*, a river of Hindooſtan, which falls into the Godavery about 90 miles from the ſea. See BAIN *Gonga*, and GODAVERY.

GONGACA, a town of Bengal; 30 miles S.W. of Calcutta.

GONGADEE, a town of Bengal; 50 miles S.W. of Rogonautpour.

GONGOLARA, in *Botany*, a name by which Imperatus has called a very beautiful ſea plant, known among botanical writers by the name of *fucus ericæ foliis*, or *erica marina*, the ſea heath.

GONGONG, is an inſtrument uſed by the Hottentots, and all the negroes on the weſtern coaſt of Africa. Of this kind there are two ſorts, the large gongong and the ſmall. In the ſupplement to the firſt edition of the French Encyclopédie, a deſcription of this inſtrument has been attempted, that ſeems totally unintelligible.

"The ſmall gongon (ſay the editors) is an iron or holly bow, of which the ſtring is the ſinew of a ſheep dried in the ſun, or a bowel ſtring; at the extremity of the bow is placed, on one ſide, the pipe of a ſplit quill, in the hollow of which the ſtring of the bow is lodged. The performer holds this quill in his mouth when he is playing, and the different tones of the gongon proceed from the different modulations of his breath.

"The great gongon only differs from the ſmall by the ſhell of a cocoa-nut, of which the upper part has been cut off, and the ſtring of the bow, before its tenſion, paſſed through it on each ſide. In touching the inſtrument the cocoa-ſhell is moved to and from the quill according to the tone which is to be produced."

We hope our readers will comprehend this deſcription, by which we frankly own ourſelves not to be much enlightened; nor can we well conceive how the motion of the ſplit quill, or the ſection of the cocoa-nut, can produce different tones. Nothing that anſwers to this deſcription is to be found on the plate referred to (fig. 3. Pl. II.) but in Pl. III. fig. 9. Muſ. Inſt. there is, we think, a very unſatisfactory repreſentation of it. And in the rude ſtate in which the European arts in general have been found in ſuch parts of Africa as have already been explored, we have little reaſon to lament our ignorance of the conſtruction and uſe of the gongong.

GONGOO, in *Geography*, an iſland in the Neel Abud or Guin river of Africa, in its courſe between Caſhna or Kaſſina, and Mekzara. N. lat. 16. E. long. 11°.

GONGOOPOUR, a town of Hindooſtan, in Oude, 12 miles S. of Kairabad.

GONGORA, LEWIS, in *Biography*, a celebrated Spaniſh poet, was born at Cordova in 1562. He ſtudied at Salamanca, and being brought up to the church, was made chaplain to the king, from whom he received conſiderable eccleſiaſtical preferment. He died at Cordova, of the cathedral of which he was prebend. His reputation is built on a volume of poems, under the title of "Obras de Dom. Louis de Gongora-y-Argore," 4to. The poems conſiſt of a variety of compoſitions, chiefly of the ſhorter kind, eſpecially lyrical, in which ſtyle he ſo much excelled, as to be termed by his countrymen "the prince of lyric poets." Gongora poſſeſſes, in the eſtimation of his countrymen, a very high rank among the Spaniſh poets for an artificial elevation of language, and uncommon turn of thought, which were formerly the characteriſtics of the poetry of that nation. So much, indeed, did he ſurpaſs in theſe qualities, that he had many cenſurers in his own country, though he alſo met with as many warm defenders. He is ſaid to have enriched his native language by the introduction of many Latin words happily employed. Moreri.

GONGRONA, in *Surgery*, a hard tumour; but eſpecially a bronchocele, or ſwelling of the thyroid gland. The word is ſaid to be derived from γογγρος, a round tubercle on the trunk of a tree.

GONHARY, in *Geography*, a town of Hindooſtan, in Oude; 40 miles W. of Lucknow.

GONIA, a town of Aſiatic Turkey, in Natolia; 16 miles W. of Aphiom-Karahiſar.

GONJAH, or KONG, ſuppoſed to be the *Conche* of D'Anville, and the *Gonge* of Deliſle, a kingdom of Africa, ſituated to the N. of Guinea, between the meridian of Greenwich, and 5° W. long., and between the 10th and 12th degrees of N. lat. It is about 870 miles weſtward from Caſhna or Kaſſina, and between 530 and 600 miles from the Gold Coaſt. Some ſay, there is no communication between this coaſt and the country of Gonjah; the king of Aſſentoi, who poſſeſſes the intervening ſpace, prohibiting his inland neighbours from paſſing through his country. Others report, that other ſtates (*e. g.* the Fantees, and their confederates) lie between Aſſentoi and the ſea; and that the Aſſentois have often unſucceſsfully attempted to open a communication with the coaſt.—Alſo, the name of a town, which is the capital of the kingdom of Gonjah or Kong. N. lat. 11° 30′. W. long. 3° 30′.—Alſo, the name of part of a chain of mountains, extending from almoſt the mouth of the river Gambia, in the Atlantic, to Nigritia, towards Abyſſinia.

GONIAH, a decayed town and large caſtle of Aſiatic Turkey, belonging to the province of Guriel, at the mouth of a river which runs into the Black ſea. It is garriſoned by a few Janiſſaries, and inhabited chiefly by ſeamen; 80 miles E.N.E. of Trebiſond. N. lat. 41° 25′. E. long. 41° 10′.

GONJENPILLY, a town of Hindooſtan, in the Carnatic; 18 miles N.E. of Nellore.

GONIOCARPUS, in *Botany*, ſo called from γωνια, *an angle*, and καρπος, *fruit*, expreſſive of one of its eſſential characters. The name, originally contrived by Thunberg, was *Gonocarpus*, which being incorrectly conſtructed, and too near *Conocarpus*, was judiciouſly changed by Mr. Konig. Schreber, Willdenow, and others, have made it *Gonatocarpus*, for want of attending to its meaning and application, which has no reference to γονυ, γονατος, *a knee*, but to the very peculiar angles of the fruit.—Konig in Ann. of Bot. v. 1. 546. t. 12. f. 5, 6. (Gonocarpus; Thunb. Nov. Gen. 55. Fl. Jap. 5. Murr. in Linn. Syſt. Veg. ed. 14. 164. Juſſ. 442. Lamarck. Illuſtr. t. 73. Gonatocarpus; Schreb. 86. Willd. Sp. Pl. v. 1. 690. Mart. Mill. Dict. v. 2.)—Claſs and order, *Tetrandria Monogynia*. Nat. Ord. *Onagræ*, or *Onagrariæ*, Juſſ. Konig.

Gen. Ch. *Cal.* Perianth ſuperior, in four deep, acute, equal, upright ſegments. *Cor.* Petals four, equal, oblong, concave, inſerted into the rim of the calyx, and twice as long as its teeth. *Stam.* Filaments four or eight, very ſhort, inſerted into the calyx, oppoſite to the petals if four, to the petals and calyx-teeth if eight; anthers oblong, large, ſhorter than the corolla. *Piſt.* Germen inferior, turbinate, with eight furrows and as many angles, crowned with the permanent calyx; ſtyle extremely ſhort; ſtigmas four, obtuſe, downy.

Eſſ. Ch. Calyx ſuperior, in four deep equal ſegments. Petals four. Drupa dry, with eight angles. Nut ſolitary, of one cell.

Three ſpecies of this inconſpicuous though curious genus are at preſent known.

1. G. *micranthus.* Thunb. Jap. 69. t. 15.—Leaves ovate, obtuſely crenate, ſmooth, as well as the ſtem.—Gathered by Thunberg in Japan. *Root* fibrous, annual. *Stems* three or four inches high, aſcending, quadrangular, ſmooth, leafy, ſimple below, panicled above. *Leaves* oppoſite, on ſhort ſtalks, ovate, rather acute, half an inch long, bluntly crenate and cartilaginous in the margin, ſmooth on both ſides, minutely dotted, furniſhed with a rib, but no veins; the upper ones gradually ſmaller and more entire. *Stipulas* none. *Flowers* very ſmall, purpliſh, drooping, in ſeveral ſlender, lax, upright ſpikes, forming a ſort of panicle. The *petals* as well as *calyx* are ſufficiently evident in Thunberg's own ſpecimens before us. The *fruit* is no bigger than the ſmalleſt pin's head, and the petals ſcarcely longer.

2. G. *rotundifolius.*—Leaves rounded, ſomewhat heart-ſhaped, obtuſely crenate, ſmooth. Angles of the ſtem rough. Spikes in a compound panicle.—Gathered near Port Jackſon, New South Wales, by John White, M. D.—We are by no means certain that this is more than a variety of the former, but its different country, much more rounded *leaves*, heart-ſhaped at the baſe, and the briſtly angles of the *ſtem*, induce us to propoſe it as a ſpecies. Poſſibly the panicled *ſpikes* may be owing to the greater luxuriance of the ſpecimens. The *fructification* appears preciſely like that of the firſt ſpecies.

3. G. *ſcaber.* Konig Ann. of Bot. v. 1. 547. t. 12. f. 6.—Leaves elliptic-lanceolate, ſharply ſerrated, briſtly as well as the ſtem.—Gathered by Mr. David Nelſon, in cultivated ground in the iſland of China, near Macao. This appears to differ from the two former very materially, being all over rough, with depreſſed briſtles, and having longer and narrower ſharply ſerrated *leaves.* The *flowers*, moreover, have eight ſtamens, and the angles of the *fruit* are wavy or criſped, not ſmooth and even.

We have a plant gathered by Dr. White, near Port Jackſon, which ſeems to anſwer in every point to Mr. Konig's deſcription and figure of the laſt, except that its petals have a briſtly keel, and the ſtigmas are ſingularly branched and plumoſe, making a large tuft in the centre of each flower after the petals are fallen. Perhaps Mr. Konig's ſpecimens had loſt all their ſtigmas. We remark, however, a further difference in the fruit, whoſe alternate angles are leſs diſtinct, or rather more criſped and interrupted than the reſt. Not having examined authentic ſpecimens of *G. ſcaber*, we muſt leave this matter in doubt.—Poſſibly this may be *G. tetragynus.* Billard. Nov. Holl. t. 53.

GONIOMETER, an inſtrument uſed for the purpoſe of meaſuring ſolid angles (particularly of cryſtals), or the inclination which one plane ſurface makes with another. The ſmall goniometers, as uſually ſold at the ſhops, are of a conſtruction ſo ſimple, as to require but little deſcription. They generally conſiſt of a ſmall pair of compaſſes or nippers, deſtined to receive the angle of the cryſtal; and the legs of theſe being continued in the oppoſite direction, beyond the angular point or joint, the angle is meaſured by applying them to a protractor or ſemicircular ſcale of degrees.

But notwithſtanding much ingenuity has been beſtowed on inſtruments conſtructed on this principle, none of them have been found nearly accurate enough for the purpoſes for which they are required, many intereſting queſtions in the modern ſcience of cryſtallography requiring a much more exact determination of the angle than can poſſibly be obtained by inſtruments of this conſtruction.

We are indebted to Dr. Wollaſton for having removed all theſe difficulties, by the invention of an inſtrument which accompliſhes all that the moſt ſcrupulous naturaliſt can poſſibly deſire. The principle of this invention is entirely optical, and (*Plate* XIX. *Miſcellany*, *fig.* 2.) repreſents the inſtrument as made and ſold by Mr. Carey, in the Strand; but the reader, when acquainted with the nature of it, will readily ſee that any perſon poſſeſſed of a graduated inſtrument, ſuch as a theodolite, tranſit, &c. may, without great difficulty, apply it to the meaſurement of angles, though in a much leſs commodious manner than on an inſtrument made expreſsly for the purpoſe.

Dr. Wollaſton's method conſiſts in employing a ray of light reflected from the ſurface, inſtead of the ſurface itſelf; and thus, for a radius of 1-50th of an inch, we may ſubſtitute either the diſtance of the eye from the cryſtal, which would naturally be twelve or fifteen inches, or for greater accuracy we may, by a ſecond mode, ſubſtitute the diſtance of objects ſeen at a hundred yards or more from us. The inſtrument deſcribed by Dr. Wollaſton, in the Tranſactions for 1809, conſiſts of a circle, *fig.* 3, graduated on its edge, and mounted on an horizontal axle ſupported by an upright pillar. This axle, being perforated, admits the paſſage of a ſmaller axle through it, to which any cryſtal of moderate ſize may be attached by a piece of wax, with its edge, or interſection of the ſurfaces, horizontal and parallel to the axis of motion. This poſition of the cryſtal is firſt adjuſted, ſo that by turning the ſmaller axle, each of the two ſurfaces, whoſe inclination is to be meaſured, will reflect the ſame light to the eye. The circle is then ſet to zero, or 180 , by an index attached to the pillar that ſupports it.

The ſmall axle is then turned till the further ſurface reflects the light of the candle, or other definite object, to the eye; and laſtly, (the eye being kept ſteadily in the ſame place,) the circle is turned by its larger axle, till the ſecond ſurface reflects the ſame light. This ſecond ſurface is thus aſcertained to be in the ſame poſition as the former ſurface had been: the angle through which the circle has moved, is, in fact, the ſupplement to the inclination of the ſurfaces; but as the graduations on its margin are numbered accordingly in the inverted order, the angle is correctly ſhewn by the index, without requiring any computation.

It may be here obſerved, that it is by no means neceſſary to have a clean uniform fracture for this application of the inſtrument to the ſtructure of laminated ſubſtances; for ſince all thoſe ſmall portions of a ſhattered ſurface that are parallel to one another, (though not in the ſame plane,) gliſten at once with the ſame light, the angle of an irregular ſurface may be determined nearly as well as when the reflecting ſurfaces are actually in the ſame plane. In this method of taking the meaſure of an angle, when the eye and candle are only ten or twelve inches diſtant, a ſmall error may ariſe from parallax, if the interſection of the planes or edge of the cryſtal be not accurately in a line with the axis of motion. But ſuch an error may be rendered inſenſible, even in that mode of uſing the inſtrument, by due care in placing the cryſtal; and when the ſurfaces are ſufficiently ſmooth to reflect a diſtinct image of objects, all errors from the ſame ſource may be entirely obviated by another mode of uſing it.

For this purpoſe, if the eye be brought within an inch of the reflecting ſurface, the reflected image of ſome diſtant chimney may be ſeen inverted beneath its true place, and, by turning the ſmall axis, may be brought to correſpond apparently with the bottom of the houſe, or ſome other diſtant horizontal line. In this poſition the ſurface accurately biſects the angle which the height of that houſe ſubtends at the eye, or rather at the reflecting ſurface: then, by turning the whole circle and cryſtal together, the other ſurface, however ſmall, may be brought exactly into the ſame poſition; and the angle of the ſurfaces may thus be meaſured, with a degree of preciſion that has not hitherto been expected in goniometry.

The accuracy, indeed, of this inſtrument is ſuch, that a circle of moderate dimenſions, with a vernier adapted to it, will probably afford corrections to many former obſervations. Dr. Wollaſton has remarked one inſtance of a miſtake that prevails, reſpecting the common carbonate of lime, which he mentions, becauſe this ſubſtance is very likely to be employed as a teſt of the correctneſs of ſuch a goniometer, by any one who is not convinced of its accuracy, from a diſtinct conception of the principles of its conſtruction.

The inclination of the ſurfaces of a primitive cryſtal of carbonate of lime, is ſtated with great appearance of preciſion to be 104 28′ 40′: a reſult deduced from the ſuppoſed poſition of its axis, at an angle of 45°, with each of the ſurfaces, and from other ſeducing circumſtances of apparent harmony by ſimple ratios.

But however ſtrong the preſumption might be, that this angle, which by meaſurement approached to 45′, is actually ſo, it muſt nevertheleſs be, in fact, about 45° 20′; for the inclination of the ſurfaces to each other is found to be very nearly, if not accurately, 105″, as it was formerly determined to be by Huygens; and ſince the meaſure of the ſuperficial angle, given by ſir Iſaac Newton, correſponds with this determination of Huygens, his evidence may be conſidered as a further confirmation of the ſame reſult; for it may be preſumed, that he would not adopt the meaſures of others without a careful examination.

Explanation of the Figure.

a b, Is the principal circle of the goniometer, graduated on its edge.

c c, The axle of the circle.

d, A milled head, by which the circle is turned.

e e, The ſmall axle for turning the cryſtal, without moving the circle.

f, A milled head on the ſmall axle.

g, A braſs plate ſupported by the pillar, and graduated as a vernier to every five minutes.

h, The extremity of a ſmall ſpring, by which the circle is ſtopped at 180 , without the trouble of reading off.

i i and *k k*, Are two centres of motion, the one horizontal, the other vertical, for adjuſting the poſition of a cryſtal; one turned by the handle *l*, the other by the milled head *m*.

The cryſtal being attached to a ſcrew head at the point *n*, in the centre of all the motions, with one of its ſurfaces as nearly parallel as may be to the milled head *m*, is next rendered truly parallel to the axis, by turning the handle *l* till the reflected image of a horizontal line is ſeen to be truly horizontal. By means of the milled head *f*, the ſecond ſurface is then brought into the poſition of the firſt, and if the reflected image from this ſurface is found not to be horizontal, it is rendered ſo by turning the milled head *m*, and ſince this motion is parallel to the firſt ſurface, it does not derange the preceding adjuſtment.

GONIOMETRICAL Lines, derived from γωνια, *angle*, and μετρω, *I meaſure*, in *Geometry*, lines uſed for meaſuring or determining the quantity of angles. Such are ſines, tangents, ſecants, verſed ſines, &c.

We have a paper by Mr. Jones, in the Philoſophical Tranſactions, containing a commodious diſpoſition of equations for exhibiting the relations of goniometrical lines, from whence a multitude of curious theorems may be derived. See Phil. Tranſ. N°. 483. ſect. 26.

GONIUM, in *Zoology*, a genus of Vermes, characterized only by their very ſimple, flat, and angular form, and being inviſible to the naked eye. The ſpecies at preſent known are few, amounting to no more than five in number; and for the exiſtence of theſe we rely chiefly on the microſcopical reſearches of Muller and Schranck, the former of whom deſcribes four of theſe minute creatures with great accuracy in his "Zoologia Danica." They are moſtly inhabitants of freſh or pure water, though ſome of them occur in ſtagnant water or in dunghills.

Species.

Polysphærium. Orbicular, pellucid, with innumerable ſpherical molecules. Schranck.

Found in ſtagnant water; the colour greeniſh-yellow, and general appearance that of a thin membrane filled with innumerable lucid globules. Very common in the month of July.

Pectorale. Quadrangular, pellucid, with ſixteen ſpherical molecules. Müll. Goeze, &c.

The molecules are oval and nearly of an equal ſize, their colour greeniſh, pellucid, and diſpoſed in a quadrangular manner within the membrane, like diamonds in a ring; or rather, as Müller compares them, to the jewels in the breaſtplate of the high prieſt among the Jews, and reflecting light on both ſides. Its progreſs is by an advancement alternately towards the right and left, at which time all the molecules are in motion, and aſſume their oval form, theſe molecules being round when the animal is in a quieſcent ſtate.

Truncatum. Angles obtuſe; poſterior part arched. Müll.

This occurs in freſh or pure water, and is rarely met with; its ſize is rather conſiderable; the fore-part is a ſtraight line, the ſides forming therewith obtuſe angles, the extremity of the ſides being united by a curved line; the internal organs, perceptible to the eye by the aſſiſtance of the microſcope, conſiſt of a number of molecules of a dark green colour, and two veſicles of peculiar brightneſs in the middle. Its motion is languid.

Lunatum. Rectangular, the poſterior part arched. Müll. Gmel. *G. Rectangulum*, Adams.

The projection at the baſe of the body in this ſpecies is placed in a right angle; the inteſtines green, with the larger veſicle tranſparent.

Pulvinatum. Quadrangular, opaque, with four cylindrical protuberances. Müller.

This ſpecies, according to Müller, appears under a ſlight magnifier like a quadrangular membrane, plain on both ſides, but, when a deeper lens is applied, reſembles the figure of a bolſter, formed of three or four cylindrical pillows, flattened or ſunk in various places: this was the appearance it aſſumed when firſt examined; ſome days after all the ſides were plain without convexity and decuſſated, or divided into little ſquares by the interſection of ſtraight lines. It is found in puddles under dunghills.

GONKEER, in *Geography*, a town of Chineſe Tartary. N. lat. 44° 50'. E. long. 117° 51'.

GONKOFEN, or Gankofen, a town of Bavaria; 14 miles E. of Landſhut.

GONNA, a town of Hindooſtan, in Lahore; 12 miles W. of Nugoreote.

GONNI, or Gonno, in *Ancient Geography*, a town of Greece, in the Perrhæbia, ſituated near Pateus, towards the ſtrait where the Olympus and Oſſa approached each other.

GONNOCONDYLUM, a town of Greece, in Macedonia, in the Perrhæbia.

GONOESSA, a town of Greece, in the Peloponneſus. In the time of Pauſanias it belonged to the Sicyonians.

GONOLOBUS, in *Botany*, from γωνια, *an angle*, and λοβος, *a pod*, alluding to the angles or ribs of the fruit. Michaux Boreali-Amer. v. 1. 119. Brown Aſclep. 24.—Claſs and order, *Pentandria Digynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juſſ. *Aſclepiadeæ*, Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, acute, ſpreading ſegments, permanent. *Cor.* of one petal, wheel-ſhaped, in five deep ſpreading ſegments. Nectary like a ſhield, crowning the ſtamens, lobed. *Stam.* Filaments five, thickiſh, united into a ſhort tube; anthers burſting tranſverſely, terminated by a membrane, their maſſes of pollen attached to the outer extremity, with reſpect to the cell, and covered by the ſtigma. *Piſt.* Germens two, ovate-oblong; ſtyles two, very ſhort, cloſe together; ſtigma common to both, flattiſh and depreſſed, with five angles. *Peric.* Pouches inflated, more or leſs angular or ribbed. *Seeds* numerous, imbricated, oblong, crowned with down.

Eſſ. Ch. Corolla wheel-ſhaped, in five deep ſegments. Nectary a lobed ſhield-like crown. Anthers burſting tranſverſely, terminated by a membrane. Stigma five-angled, depreſſed. Pouches inflated, ribbed. Seeds with a hairy crown.

This appears to be a numerous genus, properly ſeparated from *Cynanchum*, and conſiſting of climbing ſhrubs, with oppoſite broadiſh leaves, and flowers growing in umbels between the inſertion of the foot-ſtalks. They are natives of America, chiefly within the tropics. Examples of it are *Cynanchum maritimum*, Linn. Mant. 54. Jacq. Amer. 83. t. 56, a hairy plant, with dark-purple bloſſoms: *ſuberoſum*, Linn. Sp. Pl. 310, figured in Dill. Hort. Elth. t. 229. f. 296, likewiſe a downy ſpecies, with purpliſh-green flowers; and *criſpiflorum*, Ait. Hort. Kew. v. 1. 302. Plum. Ic. t. 216. f. 1: as well as many others preſumed to have the ſame generic characters, but which, according to Mr. Brown, require to be thoroughly examined, as does the whole genus.—Michaux enumerates three ſpecies, natives of the warmer parts of North America, and which he calls G. *macrophyllus*, *hirſutus*, and *lævis*.

GONON Besar, in *Geography*, a mountain on the E. ſide of the iſland of Java, famous for the quantity of pepper which its trees produce.

GONONG, or Ganapez, one of the group of Aſiatic iſles, called *Banda*, in which there is a remarkable volcano.

GONOR, a town of Hindooſtan, in the circar of Gohud.

GONORHYNCHUS, in *Ichthyology*, a ſpecies of *Cyprinus*, which ſee.

GONORRHŒA denotes, in *Surgery*, a diſeaſe in which a kind of matter, which is either actually pus, or a fluid of very ſimilar qualities, is diſcharged from the urethra of the male ſubject, and from the ſurfaces of the labia, nymphæ, clitoris, and vagina of the female, attended with more or leſs heat, pain, and difficulty in making water. The diſcharge is infectious, and capable of communicating the complaint from one perſon to another, whenever it comes into contact with any of thoſe ſurfaces, which are ſuſceptible of contamination by it, and which, we believe, muſt be ſuch as are naturally deſtined to ſecrete mucus. On the foregoing account, the diſorder is almoſt always caught, or communicated, in the venereal connection, when ſome of the diſcharge of the diſeaſed perſon is applied to the parts, which are liable to be affected in the healthy one. However, a gonorrhœa may be produced in any manner, which brings the infectious diſcharge into contact with the mouth of the urethra, the ſurfaces of the labia, &c. In the article OPHTHALMY, we ſhall have occaſion to notice a particular inflammation of the eyes, attended with a copious diſcharge of matter from beneath the eye-lids, which is repreſented, by ſurgical writers, as originating from the inadvertent application of gonorrhœal matter to the eye-lids, the inner ſurfaces of which are well known to be mucous ones.

The Hunterian doctrines go ſo far as to aſſert, on the authority of experiments, that the poiſon of the lues venerea, and that of gonorrhœa, are in fact the ſame, though uſually productive of oppoſite effects, by reaſon of the parts affected in a chancre, and thoſe concerned in gonorrhœa having quite different ſtructures. Theſe things, if true, tend to prove, that the matter of a clap may, under certain circumſtances, impart the venereal diſeaſe to the conſtitution. However, it ſhould be underſtood, that the ſtatement juſt now made can only refer to the gonorrhœa virulenta; for it is certain, that a ſimple diſcharge from the urethra, and a ſcalding ſenſation in making water, which would conſtitute a gonorrhœa, may be the conſequence of any thing which produces mere irritation in the paſſage without the poſſibility of the venereal or common gonorrhœal virus being at all concerned. Thus, a man may have a ſtricture, and begin the employment of bougies for its cure; their irritation may bring on a ſoreneſs in the urethra, and excite a diſcharge. Here we have an inſtance of the complaint ariſing from the operation of no virus whatever; but altogether from the unequivocal, mechanical, irritation of the bougies. Doubtleſs, alſo, there are ſometimes diſcharges both from the male and female parts of generation, which, when applied to other perſons, are capable of bringing on certain kinds of gonorrhœa by the entire effect of their irritation. So were a man, with a gonorrhœa, excited by the irritation of bougies to have connection with a woman, there is no doubt that the latter would be very likely to become troubled with a diſcharge and ſcalding in making water, merely in conſequence of the application of ſome of the matter from the male urethra to the ſurfaces of the labiæ, nymphæ, &c.

The arguments which have been adduced to ſhew that the poiſon of one form of gonorrhœa, and that of the venereal diſeaſe are the ſame, will more properly come under conſideration hereafter. In the meanwhile, it is our part to enter a little more particularly into the hiſtory of gonorrhœa.

The etymological meaning of *gonorrhœa* is a running of the ſemen, the term being derived from γονη, ſignifying the ſeminal fluid, and ρεω, *to flow*. The ancients are ſaid to have entertained the very erroneous notion that the diſeaſe conſiſted of an oozing of the ſemen in a morbid and altered ſtate. As it is long ſince ſo abſurd a ſuppoſition has had any partiſans, a refutation becomes ſuperfluous, and every one now knows, that in the preſent, as in many other examples, truth and etymology are not coupled together. Dr. Swediaur, who has found fault with the term *gonorrhœa*, as conveying an untrue idea, has not been happy in a ſubſtitute. He remarks, that if a Greek name is to be retained, he would call the complaint *blennorrhagia*, from βλεννα, *mucus*, and ρεω, *to flow*. Now this laſt expreſſion is objectionable, on the identical principle which makes Dr. Swediaur wiſh for the relinquiſhment of gonorrhœa; for it is generally thought by all the moſt eminent modern ſurgeons, that the diſcharge is pus, and not mucus. Beſides, we do not ſee much utility in abandoning the ancient appellation. The knowledge of ſurgery is now ſo highly cultivated, that there is not the leaſt danger of any man imbibing an abſurd opinion reſpecting this common complaint, from the etymological import of its name. Every juvenile apprentice knows that a clap is a running of matter from the urethra. Few common practitioners trouble themſelves about Greek derivations; and where is the object of changing the name of one diſeaſe, while many hundred other ſurgical terms ſtand in equal, and often greater, need of alteration?

The firſt perceptible ſymptom of a gonorrhœa is generally a kind of itching about the orifice of the urethra, attended with a ſlight ſwelling of its edges, and ſometimes extending over the whole of the glans penis. Very ſhortly afterwards the running commences, and the itching ſenſation changes into pain, which is ſeverely felt at the time of making water. In ſome few inſtances, no conſiderable pain is experienced, till a long while after the acceſs of the diſcharge and other ſymptoms. It is ſaid that there are certain caſes which are attended with no pain whatſoever, while other inſtances occur, in which patients ſuffer ſeverely, even before the diſcharge makes its appearance.

When the inflammatory ſymptoms have come on, the penis ſeems ſwollen, and as if it were in a ſtate of half-erection. The glans appears red, ſmooth, and enlarged, with a kind of tranſparency about it. Sometimes it is affected with a ſlight excoriation, which makes it exceedingly tender, and is the ſource of ſome trivial quantity of matter. The canal of the urethra becomes narrower than natural, if we may form a judgment from the diminution which takes place in the ſtream of urine. Indeed, very frequently, this fluid can only be diſcharged in a broken ſcattered current, or by drops. We have often ſeen ſevere retentions of urine attendant on the inflammatory ſtage of a gonorrhœa.

Small tumours may frequently be noticed along the inferior ſurface of the penis, in the courſe of the urethra. Theſe ſwellings have been conſidered as the mucous gland of that canal in a ſwollen ſtate. Sometimes they acquire a very large ſize, and ultimately ſuppurate and form abſceſſes, which, in ſome inſtances, burſt externally, while, in others, they break into the urethra itſelf. In the latter event, the ſwelling all on a ſudden ſubſides, as ſoon as the contained matter has eſcaped. Sometimes, after a certain interval, the tumour is ſeen to re-appear, which circumſtance is ſaid to be owing to a premature cloſure of the opening. Abſceſſes of the preceding kind are often met with in the ſituation of Cowper's glands. Here they alſo ſometimes burſt outwardly, ſometimes inwardly, ſometimes in both ways in the ſame patient. In this laſt caſe a new paſſage is made for the urine, termed a fiſtula in perinæo. See FISTULA.

A painful ſenſation is frequently felt by the patient along the lower ſurface of the penis, extending as far as the anus, and depending on the inflamed ſtate of the urethra. In moſt caſes the erections are frequent, and generally productive of infinite pain, particularly when a ſoreneſs exiſts along the track of the urethra towards the anus, or when the complaint is complicated with chordee. See CHORDEE.

The viſcid tranſparent fluid which is naturally ſecreted by the glands of the urethra changes into a whitiſh aqueous liquor, and the ſecretion which takes place from the lining of this canal, and is intended for its lubrication, alſo becomes leſs tranſparent. At length both theſe fluids, becoming thicker and thicker, gradually aſſume more and more the qualities of pus. The diſcharge often undergoes an alteration in its colour and conſiſtence, a circumſtance which Mr. Hunter imputed to the diſpoſition of the parts by which the matter is formed. Sometimes it is white, ſometimes yellow, ſometimes of a greeniſh colour. Such varieties depend upon the diminution, or increaſe of the inflammation, and not upon the poiſonous quality of the matter; for the ſame appearances happen whenever the parts are irritated in a certain degree by any cauſe whatſoever, as ſeveral facts confirm. Dr. Swediaur injected into his urethra ſome cauſtic volatile alkali mixed with water, by way of experiment. The uſual ſymptoms of a gonorrhœa enſued, together with a diſcharge which had the ſame appearances and alterations of colour, as the matter of the gonorrhœa virulenta. We have already ſtated that the ſame circumſtances moſt frequently attend the employment of bougies.

In the generality of inſtances, the diſcharge does not proceed from any great extent of the urethra, not from more than an inch, or an inch and a half of that part of the paſſage, which is neareſt the orifice in the glans penis. This diſtance was what Mr. Hunter uſed to name the ſpecific extent of the inflammation. Before this celebrated ſurgeon flouriſhed, it was commonly ſuppoſed, that the matter came from the whole of the urethra, and even from Cowper's glands, the proſtate, and the veſiculæ ſeminales. Due attention to the ſymptoms, however, makes this idea ſeem quite improbable. If, for example, every part of the urethra, beyond the bulb, or if the bulb itſelf contributed to the diſcharge, the matter would be propelled out of the paſſage in the ſame manner as the ſemen, that is to ſay, by a ſudden convulſive kind of action. It is well known that nothing can lodge in the bulb of the urethra, without immediately putting that part of the canal into action, particularly when in a ſtate of irritation and inflammation. A drop of urine is not allowed to remain there, and if ſimple warm water be injected thus far, it is inſtantly forced out by the action of the acceleratores urinæ muſcles. Therefore it ſeems rational to conclude, that if the membranous and bulbous parts of the urethra, Cowper's glands, the proſtate, and the veſiculæ ſeminales, all had a ſhare in forming the matter, no ſooner would a certain quantity have collected in the bulb, than an immediate expulſion would be occaſioned by the muſcles of the part. No ſymptom of this kind, however, is uſually obſerved, although it occaſionally happens, that the acceleratores urinæ are affected with ſpaſmodic contractions, which are particularly diſpoſed to occur juſt after the patient has been making water, and do not ſeem to have any dependance on the diſcharge.

Mr. Hunter has taken notice that when the inflammation is violent, ſome of the veſſels of the urethra often give way. Hence a hemorrhage ariſes, which is moſt profuſe, juſt after the patient makes water, though it alſo continues at other times. Sometimes the blood is inconſiderable in quantity, and only juſt ſufficient to give a red colour to the matter. The erections, which are ſo frequent in this complaint, are apt to occaſion an extravaſation of blood, a ſymptom which is always attended with an increaſe of the pain felt at the time of making water; but the bleeding always in the end leſſens the inflammation, and tends to the relief of the patient.

The inflammation, accompanying a gonorrhœa, is attended with ſeveral of the characters of common inflammation; but yet it differs alſo from the latter affection in many reſpects. It does not excite any pulſatory ſenſation; it cauſes little pain, except what ariſes from the irritation of the urine and the tenſion of the parts; and the inflammatory irritation ſeldom extends beyond the affected ſurfaces. The reaſon of ſo large a quantity of pus being ſecreted, in conſequence of ſo moderate an inflammation, has been attributed to the parts being ſuch as naturally ſecrete, ſo that they readily alter the natural into a morbid ſecretion.

Although the inflammation of a gonorrhœa is commonly moderate, there are inſtances in which it is exceedingly ſevere, and extends into the reticular texture of the ſurrounding corpus ſpongioſum urethræ, particularly of that which is near the glans penis. Sometimes the inflammation advances further along the corpus ſpongioſum, and occaſions a ſwelling, or extravaſation of coagulating lymph, which is the cauſe of chordee. We have already ſtated that the inflammation occaſionally gives riſe to abſceſſes of the glands of the urethra, particularly of thoſe in the perinæum.

It is not decidedly known in what manner the diſeaſe communicates itſelf to the urethra. Some ſuppoſe that the inflammation creeps from the glans penis to the edges of the orifice of the urethra, and thence further into the paſſage. Theſe reaſoners will not allow the probability of a common opinion, that ſome of the infectious matter gets into the urethra at the time of coition. At all events it ſeems clear, that none of the contaminating fluid can get as far as the diſeaſe extends in ordinary inſtances, much leſs in others, where the affection reaches a great way towards the bladder. There are ſome facts which tend to prove that the ſimple application of the infectious matter to the end of the penis may give riſe to a gonorrhœa. A caſe related by Mr. Hunter in his treatiſe on the venereal diſeaſe, ſeems to confirm the truth of what we have mentioned.

As we have already obſerved, the complaint ſeldom extends further along the urethra, than about an inch and a half, or two inches. Mr. Hunter thought, that this part of the canal appeared to be moſt ſuſceptible of the particular kind of inflammation brought on by the infection, and it conſtituted, what he uſed to term, the ſpecific diſtance of the diſorder. However, neither the ſenſations of which the patient complains, nor the irritation of the parts, are confined to the real ſeat of the diſeaſe. The neighbouring parts are often affected with a variety of ſymptoms, of a nature more or leſs ſevere, ſuch as uneaſineſs, and even pains every where about the pubes, ſcrotum, perinæum, anus, and hips. It is often neceſſary to ſuſpend the teſticles, which become ſo irritable, that the leaſt accident, or exertion, which, in other circumſtances, would have no effect, makes them ſwell. It frequently happens that the glands in the groin are ſympathetically affected; they ſwell and inflame, though they do not commonly ſuppurate. Caſes alſo occur in which the irritation extends to the buttocks, thighs, and abdominal muſcles, occaſioning acute pain, ſwelling, and extreme ſoreneſs of the parts, and putting the patient under the neceſſity of always continuing in an horizontal poſture. Theſe ſymptoms, however, are not ſtrictly inflammatory: if the patient be bled, his blood does not exhibit the inflammatory cruſt, and the conſtitution is little or not at all affected.

When the caſe, independently of the affections ariſing from ſympathy, is not more violent than what has been deſcribed, it is called a common gonorrhœa; but the violence of the eſſential ſymptoms of the diſeaſe will be more or leſs conſiderable, according as the patient is more or leſs ſuſceptible of ſuch complaints as depend upon irritation. Thus, in particular habits, the inflammation does not confine itſelf to the ſpecific diſtance, but reaches all along the urethra. Severe pain is alſo frequently experienced in the perinæum. Sometimes the acceleratores urinæ muſcles are affected with the ſpaſmodic contractions, of which ſome mention has already been made. Such ſpaſm is particularly apt to come on when the patient has juſt finiſhed making water; it ſhews itſelf by the manner in which the laſt drops of urine are expelled; and it is generally attended with contractions of the erectores muſcles. Sometimes the inflammation is ſo great as to occaſion a ſwelling, and even an abſceſs in the cellular membrane. It has already been obſerved, that the moſt common ſituation of ſuch ſuppuration is in Cowper's glands; but the ſmall glands of the bulb may alſo be affected in a ſimilar manner, and the irritation, in certain inſtances, is found to extend even to the bladder itſelf.

When the latter organ is once affected, it becomes more ſuſceptible of every kind of irritation, ſo that very diſtreſſing complaints are apt to be produced. It is no longer capable of bearing the degree of diſtention of which it is capable in the healthy ſtate. Hence the patient cannot hold his water in the uſual way; but no ſooner does the inclination to diſcharge it ariſe, than he is immediately compelled to make the evacuation, notwithſtanding the ſevere pain, which, while the urine is eſcaping, is felt in the bladder, and eſpecially about the glans penis. This pain has been compared with what is experienced in a fit of the ſtone, and it laſts for ſome time after the evacuation is completed.

The ureters, and even the kidnies, are ſometimes ſympathetically affected, when the bladder is conſiderably inflamed or irritated. Such an occurrence, however, is exceedingly uncommon. Mr. Hunter mentions his having ſeen an inflammation of the peritonæum brought on by a ſevere affection of the bladder in gonorrhœa; and others have obſerved a violent inflammation of the kidnies from the ſame cauſe. (See Encyclopédie Méthodique partie Chirurgicale, tom. 1. p. 584.) It has already been mentioned that a chordee is one of the occaſional effects of a gonorrhœa. It ariſes in general from inflammation; but in ſome caſes it appears to be entirely of a ſpaſmodic nature.

When the inflammation is not confined to the urethra and its glands, but ſpreads further, it attacks the ſubſtance of the corpus ſpongioſum, where it occaſions an extravaſation of coagulating lymph, which, uniting the cells together, makes the urethra incapable of yielding and being ſtretched in the ſame degree as the corpora cavernoſa. Hence, during an erection, the penis becomes bent forward. The adheſion of the cells of the corpus ſpongioſum urethræ together, which is the cauſe of chordee, in general, comes on in conſequence of mere inflammation of the canal; but occaſionally it is the effect of a ſpecies of inflammation, which is ſeen accompanying certain ill-conditioned chancres. A chordee often continues after all the other ſymptoms of a gonorrhœa have quite ceaſed.

A chordee is ſometimes altogether ſpaſmodic, in which caſe it is ſeen to diſappear and re-appear alternately, at indeterminate intervals. At one time the erections, which are ſo common in caſes of gonorrhœa, happen without being attended with any curvature of the part; while at other periods the chordee takes place in a great degree; the intervals of time between theſe changes being ſometimes remarkably ſhort.

A ſwelling of the teſticles is a frequent conſequence of a gonorrhœa. It may happen in any ſtage of the diſeaſe; but, perhaps, it takes place moſt frequently when the complaint is on the decline. It was conſidered by Mr. Hunter as an affection ariſing from ſympathy. It is ſeen attending any kind of irritation in the urethra, whether occaſioned by injections, bougies, or any other circumſtance. In many caſes, the ſwelling comes on and diſappears very ſuddenly, or ſeems to leave one teſticle to attack the other.

The ſwelling of the teſticle generally begins with a ſoft, pulpy tumefaction of its glandular part, which becomes rather painful when handled. The tumour afterwards increaſes in ſize and firmneſs, and produces conſiderable pain. The inflammation ſeldom ends in ſuppuration, though ſome inſtances of this kind are met with. The epididymis (eſpecially its lower end) is uſually the hardeſt part; but, frequently, the induration and ſwelling attack the whole of the epididymis, and form a ſort of knob at its upper part. The ſpermatic chord alſo is often affected, eſpecially the vas deferens, which is thickened, and exceedingly tender. Sometimes the veins of the teſticles are varicoſe.

The inflammation of the teſticle, as well as that of the urethra, is frequently attended with ſympathetic ſymptoms of irritation in other parts; for inſtance, pain at the lower end of the ſpine, a ſenſe of weakneſs in the loins, colic pains, nauſea, flatulence, diſorder of the digeſtive organs, &c.

The ſwelling of the teſticle is noticed to take place remarkably often juſt when the pain in the urethra has ſubſided, and the diſcharge has ſtopped; or elſe the truth is, that on the teſticle becoming affected, the ſymptoms of irritation in the urethra immediately ceaſe. Here it is ſomewhat difficult to determine which is the cauſe, and which the effect. However, it is worthy of remark, that it is not uncommon for the teſticle to begin to ſwell at the very moment when the inflammation of the urethra, and the diſcharge, are becoming worſe. Sometimes the epididymis alone is affected; ſometimes only the vas deferens; and, on other occaſions, only the ſpermatic chord. No reaſon can be aſſigned, why one of theſe parts ſhould be affected rather than the reſt. The inflammation of theſe organs is frequently attended with a ſtrangury, eſpecially when the diſcharge is ſuppreſſed; and, indeed, it is remarked, that the ſtoppage of the running generally brings on a tendency of that diſtreſſing complaint.

Another occaſional effect of a gonorrhœa is a ſwelling of the lymphatic glands in the groin, a ſymptom, which is of the ſame nature as the inflammation of the teſticle, but much more common. It has been ſuppoſed that the tumefaction of the glands depends on the abſorption of ſome of the matter from the urethra; but Mr. Hunter contended againſt this opinion. He thought that, in gonorrhœa, the matter was ſeldom abſorbed, and he derived this ſentiment partly from ſeeing that a lues venerea was ſeldom the conſequence of this diſeaſe. However, this argument will have no weight with thoſe practitioners, who diſbelieve in the doctrine that the poiſons of gonorrhœa and the venereal diſeaſe are of the ſame nature. Another conſideration, which influenced Mr. Hunter, will meet with more general approbation. It was the fact, that any ſimple mechanical irritation of irritable organs is capable of exciting an inflammation of their abſorbents, and of the glands to which ſuch veſſels run. Now, ſince the lymphatics and their glands uſually inflame before ſuppuration has taken place in the part originally affected, and their inflammation often ſubſides as ſoon as this laſt occurrence begins, we muſt conclude, that the ſwelling of the inguinal glands, in gonorrhœa, ariſes altogether from the irritation in the urethra. It is obſerved alſo, that ſuch ſwellings almoſt always admit of reſolution, while thoſe which originate from the abſorption of venereal matter from chancres very frequently ſuppurate, burſt, and turn into ſyphilitic ulcers. It is true, however, that ſwellings of the inguinal glands, induced by the irritation of gonorrhœa, do ſometimes end in abſceſſes and ſores; but no lues venerea follows, nor is mercury requiſite for the cure.

Another ſympathetic affection, ſometimes attendant on a clap, is a ſwelling of the abſorbent veſſels themſelves. In ſome inſtances, this ſymptom accompanies the ſwelling of the glands. It makes its appearance in the form of a hard, painful cord, which, proceeding from the prepuce, extends along the dorſum of the penis, ſometimes as far as the groins. This effect is not the conſequence of the abſorption of matter; for it is ſeen attending other irritations in the urethra, where no ſuſpicion of any irritating or poiſonous matter being taking up by the lymphatics can be entertained by any kind of reaſoning whatſoever. The ſymptom is ſometimes brought on by the employment of bougies, in the treatment of ſtrictures. It was for a long while ſuppoſed, that the matter which is diſcharged from the urethra, in caſes of gonorrhœa, was furniſhed from ulcers in this canal; but obſervation at length detected, that the opinion was deſtitute of all foundation. Dr. William Hunter is reputed to have been the firſt who aſſerted, that in gonorrhœa no ulcers exiſted in the urethra, and he is ſaid to have begun to inculcate the fact in his lectures about the year 1750. This celebrated phyſician had derived his ſentiment from ſome particular caſes which he had ſeen, where a large quantity of pus had been formed upon the ſurface of the viſcera, without any ulceration of theſe parts whatſoever. In 1753, his brother, Mr. John Hunter, had an opportunity of diſſecting the bodies of two malefactors, who were executed, while it was known that they were affected with a ſevere gonorrhœa. After a moſt careful examination, no ulceration could be diſcovered: the urethra of each was merely found to be rather redder than natural, particularly near the glans penis. Mr. Hunter afterwards opened the urethra of many patients who had died with gonorrhœa upon them, and he never could find any veſtiges of ulceration. It conſtantly appeared, that the membranous lining of the canal, near the glans penis, was redder than uſual, and that the lacunæ were frequently filled with pus. Morgagni is ſaid to have remarked the ſame fact. (De Sedibus et Cauſis Morborum. Epiſt. 44. § 7.)

As an attempt has been made by a late writer, Dr. Swediaur, to transfer the honour of the diſcovery from the Hunters to Morgagni, we deem it our duty to obſerve, that we cannot diſcover any accuracy, or juſtice, in the doctor's ſtatement, ſince Morgagni's work was not publiſhed till 1761.

Although there can now remain no doubt, that in gonorrhœa there are no ulcers eſſentially, or commonly preſent in the urethra, to furniſh the matter which is diſcharged, yet Mr. Hunter himſelf has explained, that a ſore, occaſioned by the burſting of an abſceſs in one of the glands of this paſſage, is ſometimes produced. This kind of ulceration, however, never takes place till long after the commencement of the running, and it is quite of a different nature from ſuch ſores as were fancied to be the cauſe of gonorrhœa.

We ſhall now conſider the identity of the gonorrhœa and venereal poiſons. It has been repreſented by ſome ſurgical authors, that the eſſential difference between gonorrhœa and the venereal diſeaſe depends upon the circumſtance of the firſt complaint being an affection of a ſecreting ſurface. Many other writers, and we may add, the generality of enlightened practitioners in this country, contend, that the two diſeaſes originate from different poiſons, a ſentiment which is ſupported by the ſtriking diſſimilarity of the two affections, and the wide difference of their modes of cure.

Such authors, as maintain the doctrine of the two complaints being the conſequence of different diſtinct poiſons, found their arguments upon various circumſtances. Firſt, the hiſtory of theſe diſeaſes, and of their progreſs in different countries. Secondly, the phenomena peculiar to each diſorder. Thirdly, the remedies neceſſary for the cure.

It is aſſerted, that the venereal diſeaſe and gonorrhœa did not make their appearance in Europe at the ſame period; but that the former was many years antecedent to the latter. The ſame thing is ſtated to have happened in other parts of the world, whither Europeans have conveyed the venereal virus. For inſtance, the venereal diſeaſe was known in China almoſt immediately after it had made its appearance in Europe; yet it is remarked by Aſtruc, that at the time when he wrote, gonorrhœa was a malady which had only been very recently obſerved among the Chineſe. Alſo, in the South-ſea iſlands, diſcovered in modern times, where both the venereal diſeaſe and gonorrhœa were unknown before the landing of European navigators, but where theſe maladies were afterwards diffuſed, gonorrhœa was not noticed till ſeveral years after ſyphilitic diſorders had begun to ſhew themſelves. Claps are ſaid to have been yet unknown to the natives of the South-ſea iſlands, at the period when captain Cook was performing his ſecond voyage. (Duncan's Medical Caſes and Obſervations.) All theſe circumſtances have been adduced to prove the difference between that virus which gives riſe to the venereal diſeaſe, and that from which gonorrhœa has its origin.

On the other hand, the circumſtances attending the commencement of the venereal diſeaſe in theſe remote countries, led Mr. Hunter to draw a concluſion diametrically oppoſite to the one deduced by the foregoing claſs of reaſoners; for, he obſerves, that it is almoſt impoſſible for a man to have a chancre during a voyage of ſeveral months, without the whole of the penis being deſtroyed, while it is well known, that a gonorrhœa may laſt an immenſe time, without loſing the character of being virulent. It is related in the account of captain Cook's voyage, that the inhabitants of Otaheite, who were infected with the gonorrhœa, went up the country and got well; but that when the conſequence of the malady was the venereal diſeaſe, the latter was incurable. Hence it is inferred, that the complaint which the Otaheiteans contracted was the gonorrhœa, ſince chancres and venereal affections would never have yielded to the ſimple means which were adopted. Beſides, if the diſorder had conſiſted of chancres, and the natives of Otaheite had been acquainted with the mode of curing ſuch ſores, it is contended, that they would likewiſe have underſtood how to cure other venereal ſymptoms. We find, alſo, from the peruſal of captain Cook's third voyage, that the venereal diſeaſe afterwards raged in all its forms in the iſland of Otaheite. Now, ſince there is no document to ſhew, that the gonorrhœa was again introduced into that country, ſubſequently to Cook's ſecond viſit, it is concluded, that every form of the venereal diſeaſe which has been obſerved there has been derived from one ſource, which, in all probability, was a gonorrhœa.

Mr. Hunter mentions a gentleman who had a gonorrhœa thrice, of which he was cured without mercury. About two months after each infection, he had ſymptoms of lues venerea. The firſt were ulcers in the throat; the ſecond were blotches on the ſkin; both which forms of the diſeaſe yielded to mercury. Thirdly, two punctures were made on the penis, with a lancet dipped in the matter of a gonorrhœa. One of theſe produced, on the part of the prepuce where it was made, a red, thickened ſpeck, which increaſed and diſcharged ſome matter. This ſuppoſed chancre healed on having its ſurface repeatedly deſtroyed by cauſtic. The other puncture was made on the glans, where it was followed by a pimple, full of yellowiſh matter. This pimple was touched with cauſtic, and healed in the ſame way as the ſore on the prepuce. Four months afterwards the chancre on the prepuce broke out again; then it healed, and returned. This it did ſeveral times; but always healed without any application to it. While the ſores remained on the prepuce and glans, a bubo formed in the groin. A ſufficient quantity of mercury was given to cure the gland locally, but not to prevent the conſtitution from being affected. Two months after the cure of the bubo, a venereal ulcer, according to Mr. Hunter, formed on one of the tonſils. This was cured by mercury; but the medicine was purpoſely left off as ſoon as the ſore was ſkinned over, in order to ſee what parts would next be affected.

About three months afterwards, copper-coloured blotches made their appearance in the ſkin, and the ulcer on the tonſil recurred. This diſeaſe was again only palliated by mercury; but the complaints returned in the ſame ſituation as before; and were ultimately cured by a proper quantity of mercury.

On the other hand, doubts muſt exiſt, concerning this account of the matter of gonorrhœa, when the following circumſtances are taken into conſideration:

1ſt. It is impoſſible to ſay what time may elapſe between the application of venereal poiſon to the penis, and the commencement of ulceration. Therefore, Bougainville's ſailors, alluded to by Mr. Hunter, might have contracted the infection at Rio de la Plata; but actual ulcers on the penis might not have formed till about five months afterwards, when the ſhip arrived at Otaheite. 2dly. The ſecond argument adduced by Mr. Hunter is certainly inconcluſive. Every ulcer in the throat is not regularly venereal. A common ulcer may heal while the patient is uſing mercury. Hence the cure, apparently accompliſhed by this medicine, is no proof that the complaint was ſyphilitic. 3dly. The laſt fact of inoculation is undoubtedly very ſtrong. But, though the inſertion of gonorrhœal matter, or any other morbid matter, beneath the cuticle, will undoubtedly produce troubleſome local complaints, may we not doubt that the ſores, in the above caſe, were actually venereal ones? Can we implicitly depend on the continence of the ſubject of the above remarkable experiments, during the long ſpace of four months, between the healing of the ſore on the prepuce, and its recurrence? If we cannot, the inference, in regard to the power of gonorrhœal matter to communicate the venereal diſeaſe remains uneſtabliſhed. How much more concluſive in this reſpect, the experiments would have been, had the inoculation been practiſed on any other part but the penis. If the matter of gonorrhœa be capable of communicating the venereal diſeaſe, why does not the diſcharge commonly produce chancres on the glands and prepuce, with which parts it muſt lie in contact a very conſiderable time in every caſe? Why alſo does not the preſence of a chancre frequently cauſe a gonorrhœa? If the infection of gonorrhœa, and the venereal diſeaſe, be really of the ſame identical nature, certainly, it ſeems very extraordinary, that the former complaint ſhould receive no benefit from mercury, and the latter diſeaſe invariably require this ſpecific remedy.

With reſpect to the venereal diſeaſe and gonorrhœa having ariſen in Europe and elſewhere at different periods, it has been obſerved by ſuch writers, as incline to the belief in the identity of the virus of the two affections, that every kind of contagious diſeaſe appears with greater violence in new-infected countries, than in other ſituations where it has been a conſiderable time endemial. In this manner, an endeavour, which, in our opinion, is quite unſucceſsful, is made to explain the cauſe why the gonorrhœa generally did not make its appearance till a long while after the venereal diſeaſe had ſhewn itſelf in much worſe ſhapes. The ſame claſs of reaſoners alſo aſſert, that, notwithſtanding the diligent enquiries of many able men, there is ſtill a degree of doubt concerning the exact time when theſe diſeaſes originated, and, of courſe, concerning the point, whether one of them actually exiſted a long while before the other. As we ſhall have occaſion to treat of the origin of the venereal diſeaſe hereafter (ſee Lues Venerea), we ſhall not enter into this diſquiſition in the preſent article. We may be permitted, however, to expreſs our ſuſpicions, that diſcharges from the urethra muſt have been occaſional diſeaſes from time immemorial. Whether there be a ſpecies of gonorrhœa truly venereal, that is to ſay, one which depends upon the ſame virus, as ſyphilis, there may for ever remain doubts; but, that there are claps or diſcharges which ariſe from no poiſonous or infectious matter whatſoever, but altogether from mere irritation in the urethra, as, in certain caſes of ſtrictures, is certain and undiſputed. Theſe gonorrhœas muſt have prevailed as long as that canal has been liable to various kinds of irritation.

One argument adduced againſt the identity of the virus, is derived from the ſtriking difference obſervable in the progreſs and ſymptoms of the two diſeaſes. When the venereal diſeaſe is neglected, it always grows worſe and worſe, and ſooner or later brings on the patient's diſſolution. On the contrary, a gonorrhœa tends to a natural cure, and, though left to itſelf, commonly ends in a favourable way.

The advocates for the identity of the poiſon, however, contend, that, in order to account for this laſt fact (which they ſtate is not without exceptions), it is by no means neceſſary to ſuppoſe a different virus. They bring into conſideration the circumſtance of gonorrhœa depending upon an inflammation of the ſurface of the urethra, and not ulceration; and they maintain, that the abſorption of the venereal poiſon generally happens much more eaſily from ulcerated ſurfaces, than from ſuch as are ſimply inflamed. This mode of reaſoning is brought forward as explanatory of the cauſe why, in the majority of caſes, a gonorrhœa remains entirely a local complaint, and admits of a ſpontaneous cure, while the venereal diſeaſe is always prone to extend itſelf, and ſpread from one part of the body to another.

An argument againſt the identity of the virus is alſo founded on the reflection, that the venereal diſeaſe is only capable of communicating the venereal diſeaſe, and gonorrhœa of imparting gonorrhœa. The partizans of the doctrine which imputes this latter affection to the venereal virus, acknowledge, that things do uſually correſpond with the ſtatement juſt now given; but they aſſert that the contrary caſe is alſo frequently obſerved. They remark, that we may eaſily convince ourſelves of this circumſtance, by a fact which is well known to practitioners, namely, that when perſons, who have a gonorrhœa, are not particularly careful to keep the glans and prepuce clean, chancres are very apt to form upon theſe parts, and by one ſuch ſore the whole ſyſtem may become infected. It is alſo aſſerted, that, independently of the formation of any chancre, there are caſes proving, that the venereal diſeaſe may be the conſequence of a gonorrhœa, and that every ſurgeon of extenſive practice muſt meet with inſtances of this kind. One of the moſt remarkable on record, is that related by Mr. Hunter; and it having been already noticed by us in the preſent article, we need not dwell upon it again.

With reſpect to chancres ariſing from the matter of gonorrhœa being in contact with the glans and prepuce, we do, undoubtedly, ſee both men and women who have claps and chancres together; but, in our opinion, it is moſt rational to impute the ſores to the application of venereal pus from chancres, together with the gonorrhœal matter, at the time of coition. We have no doubt that this act is often performed, when, between the two parties, both kinds of infection are preſent.

Certainly it ſeems extraordinary, that if the virus be of the ſame nature in both caſes, the two effects ſhould not always occur in the ſame patient. We ought naturally to expect, that when a gonorrhœa makes its appearance firſt, it would always be the cauſe of a chancre; and that when a chancre is the firſt ſymptom, it would invariably be the occaſion of gonorrhœa. We diſmiſs from preſent conſideration the aſſertion of ſuch writers as defend the identity of the virus, that, in ſome few inſtances, one malady does become the cauſe of the other. Mr. Hunter ſuſpected, that the irritation of one of the parts, forming the ſeats of the two diſeaſes, became the preſervative of the other. He thought, that when the urethra inflames and diſcharges matter, the adjacent external parts might, on that very account, be exempt from a diſeaſe which they would otherwiſe inevitably contract, by reaſon of the effect of the very virus which gave riſe to the gonorrhœa. The ſame celebrated writer alſo entertained a ſuſpicion, that when a chancre attacks the glans, or prepuce, the urethra might become inſuſceptible of the irritation, which, without the external diſeaſe, would certainly lead to a diſcharge from that canal.

This mode of explanation appears to us ſomewhat theoretical. We are of opinion, alſo, that in arguing in this way, the advocates for the identity of the virus only bring forward the ſhadow, inſtead of the ſubſtance of reaſon. In fact, they ſay nothing more than that ſuppoſed venereal matter cannot make the external parts of the penis ulcerate, becauſe there is an irritation in the urethra; and that the urethra cannot be affected with gonorrhœa, becauſe a chancre already occupies the external parts. If this reaſoning be not hypothetical and fanciful, we cannot conceive what arguments can ever be conſidered ſo. They who talk in this manner, inadvertently fall into difficulties, and make one opinion inconſiſtent with another. Thus, they have already told us, that, occaſionally, a chancre is apt to occur, when patients with gonorrhœa neglect to keep the glans and prepuce clean; yet, according to their principles, a clap renders the external parts inſuſceptible of infection, and, of courſe, there would be no need of cleanlineſs as a preſervative. We think that the weakneſs of the argument muſt be obvious to the youngeſt ſtudent, who, on his entrance into any venereal ward of an hoſpital, is almoſt ſure of immediately finding a patient who has at the ſame time both chancres and gonorrhœa.

The different treatment required by gonorrhœa and the venereal diſeaſe, is another argument againſt the identity of the virus, mercury being unneceſſary in claps, and the ſole ſpecific in the other complaint. The partiſans of the oppoſite opinion endeavour to diminiſh the force of this fact, by adverting to the different ways in which the two diſeaſes affect the parts which are attacked, and by maintaining that no juſt inference can be drawn from the difference of treatment, while the particular action of mercury, on various parts affected with the venereal poiſon, is not underſtood. They alſo contend that, though mercury may have no effect in gonorrhœa, when uſed in the ſame way as for other venereal affections, yet, when applied to the urethra itſelf, it ſerves to moderate the ſymptoms, and accelerate the cure.

Having ſeen the calomel injection employed in ſome hundreds of caſes, with leſs benefit than the common vitriolic one, we cannot aſſert to the laſt obſervation. The other remarks, being bare opinions, may be received or not, as the judgment of the reader may incline him; but, for our own part, we have no heſitation in refuſing them a place among ſuch information as is founded on rational evidence.

We ſhall now ſay a few words, reſpecting the time, between the application of the infection and the beginning of its effects.

In the greater number of diſeaſes, a certain ſpace of time always elapſes between the application of the cauſe and the firſt appearance of the effect. The time when a gonorrhœa begins, after contamination, varies conſiderably in different caſes. In ſome examples, the poiſon takes effect in a few hours, as Mr. Hunter has ſeen two or three times; while, in other inſtances, the complaint does not ſhew itſelf till the end of five or ſix weeks. There are alſo caſes to be met with, in which the diſorder begins at all the intermediate periods. It is calculated, that the moſt common time of its origin is in the ſpace between the ſixth and twelfth day. In one inſtance, in which the malady did not commence till the end of ſix weeks, it was noticed by Mr. Hunter, that the affection was preceded by various ſymptoms of irritation, and uncommon ſenſation, in the parts. Hence, this celebrated author concluded, that the virus ſeldom, or never, remains ſo long inactive; but that the inflammatory ſtate may exiſt a good while before ſuppuration takes place. The delay in the commencement of the diſcharge, however, may be owing to cauſes which are not underſtood, and this is very likely to be true, if we conſider that ſome caſes of gonorrhœa do not begin for five or ſix weeks after infection, and yet are not preceded by any remarkable ſymptom whatſoever.

The obſervations already made in a preceding part of this article, muſt have apprized the reader, that diſcharges from the urethra may originate from more cauſes than one, and from more irritations than that which is produced by one particular kind of virus. There are ſometimes ſpontaneous diſcharges from this paſſage, while no immediate cauſe whatever is aſſignable. Such inſtances as occur independently of a ſpecific gonorrhœal, or, according to the Hunterian doctrine, the venereal virus, have been termed *ſimple* or *benign*. Some aſſert, that theſe caſes may be known by their coming on immediately after coition, and it is violent from the very beginning; while the virulent gonorrhœa does not commence till after ſome days, and grows gradually worſe. However, this criterion is inſufficient: ſimple gonorrhœas are not always owing to coition, nor are they always ſudden in their appearance.

Mr. Hunter has ſeen the urethra ſympathize with the gums in dentition, and all the ſymptoms of gonorrhœa affect the ſame infant ſeveral times. The author of the article *Gonorrhée*, in the Encyclopédie Méthodique, alſo mentions his having ſeen two female children, who were affected during dentition with a diſcharge from the pudenda, attended by a certain degree of inflammation, and pain in making water.

We ſhall next introduce a few remarks on the effect of the diſcharge on the parts producing it.

It was formerly not an uncommon opinion, that the diſcharge was a means employed by nature for carrying off the virus occaſioning the complaint, and thus bringing about a cure. However, it is impoſſible for this to be true, with reſpect to inflammations, which ariſe from a ſpecific virus; for, ſuppoſing the ſuppuration could waſh away all the poiſon, cauſing the original irritation, yet, as all the matter afterwards ſecreted is equally virulent, no good would be done; the irritation, according to the preceding idea, would be perpetuated, and, of courſe, the diſcharge. This laſt occurrence, however, we need hardly remark, is not the caſe. The affection of the urethra in gonorrhœa is not kept up by the matter, but by the ſpecific quality of the inflammation itſelf, which, in all probability, can never continue beyond a limited time, ſince the ſymptoms at length ſpontaneouſly ſubſide. Had the infectious matter, which is formed in the courſe of the diſeaſe, the power of protracting the original irritation, the diſorder would have no termination.

In gonorrhœa, as in many other diſeaſes, the morbid action of the parts affected cannot go on for a long while in the ſame way. After having increaſed in violence to a certain degree, it naturally tends to become weaker; and the ſymptoms of the diſorder which depend upon ſuch action, at length, entirely ceaſe. The time of this ceſſation will vary according to circumſtances; for if the irritated parts be very ſuſceptible of the ſpecific irritation, the diſeaſed action muſt be more violent and laſting; but, in all caſes, this difference is always owing to ſome particularity of conſtitution, and not to any peculiarity of the virus.

The reader is aware that Mr. John Hunter regarded the gonorrhœa as one form of the venereal diſeaſe. It was the opinion of this diſtinguiſhed man, that the venereal diſeaſe was only capable of a natural ceſſation, when it occupied a ſecreting ſurface, from which it produced pus. He believed that when the part attacked was not a ſecreting one, and an ulcer was formed, the diſeaſe would of itſelf go on for ever. He referred this difference between gonorrhœa and a chancre, however, more to the difference in the mode of action, than to that of the affected ſurfaces; for when the venereal virus produces an ulcer upon a ſecreting ſurface, as it ſometimes does upon the tonſils, and even the urethra itſelf, ſuch ſores are not more diſpoſed to heal, than if they were ſituated any where elſe in the body.

It is ſometimes obſerved, in caſes of gonorrhœa, that the parts which were firſt irritated get well, while the irritation is communicated to another part of the ſame ſurface, as happens, when it leaves the urethra near the glans, and affects that part of the canal which is further on towards the bladder.

Admitting that every gonorrhœa is capable of getting well, without ſurgical aſſiſtance, it may be doubted whether a perſon, who already has a gonorrhœa, is ſuſceptible of the irritation of freſh gonorrhœal matter, or that the clap which exiſts could be augmented by its application. Mr. Hunter extended the ſame obſervation to every form of the venereal diſeaſe; and he ſtates, that the matter of gonorrhœa, or of a chancre, put on an ulcerated bubo, does not in the leaſt retard the cure, although, if venereal matter be applied to a common ſore, the venereal irritation will frequently be excited. Such facts are ſtrongly in favour of the opinion, that the matter of gonorrhœa has no effect in keeping up the complaint. The urethra is neither irritated by the infectious matter which it ſecretes, nor can the irritation already exiſting laſt beyond a certain period. Even were freſh matter applied to the urethra, the complaint would probably get well with equal quickneſs.

Mr. Hunter extended the idea further, and even conceived that a freſh gonorrhœa could not be contracted, were freſh virus applied to the parts affected, at the period when the cure was juſt on the point of being completed. He thought that, in time, the parts might be ſo habituated to the impreſſion of the virus, as to become inſenſible of it, and they muſt have regained their natural and original ſtate, ere the infection can again have ſuch effect upon them as to reproduce the complaint.

The foregoing opinions do not reſt altogether upon theory: they are alſo founded on experience and obſervation. Men, who have juſt had a gonorrhœa, have frequently been known to expoſe themſelves to be infected again without any recurrence of the complaint taking place, while other healthy perſons, who had connection with the ſame woman, have immediately caught the malady. Perhaps, it is on the ſame principle, that the firſt gonorrhœa is generally the moſt violent, and that ſuch perſons as are often affected with claps have them more and more mildly, particularly when the intervals are ſhort.

In corroboration of theſe ſentiments, Mr. Hunter relates ſeveral caſes, among which is the following: a married man, who, for ſeveral years, had had no connection with any woman except his own wife, happened to meet with an old acquaintance, who gave him a ſevere gonorrhœa, though ſhe declared her belief that ſhe was quite well. Both adopted ſome means of cure; but continued to cohabit together during the treatment. The man got well, and it was preſumed that the woman was alſo cured. They continued to live together ſeveral months, without the former experiencing any inconvenience, or having any reaſon to ſuppoſe that there was ſtill any thing the matter with the latter. At length they parted, and the woman formed a new attachment. She had no ſooner made this laſt connection, than ſhe gave the new lover a gonorrhœa. She again conſulted Mr. Hunter, whom ſhe aſſured, that ſhe had never cohabited with any others, except the preceding two; and conſequently, if this be true, the infection of her laſt lover muſt have ariſen from the very ſame gonorrhœa, of which ſhe ſuppoſed that ſhe had been formerly cured. However, ſhe now uſed no remedies, and the man, after he was well, continued to cohabit with her for ſeveral months without receiving any new infection. But her old lover now returning, after a year's abſence, and thinking that, as ſhe was living regularly with the ſecond, there could be no danger, ventured to have connection with her; the conſequence was, that he caught another gonorrhœa.

Before deſcribing the treatment, it is proper to ſay a few words of the diſeaſe in women.

The gonorrhœa in females is not ſo complicated as in men, the parts affected being more ſimple and fewer in number. In women the diſeaſe is not ſo eaſy to be aſcertained, becauſe they are alſo liable to a complaint, called the fluor albus, which has ſome reſemblance. A mere running from the parts is not ſo much a proof of the exiſtence of an infectious gonorrhœa in a woman, as a diſcharge without pain in a man; and in the former the diſeaſe will often exiſt, while there is no increaſe whatever in the natural ſecretion from the parts. Nor can any criterion be deduced from the kind of matter, ſince the diſcharge of the fluor albus frequently puts on all the appearances of gonorrhœal matter. Neither is pain, nor any peculiarity in the ſenſations of the parts, neceſſarily attendant upon the complaint in women. Mr. Hunter alſo remarks, that the appearance of the parts often gives us but little information; for he frequently examined them in patients, who complained of all the uſual ſymptoms, ſuch as an increaſed diſcharge, pain in making water, ſoreneſs, &c. and yet he could perceive no difference in the look of the parts and of ſuch as are quite healthy. When the patient was not conſcious of any particular ſymptoms, or was diſpoſed to conceal her knowledge of them, Mr. Hunter thought that ſome judgment might be formed from her having had connection with men ſuppoſed to be unſound, and from her power of communicating the diſeaſe to others. However, it is acknowledged, that as this laſt circumſtance is derived from the teſtimony of another perſon, there are obvious reaſons why it ſhould not always be truſted.

When a woman contracts a gonorrhœa, the vagina muſt be firſt attacked, a part which is not endued with conſiderable ſenſibility. Frequently, however, the complaint extends much further, producing diſagreeable ſenſations and ſoreneſs of the inſide of the labia, nymphæ, clitoris, carunculæ myrtiformes, and meatus urinarius. The parts are ſometimes ſo ſore that the patient cannot bear them to be touched; ſhe can hardly walk; and a great deal of pain is experienced when the urine comes into contact with the ſore ſurfaces, as it muſt unavoidably do as often as the bladder is emptied.

When the diſeaſe extends to parts which are more ſenſible than the vagina, and more ſuſceptible of inflammation, women have nearly the ſame ſymptoms as men; a fulneſs about the parts, a diſcharge from the urethra, violent pain in making water, and great uneaſineſs from the preſſure on the parts in ſitting. Sometimes the bladder is alſo affected.

The inflammation frequently extends to ſome depth, running along the ducts of the glands, and affecting the glands themſelves, ſo as to occaſion hard ſwellings under the ſurface of the inſide of the labia. Theſe tumours often ſuppurate, and burſt near the orifice of the vagina. They reſemble the abſceſſes in the glands of the urethra in men.

The time in which a gonorrhœa may be cured is exceedingly variable, ſome caſes terminating in a week, while others continue for months under the ſame treatment.

According to Mr. Hunter, the object in the cure is to deſtroy the diſpoſition and ſpecific mode of action in the ſolids of the parts, and, as ſoon as that change is accompliſhed, the poiſonous quality of the matter produced will alſo be deſtroyed. Thus the diſeaſe may be cured though not always its conſequences.

A gonorrhœa is not capable of being continued beyond a certain time in any conſtitution, and when the complaint is violent and laſts a long while, it is owing to the parts being very ſuſceptible of ſuch irritation, and readily retaining it.

Since there is no ſpecific medicine for the gonorrhœa, it is very fortunate, as Mr. Hunter obſerves, that time alone will effect a cure. This celebrated ſurgeon was inclined to think, that, in caſes of gonorrhœa, medicines were ſeldom of ſervice, perhaps not more frequently than once in ten inſtances. With the idea, that every gonorrhœa cures itſelf, he gave certain patients pills of bread, which were taken with great regularity. Theſe perſons all got well; but Mr. Hunter thought that ſome of them were not cured quite ſo ſoon as they would have been, had artificial means been employed.

The ſurgical methods of cure conſiſt of internal remedies and local applications; but in putting any plan of treatment in execution, more attention ſhould always be paid to the nature of the conſtitution, or to any attending diſeaſe in the parts themſelves, or parts connected with them, than to the running itſelf.

The nature of the conſtitution is principally to be judged of from the local effects of the diſeaſe. Theſe are ſo different in different people as to require a great variety of treatment, a circumſtance, ſays Mr. Hunter, which has been too little attended to, every one endeavouring to attack the immediate ſymptoms, as if he had a ſpecific for a gonorrhœa.

We are firſt to conſider, whether the inflammation is violent or mild, common or irritable. When the ſymptoms are violent, but of the common inflammatory kind, which is to be judged of from the attending circumſtances, and particularly from the extent of the inflammation not exceeding the ſpecific diſtance, the local applications may be either of the irritating or ſoothing kind. In this example, irritating applications may be leſs dangerous, than when the inflammation is of the irritable ſort, and may have the effect of altering the ſpecific action, the parts afterwards recovering of themſelves, as from any other common inflammation. Mr. Hunter, however, expreſſes his belief, that the ſoothing plan is the beſt at the beginning.

When the inflammation is great, and of the irritable kind, no violence is to be uſed in the treatment, as the ſymptoms would thus only be increaſed. Mr. Hunter thought, indeed, that there were ſome caſes, which are exceptions to the latter remark, the great degree of inflammation ariſing entirely from a ſuſceptibility of this irritation, and not from any general irritability in the conſtitution. He confeſſes, however, that ſuch examples can ſeldom be diſcriminated.

When the ſymptoms run very high, nothing ſhould be done to ſtop the diſcharge, as, were it to be checked, the inflammation would ſtill continue, and no good be effected.

Mr. Hunter recommends us to alter the conſtitution, if poſſible, by remedies adapted to each diſpoſition, with a view to alter the actions of the parts ariſing from ſuch diſpoſitions, and reduce the diſeaſe to its ſimple form. If the conſtitution cannot be altered, we can only allow the action to wear itſelf out.

When the inflammation has conſiderably abated, and the diſeaſe only remains in a mild form, its cure may be attempted either by internal remedies, or local applications. If local means are uſed, violence is ſtill to be avoided, becauſe it may bring back the irritation. At this period (continues Mr. Hunter), gentle aſtringents may be applied with a proſpect of ſucceſs; or, if the diſeaſe has begun mildly, and there are no ſigns of an inflammatory diſpoſition, either of the common, or irritable kind, an irritating injection may be uſed, in order to get rid of the ſpecific mode of action quickly. Such application will increaſe the ſymptoms for a time; but, when it is left off, they will frequently abate, or wholly diſappear. In ſuch a ſtate of parts, aſtringents may be uſed: for the only thing to be done, is to procure a ceſſation of the diſcharge, which is now the principal ſymptom.

When the itching, pain, &c., are felt for ſome time before the diſcharge appears, Mr. Hunter rather prefers the ſoothing to the irritating plan of treatment. He ſuſpected, that thus the coming out of the diſcharge would be promoted, which occurrence he conceived was the firſt ſtep towards a reſolution of the irritation. He believed that, at all events, in this caſe, the employment of aſtringents would be bad practice, as, by preventing the diſcharge from taking place, they might prolong the inflammation, and protract the cure. Alſo, in caſes of ſtrictures, and of diſeaſed teſticles, he is adverſe to the uſe of aſtringents; for, ſays he, while the diſcharge laſts, both the other complaints are relieved.

The internal remedies commonly recommended in a gonorrhœa, may be divided into evacuants and aſtringents. The evacuants (ſays Mr. Hunter), are principally of the purgative, or diuretic kind, and theſe are not confined to any particular medicines, every practitioner ſuppoſing that he is in poſſeſſion of the beſt. Some uſe mercurial evacuants; whilſt others carefully avoid mercury in every form. The neutral ſalts have been given from the idea of their being cooling. Some of the profeſſion have chiefly kept to diuretics, perhaps with two views; firſt, as evacuants acting mechanically upon the urinary paſſages, ſo as to waſh away the matter; ſecondly, as ſpecifics. For this purpoſe, nitre has been given, a medicine which has always been thought to have great effect in leſſening inflammation, though Mr. Hunter had doubts concerning the truth of the opinion. Under every mode of treatment the patients always get well, and the cures are aſcribed by each practitioner to his own favourite method.

Mr. Hunter remarks, that "to keep the body open in moſt caſes, even when the patient is in other reſpects in health, muſt, no doubt, be proper; but what idea can we form of an irritation, produced all along the inteſtinal canal, curing a ſpecific inflammation in the urethra? Yet there are caſes where a briſk purge has been of ſervice, and even in ſome has performed a cure. But I ſuſpect, that, in ſuch caſes, the diſeaſe had been continued by habit only, and that this practice would not have ſucceeded in the beginning. A gentleman had a gonorrhœa, all the ſymptoms of which continued for two months, and by taking at once ten grains of calomel, which purged him moſt violently, he was almoſt immediately cured. The calomel could not have acted ſpecifically, but by a kind of derivation, that is, an irritation produced in one part, cured one that ſubſiſted in another; but even if it ſhould be granted, that in ſome conſtitutions purges have the power of making the ſolids leſs ſuſceptible of this irritation, it cannot be ſuppoſed they will have this effect in every caſe: in ſome conſtitutions, they might debilitate, increaſe irritability, and of courſe increaſe the ſymptoms. Theſe contrary effects muſt take place in different conſtitutions, in which a medicine has no ſpecific action. On the ſuppoſition of the cure being promoted by an evacuation from the blood, what ſervice can purging out ſome of the blood, in form of a ſecretion from one part, do to an inflammation of another part? On ſuch a ſuppoſition would not a ſweat, or an increaſe of ſaliva, by chewing tobacco, or ſtimulating the noſe by ſnuff, all tend equally to cure a gonorrhœa? But humours having been conſidered as the univerſal cauſe of every diſeaſe, eſpecially thoſe in which pus is formed, or a diſcharge produced, and purging having been ſuppoſed to be the cure for humours, purgatives were of courſe made uſe of in this diſeaſe; and as the patients have always been cured, the practice became generally eſtabliſhed.

"Thoſe who recommended mercury in this form of the diſeaſe, did it moſt probably from the opinion, that this medicine was a ſpecific for the venereal diſeaſe in all its forms. On this ſuppoſition, we can ſee ſome reaſon for their practice, as it would be abſorbed from the inteſtines, circulate through the inflamed veſſels of the urethra, and thereby deſtroy the venereal irritation. Here we can only ſuppoſe it to act by its ſpecific virtue; but I doubt very much of mercury having any ſpecific virtue in this ſpecies of diſeaſe; for I find, that it is as ſoon cured without mercury as with it; and where this medicine is only uſed as a purge, or purged off the next day, and therefore allowed to act merely upon the bowels, I cannot conceive that it could have any more effect upon the venereal inflammation in the urethra, than an irritation in the bowels ariſing from any other purgative. So little effect, indeed, has this medicine upon a gonorrhœa, that I have known a gonorrhœa take place while under a courſe of mercury ſufficient for the cure of a chancre. Whether the gonorrhœa aroſe from the ſame infection that produced the chancre I cannot ſay; nor can it be eaſily determined in ſuch caſes. Men have alſo been known to contract a gonorrhœa when loaded with mercury for the cure of a lues venerea; the gonorrhœa, nevertheleſs, has been as difficult of cure as in ordinary caſes." P. 72, &c.

With reſpect to diuretics, conſidered as evacuants, Mr. Hunter obſerves, that they may have the ſame general remarks made on them as have been offered in regard to purgatives. It is poſſible, ſays he, that ſpecific medicines, taken into the conſtitution (if we had ſuch), and paſſing off by the urine, might act upon the urethra in their paſſage through it. The balſams and turpentines paſs off in this way, and become ſpecifics for many irritations in the urinary paſſages; but how far medicines which have the power of affecting particular parts when ſound, or when under diſeaſes peculiar to thoſe parts, have alſo the powers of affecting a ſpecific irritation in them, Mr. Hunter was uncertain. He conceived, however, that they might be capable of removing any attending irritation, though not the ſpecific one. He thought, that diuretics did good inaſmuch as they increaſed the quantity of urine; but he believed ſimple water was beſt for this purpoſe, or water joined with ſuch things as encourage the patient to drink a good deal, as with tea, capillaire, orgeate, &c.

Aſtringents have frequently been preſcribed, though without the approbation of the generality of regular practitioners. It was Mr. Hunter's opinion, that ſuch medicines did not leſſen the inflammation, but that they often leſſened the diſcharge.

With regard to local applications, they may be either internal to the urethra, or external to the penis. In many caſes both kinds are proper. One would ſuppoſe, that what is applied to the urethra, muſt be the moſt likely to effect a cure, by coming immediately into contact with the diſeaſed parts.

Local applications to the urethra may be either in a ſolid or fluid form, each of which has its advantages and diſadvantages. A fluid, (ſays Mr. Hunter) is only a temporary application, and that of very ſhort duration.

The ſolid applications may remain a long time, and, in this reſpect, would ſeem to be better than fluid ones; but in general they create irritation. They muſt be uſed in the form of a bougie, which Mr. Hunter imagined was commonly injurious, when the parts were in an inflamed ſtate, though he confeſſes, that he never ſaw any harm from it in any caſe, when employed with caution.

Fluid applications to the inſide of the urethra are uſually called injections, and, like the internal remedies, are without number. However, as the inflammation is frequently removed under the uſe of injections of various kinds, have we not, (as Mr. Hunter notices) a ſtrong corroborating circumſtance in favour of an opinion, that every ſuch complaint will in time cure itſelf? This eminent ſurgeon thought, however, that practice evinced, that an injection often has almoſt an immediate effect upon the ſymptoms, and, therefore, that it muſt have ſome powers, though the injection, which would have the greateſt ſpecific effect, he believed, was not yet known. If an injection has no ſpecific powers, it muſt be very uncertain in its effects, and can only be of ſervice as far as it may be adapted to a peculiarity of conſtitution, or parts. As injections are only temporary applications, it becomes neceſſary to uſe them often, eſpecially in caſes where they are found to be of ſervice. They ſhould therefore be applied as often as convenient, perhaps every hour, or even oftener; but Mr. Hunter adds, that this muſt be regulated in ſome meaſure by the kind of injection; for, if it be irritating, it will not be proper to uſe it ſo often, as it may be productive of bad conſequences.

The ſame author obſerves, that many injections remove the ſymptoms immediately, or ſoon after the application, and prevent the formation of matter, which has given riſe to the notion of their ſhutting up the diſeaſe and driving it into the conſtitution; but this ſuppoſition cannot be true, ſince the matter is the only ſubſtance in which the poiſon is contained, and the formation of the poiſon is inſeparable from the formation of matter. Therefore, if we can prevent the one, the other cannot take place, and, of courſe, there can be no room for abſorption; ſo that there can neither be any power of infecting the conſtitution in the ſame perſon, nor of communicating the infection to others.

Mr. Hunter divided injections into four kinds, namely, the irritating, ſedative, emollient, and aſtringent. He believed that we are not acquainted with any ſpecific one, although a mercurial injection, of ſome ſort or another, is frequently fancied to have ſuch a quality.

All irritating injections act upon the principle of producing an irritation of another kind, which ought to be greater than that of the gonorrhœa, by which means the laſt is deſtroyed and the diſeaſe cured, although the pain and diſcharge may ſtill be kept up by the application.

Theſe ſymptoms will ſoon go off, as ſoon as the injection is laid aſide, becauſe they only ariſe from its irritating qualities. In this way bougies, as well as many injections, may be ſuppoſed to perform a cure; and although they increaſe the ſymptoms for a time, they never can increaſe the diſeaſe itſelf, any more (ſays Mr. Hunter) than the ſame injection, which would produce the ſame ſymptoms, if applied to the urethra of a ſound man, can communicate the diſeaſe. Moſt of the irritating injections have an aſtringent effect, and, when mild, prove ſimply aſtringents; their irritating quality depending chiefly upon their ſtrength.

Mr. Hunter was not able to determine abſolutely the kind of caſes in which irritating injections might be uſed with advantage. He thought, however, that ſuch applications ſhould never be uſed when there is already much inflammation, eſpecially in conſtitutions which cannot bear a great deal of irritation, as a previous knowledge of the diſeaſe in the ſame perſon ſometimes teaches us. Neither ſhould theſe injections be uſed when the irritation has ſpread beyond the ſpecific diſtance; when the teſticles are tender, or when they have become ſore upon a ſudden diminution of the diſcharge; when the perinæum is very ſuſceptible of inflammation, and particularly if it ſhould have formerly ſuppurated. Irritating injections alſo ought not to be employed when there is a tendency in the bladder to irritation, which is known from the patient having had, for ſome time, a frequency in making water. In all the preceding caſes they do no good, and often do miſchief: Mr. Hunter thought he had ſeen abſceſſes in the perinæum brought on by their employment.

In mild caſes, and in conſtitutions which are not irritable, ſuch injections often ſucceed, and remove the diſeaſe almoſt immediately. The practice, however, as the foregoing writer remarks, ought to be attempted with caution, and not, perhaps, till milder methods have failed. Two grains of corroſive ſublimate (hydrargyrus muriatus), diſſolved in eight ounces of diſtilled water, are an eligible injection of this kind; but an injection of only half this ſtrength may be uſed, when it is not the deſign to attempt a very ſudden cure. If, however, the injection thus weakened ſhould give conſiderable pain, or occaſion a great increaſe of ſoreneſs in making water, it muſt be ſtill more diluted.

Sedative injections, according to Mr. Hunter, will always be of ſervice in caſes where the inflammation is conſiderable, not by leſſening the diſeaſe itſelf, but by leſſening the diſeaſed action, which always allows the natural actions of the part more readily to take place. They are likewiſe very uſeful in relieving the painful feelings of the patient. Perhaps, ſays this celebrated ſurgeon, the beſt ſedative which we have is opium, as when given by the mouth or anus, as when applied to the part affected in the form of an injection. But even opium will not agree, nor act as a ſedative in all conſtitutions or parts. On the contrary, it has often oppoſite effects, producing great irritability. Lead may be reckoned a ſedative, ſo far as it abates inflammation, while, at the ſame time, it may act as a gentle aſtringent. Fourteen grains of ſaccharum ſaturni (acetite of lead), diſſolved in eight ounces of diſtilled water, make a good ſedative aſtringent injection.

Mr. Hunter next remarks, that the drinking freely of diluting liquors may, perhaps, be conſidered as having a ſedative effect, as it in part removes ſome of the cauſes of irritation, rendering the urine leſs ſtimulating, either to the bladder, when the irritation is there, or to the urethra in its paſſage through it; and the plan may poſſibly leſſen the ſuſceptibility of irritation. The vegetable mucilages of certain ſeeds and plants, and the emollient genus, are recommended for impregnating the patient's drink. Such ſubſtances paſs off with the urine, and render the evacuation of that fluid leſs painful. It is proper to notice, however, that Mr. Hunter does not appear to have a high opinion of the utility of this practice.

When the inflammation is very great, Mr. Hunter believed, that emollient injections are the moſt proper applications. It ſeems probable, that they act firſt by ſimply waſhing away the matter, and then leaving a ſoft application to the part, in which way, ſays this eminent writer, they can be of ſingular ſervice by leſſening the irritating effects of the urine. A ſolution of gum arabic, milk and water, or ſweet oil, will frequently leſſen the pain and other ſymptoms, when the more active injections have done nothing, or ſeemed to do harm.

When great irritation and ſoreneſs prevail at the mouth of the urethra, the point of the ſyringe cannot be introduced, and no attempt to uſe an injection ought to be made before the inflammation abates. Emollients may be uſed externally in the form of fomentation.

The aſtringent injections, obſerves Mr. Hunter, can only act by leſſening the diſcharge. They can have no ſpecific effect upon the inflammation. They ſhould only be uſed towards the latter end of the diſeaſe, when it has become mild and the parts begin to itch. However, if the diſeaſe ſhould begin mildly, they may be uſed at the very beginning; for, by gradually leſſening the diſcharge, without increaſing the inflammation, we complete the cure, and prevent a continuation of the diſcharge called gleet. If the aſtringent injections be ſtrong, they will be irritating, and frequently increaſe the diſcharge, inſtead of diminiſhing it. When weaker, they often ſtop the running, without haſtening, however, the cure in all caſes; for the inflammation may ſtill continue even longer than it would have done, had the tendency to ſecretion not been removed. But ſometimes an aſtringent injection will cure a ſlight irritation in a very few days. Mr. Hunter never found one aſtringent more efficacious than another. The aſtringent genus, as dragon's blood, the balſams, and the turpentines, diſſolved in water; the juices of many vegetables, as oak bark, Peruvian bark, tormentil root, and, perhaps, all the metallic ſalts, as green, blue, and white vitriols; the ſalts of mercury, and alſo alum; probably all act much in the ſame way. Mr. Hunter, however, owns that they do not act equally well in every gonorrhœa,

norrhœa, and that changing the injection will often ſucceed, when a long perſeverance in a previous one would not.

We have to obſerve, that the aſtringent injection, which is moſt generally approved of by practitioners, is that containing white vitriol (zincum vitriolatum), about half a ſcruple of which, diſſolved in eight ounces of water, is a very good application to begin with. The ſtrength may be increaſed or diminiſhed, however, as the patient's feelings may require.

Poultices and fomentations have been uſed as external applications in caſes of gonorrhœa; but, ſays Mr. Hunter, they can be of little ſervice, except when the prepuce, glans, and orifice of the urethra are inflamed. It is now more common, in the inflammatory ſtage of the complaint, to ſurround the penis with linen kept continually wet with the ſaturnine lotion.

When any of the glands of the urethra remain in an indurated ſtate, after the ſubſidence of the inflammation, the hardneſs may be removed by frictions with camphorated mercurial ointment.

It is remarked by Mr. Hunter, that in women, the mode of curing the gonorrhœa is nearly the ſame as in men; but the diſeaſe itſelf is milder, and the ſecondary ſymptoms leſs numerous in females. Hence the cure is more ſimple.

When the diſeaſe is confined to the vagina, it may be eaſily cured by means of injections, taking care alſo to waſh the external parts with the application. The patient cannot, however, apply an injection to the meatus urinarius, when that paſſage is affected.

The ſame kinds of injections are proper for women as are preſcribed for men; but they may be made doubly ſtrong, as the parts in women are not nearly ſo irritable as the common ſeat of this diſeaſe in the other ſex.

When the inflammation runs along the ducts of the glands, either of the mouth of the vagina, or of the urethra, or where it affects the glands themſelves, the caſe claims the ſame treatment as in men. The mercurial ointment ſhould be freely applied to the indurated parts. When the ducts and glands ſuppurate and form abſceſſes, theſe ſhould be opened and dreſſed like a ſore. The ulcer, however, is not regarded as venereal. Though Mr. Hunter entertained ſuch a ſentiment, and directed a correſponding treatment.

In plethoric conſtitutions, the ſymptoms are frequently violent, attended with a ſtrong propenſity to the inflammatory fever. The inflammation, however, does not extend beyond the ſpecific diſtance. Many medicines, which might be of ſervice in another conſtitution, here do harm, and increaſe the ſymptoms which they were intended to relieve. Mr. Hunter has ſeen opiate glyſters, after at firſt doing good, bring on fever and an exaſperation of all the ſymptoms. He has ſeen the balſam capivi render the inflammation worſe. The treatment of ſuch a conſtitution, when affected with this diſeaſe, ſhould chiefly conſiſt in bleeding and gentle purging. It is proper alſo for the patient to live ſparingly, and uſe little exerciſe.

In the weak and irritable conſtitution, as Mr. Hunter obſerves, the ſymptoms are frequently very violent; and often extend beyond the ſpecific diſtance, the inflammation running along the urethra, and even affecting the bladder. In this inſtance the foregoing author was of opinion, that a ſtrengthening plan ſhould be adopted.

Sometimes a gonorrhœa is ſo capricious in its cure, that the acceſſion of an accidental fever ſtops the diſcharge, removes the pain in making water, and the diſorder is permanently cured. Sometimes the ſymptoms ceaſe on the commencement of the fever, and return when the latter complaint is well. In other examples a gonorrhœa may begin mildly; but a ſevere fever coming on and continuing for ſeveral days, the ſymptoms of the firſt diſorder are rendered much worſe, and, on the fever going off, the gonorrhœa likewiſe diſappears. Mr. Hunter remarks, that although a fever does not always cure a gonorrhœa, yet, as it poſſibly may, nothing ſhould be done while the fever laſts; and if the local complaint ſhould continue after the fever is gone, it is then to be treated according to the ſymptoms.

The ſame writer repreſents, that, unfortunately, there are caſes in which no known method leſſens the ſymptoms; evacuations, a ſtrengthening plan, ſedatives and emollients, all prove uſeleſs, and time alone ſeems to bring about the cure. In theſe inſtances, Mr. Hunter thought the ſoothing plan of treatment the moſt adviſable, and was againſt the employment of aſtringents. Neither had he much opinion of the capivi and Canada balſams, nor of turpentines in general, though they might diminiſh the diſcharge.

A gonorrhœa is alſo conſiderably affected by the patient's way of life, during the inflammatory ſtate. Moſt things which hurry or increaſe the circulation, aggravate the ſymptoms, ſuch as violent exerciſe, drinking ſtrong liquors, eating ſtrong indigeſtible food, taking peppers, ſpices, ſpirits, &c.

When the complaint begins mildly, or after the violent ſymptoms have ſubſided, we may preſcribe medicines which will aſſiſt the above local remedies, in checking the diſcharge. Mr. Hunter thought the turpentines the moſt efficacious. Cantharides, cuprum vitriolatum, acetite of lead, and alum, have alſo been recommended.

The reader is already aware, that Mr. Hunter regarded gonorrhœa as a diſeaſe ariſing from the venereal poiſon, and believed that the matter from the urethra, if introduced into the circulation, would occaſion a lues venerea. In order to guard againſt the effects of abſorption, he was an advocate for exhibiting ſmall doſes of mercury at an early period of the malady, and for continuing them even for ſome time after the formation of matter is at an end. He adviſed a grain of the hydrargyrus calcinatus to be taken every night, or every evening and morning; but frictions, with the mercurial ointment, when mercury diſagreed with the ſtomach and bowels. Many practitioners at this day are ſtrongly attached to the ſyſtem of preſcribing a grain or two of calomel every day during the treatment of a gonorrhœa, and deem it unſafe to abſtain altogether from the uſe of mercury, in ſome form or another. Others give calomel with a view of its acting as an alterative and purgative. We never have ſeen any reaſon, however, for exhibiting either the hydrargyrus calcinatus, or calomel, or for employing mercury in any mode whatſoever.

Before cloſing the preſent article, it only remains for us to ſay a few words reſpecting ſome complaints, which are occaſionally attendant on gonorrhœa.

When the inflammation is violent, or ſpreads along the urethra, there is frequently a diſcharge of blood from the veſſels of that part. Mr. Hunter ſtates, that in ſuch caſes the balſam capivi has been found ſerviceable; but that he did not obſerve any good reſult from the uſe of aſtringent injections.

Opium alone, or joined with camphor, is the beſt medicine for the prevention of painful erections. Cicuta is alſo ſaid to prove uſeful for the ſame purpoſe.

With regard to the treatment of chordee, Mr. Hunter remarks, that in the beginning of this complaint bleeding from the arm is often of ſervice, but that it is more immediately uſeful to take away blood from the part itſelf by leeches. Great benefit often follows the accidental burſting of a veſſel, and a profuſe hemorrhage. Relief is often obtained

tained from expoſing the penis to the ſteam of warm water. Poultices and fomentations, eſpecially ſuch as contain camphor, are frequently productive of benefit by removing the inflammation. Opium given internally is of ſingular ſervice, and is ſtill more beneficial when joined with camphor. It leſſens the pain and prevents erections, which are the immediate cauſe of the complaint.

When the chordee continues after all the other ſymptoms are gone, the only remaining object is to promote the abſorption of the extravaſated coagulable lymph, by friction with mercurial ointment on the parts. Mr. Hunter informs us, that in one caſe conſiderable benefit ſeemed to reſult from giving cicuta, after the common methods had failed. Electricity, he ſays, may alſo be of ſervice. A chordee is often longer in diſappearing than either the running or pain; but, like moſt of the conſequences of inflammation, its declenſion is gradual and uniform.

Mr. Hunter has ſeen the kind of chordee, which ſeems to depend on ſpaſm, relieved by bark.

When the glands of the urethra ſuppurate, Mr. Hunter adviſes the uſe of mercury, juſt as if the caſe were a chancre; but this practice is not deemed neceſſary by the moſt judicious ſurgeons of the preſent day. It is proper to make an early opening into the abſceſs, when Cowper's glands ſuppurate, in order to prevent the matter from making its way into the urethra or ſcrotum.

When the bladder is affected with irritation, in conſequence of gonorrhœa, opiate clyſters, the warm bath, and copious bleeding, are the chief means of relief. Leeches applied to the perinæum have alſo good effects. Bleeding, however, in certain conſtitutions, is hurtful, and ſhould always be reſorted to with caution. When the complaint laſts very long, reſiſting ordinary methods, Mr. Hunter ſuggeſts the trial of an opiate plaſter on the pubes, or ſmall of the back; or a ſmall bliſter on the perinæum.

The mode of treating a ſwelling of the teſticle, we ſhall conſider under the head, HERNIA *Humoralis*.

The decline of a gonorrhœa is generally known by the pain becoming leſs, or changing into an itching, ſimilar to what is often felt in the beginning of the complaint, and which at length goes away altogether. The ſenſe of wearineſs about the loins, hips, teſticles, and ſcrotum is no longer felt; and the cherry-like appearance of the glans penis gradually ſubſides. The running diminiſhes, or at all events becomes whiter, then paler, and by degrees aſſumes a more ſlimy conſiſtence, in proportion as it becomes more like the natural ſecretion, which is deſigned to lubricate the urethra.

Recurrences of the diſeaſe every now and then are met with, after the pain, diſcharge, &c. have quite ceaſed. Such relapſes, however, are more common in women than men, and the complaint is uſually in a milder form than before.

GONRA, in *Geography*, a town of Hindooſtan, in Bundelcund; 20 miles N. of Callinger.

GONS, a town of Hungary; 22 miles S.S.W. of Zatmar.

GONSALVO, HERNANDEZ DE CORDOVA, in *Biography*, an eminent Spaniſh commander, was born in 1443, and brought up from a very early age to the profeſſion of arms. He ſignalized himſelf in a war againſt Portugal, and under the reign of the celebrated Ferdinand and Iſabella he ſerved in the conqueſt of Grenada. He was afterwards employed to ſuccour Ferdinand king of Naples againſt Charles VIII. of France, and by his aſſiſtance the whole of that kingdom was recovered from the French. Kings, however, are not always conſiſtent in their projects, and the monarch of Spain who had defended and ſaved one king of Naples, formed a project of ſupplanting his ſucceſſor, and making a partition of the country with Lewis XII. of France, and Gonſalvo was employed to execute the attempt. The warrior was completely ſucceſsful, and made Alphonſo, ſon of the king of Naples, his captive. Elated with his ſucceſs, and willing to ſhew his moderation, Gonſalvo ſwore upon the holy ſacrament, a wretched abuſe of a religions rite, that the young prince ſhould enjoy his liberty; but after the ſurrender was complete, and the time was come when he could execute his promiſe, he pretended that he had received new orders from his own ſovereign, which obliged him to ſend Alphonſo a priſoner into Spain. The partitioning powers ſoon diſagreed among themſelves, and the French, being in a greater ſtate of preparation, attacked, defeated, and expelled the Spaniards from moſt of the places which they poſſeſſed. Gonſalvo was now compelled to retire with his army, deſtitute of money, proviſions, and ammunition. He retired, however, only to recruit himſelf, which he had an opportunity of doing among the Venetians, when he rallied, drove the French before him, and entered Naples in triumph. Ferdinand, in the mean time, doubtful of the event, had negociated a treaty with Lewis, confirming their former partition; but upon the intelligence of the great ſucceſs of Gonſalvo, ſuch was "Spaniſh honour," that he refuſed to ſign it, and the French were, by the efforts of Gonſalvo, obliged entirely to evacuate the kingdom of Naples. For theſe and other eminent ſervices, he not only obtained the title of the "Great Captain," but was rewarded by his ſovereign with many valuable as well as honourable poſts of honour. He was made conſtable of the kingdom of Naples, raiſed to the dukedoms of Terranova, St. Angelo, and other eſtates. He at length fell under the ſuſpicion of his ſovereign, who ſent letters to recal him, which the general repeatedly eluded upon different pretexts. The king determined to go to Naples, and was met at Genoa by Gonſalvo. They entered Naples together in apparent harmony, and the king conferred an additional dukedom on his "Great Captain," but Ferdinand thought it prudent, in the following year, when he left Naples, to take his general with him. At Savona they had an interview with Lewis XII. who ſhewed his eſteem for Gonſalvo, by decorating him with a gold chain taken from his own neck, and cauſing him to ſup at the ſame table with himſelf. At Venice alſo he received ſome magnificent preſents. On his arrival in Spain, he was commanded to retire to his own eſtate at Grenada, where he died in 1515, at the age of ſeventy-two. Gonſalvo is diſtinguiſhed as a firm diſciplinarian, a great maſter of the art of war, but as one who was never diſtinguiſhed for generoſity of ſentiment. Univer. Hiſt. Moreri.

GONSALVO, *St.*, in *Geography*, a town of Brazil, in the government of St. Salvador; 40 miles W. of Sergipe.

GONTAPILLY, a town of Hindooſtan, in the circar of Cicacole; 25 miles S. of Coſſimcotta

GONUS, in *Botany*, from γονος, *offspring*, becauſe of its plentiful produce. Lour. Cochinch. 658.—Claſs and order, *Polygamia Diœcia*, Loureiro: rather *Tetrandria Tetragynia*. Nat. Ord. *Terebintaceæ*, Juſſ.?

By Loureiro's deſcription of his only ſpecies, *G. amariſſimus*, a ſhrub with pinnated ſerrated hairy leaves, and by his reference to Rumph. Amboin. Append. t. 15, it ſhould ſeem to be allied to *Fagara*, though the deſcription of the piſtil and fruit does not exactly anſwer. It agrees perhaps beſt with *Brucea*, Juſſ. 373, both in botanical characters and medical properties; ſee that article. Loureiro ſays his plant is found in the woods of China and Cochinchina, and that the virtues of the root and fruit are diaphoretic, alexiteric, antifebrile, and anthelmintic. He adds, that "it ſeems to be the ſame drug which the Portugueſe call *radix de Solor*, becauſe it grows in the iſland of Solora, as well as in Timor, and which is in great uſe in India." Is the *Brucea*, after all, an Indian plant?

GONWA, in *Geography*, a town of Hindooſtan, in Guzerat; 20 miles N.W. of Amood.

GONYALGIA, of γονυ, *knee*, αλγος, *pain*, a term uſed by ſome authors to expreſs a violent pain in the knee.

GONZAGA, Lucretia, in *Biography*, daughter of Pirro Gonzaga, lord of Gazzuolo, was diſtinguiſhed as a literary lady in the ſixteenth century. The celebrated Bandello was one of her maſters; by him ſhe was introduced to the knowledge of the Greek tragedians. She married, at the age of fourteen, Gianpaola Manfroni of Ferrara, which proved an unfortunate union, ſince her huſband, on account of a plot againſt the life of duke Hercules II. was capitally condemned in 1546. The duke did not cauſe the ſentence to be executed, but was contented with keeping him in perpetual impriſonment, under which he died in 1552. His faithful ſpouſe, Lucretia, employed all her powers to obtain his liberation: ſhe is ſaid to have addreſſed letters to almoſt all the powers in Europe, imploring their interceſſion, and one to the grand ſeignior, inſtigating him to make an attack upon the fortreſs where her huſband was confined. It muſt be obſerved, that theſe letters have been imputed to Ortenſia Landi; it cannot, however, be doubted, that this lady had acquired a conſiderable literary reputation by being ſuppoſed capable of ſuch productions. She was, indeed, panegyriſed by moſt of the learned in Italy in her time, among the reſt by Julius Cæſar Scaliger, and a volume of poems in her praiſe was publiſhed in Bologna in 1565. Several of her works were printed, one of which was a ſmall volume of poems. She remained ſingle after the death of her huſband, and placed her two daughters in a convent. She died at Mantua in 1576. Moreri.

Gonzaga, Scipio, born in 1542, was ſon of Charles, count of St. Martino, of the branch of the Gonzagas, dukes of Sabbionetta. He was carefully inſtructed in letters, and ſent to Padua to complete his ſtudies, where he greatly diſtinguiſhed himſelf in claſſical literature. He afterwards acquired conſiderable reputation for his knowledge in theology and philoſophy. Muretus, in 1571, dedicated to him the firſt volume of his Orations, with a high panegyric: and Guarini ſubmitted to his criticiſm his "Paſtor Fido." He was created cardinal in 1587, and died at Samartino in the year 1593, leaving behind him commentaries of his own life, written in elegant Latin. Moreri.

Gonzaga, Vespasian, duke of Sabbionetta, born in 1531, is celebrated as a commander in the ſervice of Charles V. and Philip II., but he is ſtill more diſtinguiſhed as a ſplendid promoter of the arts and ſciences. He built from the ground the city of Sabbionetta, which, for the neatneſs and regularity of the ſtreets, the architecture of the private houſes, the beauty of the churches, and the elegance of the public buildings, has excited univerſal admiration. He alſo founded in it a public ſchool for the learned languages, to which he invited as a profeſſor Mario Nizzoli, one of the moſt learned men of the age. His palace was always full of men of knowledge and ſcience, of whom he was the liberal patron. Gonzaga employed Scammozi in the erection of a very fine theatre, for the performance of dramatic pieces, and he is himſelf recorded as an elegant Italian poet. He is mentioned with high reſpect and applauſe by Taſſo, and other literary characters, and he is noticed as a collector of books.

Gonzaga, in *Geography*, a town of Italy, in the department of the Mincio; 16 miles S. of Mantua.

GONZAGO, St., a town of Peru, in the audience of Quito; 60 miles N.W. of St. Joſef de Huales.

GONZALES, Bartolome, in *Biography*, a painter, born at Valladolid in the year 1564. He frequented the ſchool of Patricio Caxes at Madrid; in the ſequel painted much for Philip III. at Burgos, Valladolid, Lerma, in the Pardo and Eſcurial, till 1617, when he was made painter to the court, in the place of Fabricio Caſtello. His portraits are admirable, eſpecially the ſix whole lengths with the date 1621, poſſeſſed by the baron of Caſa Davalillo. In hiſtory, his ſtyle was ornamental; his drapery, a varied imitation of ſtuffs, by its illuſion captivated the vulgar, whilſt it deſtroyed the dignity, ſimplicity, and generally the coſtume of the ſubject. He died in 1627, not, as Palomino ſtates, in 1611. Fuſeli's Pilkington.

GOOBER, in *Geography*, a country of Africa, S. of Wangara, between 10° and 12° N. lat. and 15° and 20° E. long. The mountains of Komri, ſo called by Abulfeda, commence in this territory.

GOOCHLAND, a county of Virginia, in America, ſurrounded by Louiſa, Flavanna, Henrico, Hanover, and Powhatan counties; about 40 miles long and 14 broad, and containing 4893 free inhabitants, and 4803 ſlaves.

GOOD, or Goodneſs, denotes whatever tends or conduces to preſerve or improve human nature or ſociety; in oppoſition to *evil*, which tends to deſtroy, injure, or impair the ſame.

Hence good is divided by the philoſophers into 1. *Bonum ſui*, private good; which is that whereby a thing tends to preſerve, &c. itſelf, under which comes that popular diviſion of goods of body, mind, and fortune.

2. *Bonum communionis*, whatever promotes the intereſt and welfare of ſociety; as all the civil offices, &c.

Good, in *Metaphyſics*, or *Metaphyſical Good*, called alſo *abſolute* or *real* good, and *good per ſe*, is the eſſential perfection or integrity of a thing whereby it has every thing that belongs to its nature.

In this ſenſe, all things are good, inaſmuch as they have the perfections naturally belonging to things of their kind. Thus, a thinking ſubſtance is good, or perfect, as it has all the eſſential attributes of thought; ſo an extended ſubſtance is good, as it poſſeſſes all the parts neceſſary to conſtitute it ſuch.

In effect, as it is abſurd to imagine a being without its eſſence, ſo is it to imagine a being without the requiſites of its eſſence: ſo that it appears an error in ſome philoſophers, who divided beings into good or perfect, and evil or imperfect. See Essence.

Others define metaphyſical, or tranſcendental goodneſs, by congruency with the divine will, which, they ſay, conſtitutes the meaſure of all real goodneſs.

Good, *Phyſical* or *Natural*, is that whereby a thing poſſeſſes all things neceſſary to its *bene eſſe*, *i. e.* its well being, or ſecond perfection, and to the performance of its functions and uſes.

In this ſenſe, phyſical goodneſs coincides with phyſical perfection.

To this are required the ſeveral powers and faculties, in their proper degree; a due ſituation, figure, and proportion of parts, &c.

Note, beſide abſolute phyſical goodneſs, there may be a *relative* one; as in foods, which to one, are ſalutary, to another poiſon, &c. To this head alſo belong the things good *pro tempore*, or according to circumſtances; as the amputation of a mortified limb, &c.

Natural good may be otherwiſe defined to be that which makes or denominates a being happy, or prepares him for happineſs; or, at leaſt, prevents or removes his miſery: accordingly, good is either objective or formal; *objective* good is that which makes us happy; *formal* good, or the pleaſure reſulting from the application of the faculty to the object, is that which denominates us happy.

Good, *Moral* or *Ethical*, is the agreement of a thinking, reaſonable being, and of the habits, acts, and inclinations of ſuch a being with the dictates of right reaſon, and the will of the Creator, as diſcovered by natural light. See Virtue.

In order to this, it is not enough that a thing done, ſaid, thought, deſired, be juſt and good; but it muſt be done, thought, &c. well, *i. e.* from good principles, and to good ends.

Others define moral good more largely. *Moral*, which they alſo call *relative* good, according to them, is ſomething that is good to another, or that tends ſome way to the perfection thereof. In this ſenſe they divide it into three kinds, *honeſtum*, *jucundum*, and *utile*.

The firſt, *bonum honeſtum*, is what agrees with right reaſon, and is deſirable for itſelf; as all things virtuous; *e. gr.* to love God, reſpect our parents, &c. It is conſidered without any regard to pleaſure; not but there is ſincere pleaſure annexed to it. Zeno and the Stoics allow of no other goods; thoſe of the body, &c. they call *commoda*, *conveniences*, not goods.

Bonum jucundum is that which is good, as it tends to give us pleaſure, and is deſired on that account; but without any repugnancy to virtue or right reaſon; as muſic to the ears, painting to the eyes, &c.

Bonum utile, or *commodum*, is that which is good on account of ſomething elſe for which it is deſired; as money, riches, &c.

Good, *chief*, *ſovereign*, or *ſupreme*, *ſummum bonum*, is that, the enjoyment of which renders men truly and completely happy. The ſchools diſtinguiſh this chief good of man into that which is ſimply and adequately ſo, and beyond which there can be no other; and an inferior, ſubordinate kind, which is, in ſome meaſure, attainable in this imperfect ſtate. This laſt they call *felicitas viatorum*, and the former *felicitas comprehenſorum*. The chief or ſovereign good, according to the idea collected of it from the original, natural, and univerſal preconceptions of all mankind, is ſomething agreeable to our nature, conducive to well-being, accommodate to all places and times, durable, ſelf-derived, and indeprivable; and this conſiſts, ſays Mr. Harris, in rectitude of conduct, or in living perpetually ſelecting, as far as poſſible, what is congruous to nature, and rejecting what is contrary, making our end that ſelecting and rejecting only. Three Treatiſes, &c. 1765, p. 121, &c. 205, &c.

Philoſophers are divided as to what the chief good of man conſiſts in; whether in the goods of fortune, of body, or of mind. Some hold riches and honours the ſupreme good; others, as Ariſtippus and the Cyrenaic ſchool, bodily pleaſures; and others, as Zeno and the Stoics, virtue, or living according to nature. The Peripatetics agreed with the Stoics in maintaining that virtue is the *ſummum bonum*: but the Stoics aſſerted farther, that virtue was the only good: whilſt the Peripatetics denied, with reaſon, that virtue was ſelf-ſufficient, and therefore required ſeveral other things as auxiliaries, ſuch as health, proſperity, friends, &c. which are to the virtuous man in the nature of inſtruments or ornaments to his felicity. An excellent writer lays down the following *criteria* or characteriſtics of the *ſummum bonum*, or chief good, which reaſon can demonſtrate to be actually deſigned for man: it is ſomething which all men, if not wanting to themſelves, may be poſſeſſed of; it is one and the ſame to all mankind; and while in itſelf fitted to make the poſſeſſor happy, is not prevented in its operation by ſome other thing which keeps him from reliſhing it: and as to the higheſt good which it is poſſible for man to enjoy, it muſt be referred to no other, but all others muſt be embraced for the ſake of this; and it muſt be ſufficient to furniſh a happineſs adequate to the capacities of human nature, and of equal duration; *i. e.* it muſt be not only perfect whilſt it laſts, but everlaſting. According to theſe characters we may infer, that neither the goods of fortune, nor thoſe of the body, nor even virtue itſelf, conſtitute the chief good. Virtue, rightly underſtood, is the perfection of human nature; it is the inſtrument of obtaining happineſs: but this alone will not make a man happy; it is farther neceſſary that he be perfect as to life, or happy in the circumſtances of his being: and, therefore, natural reaſon demonſtrates, that the favour of God, ſecured by virtue, is properly man's ſupreme good. Grove's Syſtem of Moral Philoſophy, vol. i. part. 1. paſſim. See Epicureans, Peripatetics, and Stoics.

Good-*will*. See Benevolence.

Good *Works*. See Merit and Supererogation.

Good *Abearing*, *bonus geſtus*, in a *Law Senſe*, is particularly uſed for an exact carriage or behaviour of a ſubject towards the king and his liege people; to which ſome men, upon their miſbehaviour, are bound.

The juſtices are empowered by 34 Edw. III. cap. 1. to bind in this manner all them that be not of good fame; under which general expreſſion, it is holden that a man may be bound to his good behaviour for cauſes of ſcandal, *contra bonos mores*, as well as *contra pacem*; as, for haunting bawdy-houſes; for keeping bad women in his own houſe; or for words tending to ſcandalize the government; or in abuſe of the officers of juſtice, eſpecially in the execution of their office: a juſtice may alſo bind over all night-walkers, eaves-droppers, ſuch as keep ſuſpicious company, or are reported to be pilferers or robbers, common drunkards, whore-maſters, the putative fathers of baſtards, cheats, idle vagabonds, and any other perſons, whoſe miſbehaviour may reaſonably bring them within the general words of the ſtatute. Perſons of this deſcription may be bound, with one or more ſureties, in a recognizance or obligation to the king, entered on record, and taken in ſome court, or by ſome judicial officer, whereby the parties acknowledge themſelves to be indebted to the crown in the ſum required, *e. gr.* 100*l.* with condition to be void and of none effect, provided that they behave themſelves well, either generally or ſpecially, for the time therein limited; as for one or more years, or for life. This recognizance, if taken by a juſtice of the peace, muſt be certified to the next ſeſſions, by 3 Hen. VII. cap. 1. and if the condition of it be broken, the recognizance becomes forfeited or abſolute; and being eſtreated or extracted, (*i. e.* taken out from among the other records) and ſent up to the exchequer, the party and his ſureties are become the king's debtors, and are ſued for the ſeveral ſums in which they are bound. All perſons under the king's protection may obtain ſuch ſecurity, upon due cauſe ſhewn; and the juſtice may be compelled to grant it by a mandatory writ, called *ſupplicavit*: but this writ is ſeldom uſed, for, when application is made to the ſuperior courts, they uſually take the recognizances there, under the direction of the ſtatute 21 Jac. I. cap. 8. A recognizance may be diſcharged, either by the demiſe of the king, or by the death of the principal party bound thereby, or by order of the court to which it is certified by the juſtices. He that is bound to this, Lambard ſays, is more ſtrictly bound than to the peace; becauſe, whereas the peace is not broken without an affray, battery, or ſuch like, this ſurety *de bono geſtu* may be forfeited by the number of a man's company, or by his or their weapons or arms, by ſpeaking words tending to ſedition, or by committing any of thoſe acts of miſbehaviour which the recognizance was intended to prevent.

Good *Aller*. See Aller.

Good *Behaviour*. See Good *abearing* and Peace.

Good *Conſideration*. See Consideration.

Good *Fortune*, or Para, in *Geography*, an iſland in the Eaſt Indian ſea, near the W. coaſt of Sumatra, about 36 miles long and ſix broad. S. lat. 1° 5′. E. long. 98° 30′.

Good *Taſte*. See Taste.

GOODALORE, in *Geography*, a town of Hindooſtan, in the circar of Dindigul; 10 miles S. of Ootampaliam.

GOODENIA, in *Botany*, ſo named by the writer of the preſent article in honour of the Right Rev. Samuel Goodenough, lord biſhop of Carliſle, F.R.S. and a vice-preſident of the Linnæan Society, author of a moſt valuable paper on Britiſh *Carices*, in the ſecond volume of the Linn. Society's Tranſactions, and of one on Britiſh *Fuci*, in conjunction with Mr. Woodward, in the third. The name was conſtructed after the example of Tournefort, who, as he tells us, not without much conſideration, contrived to form *Gundelia* out of *Gundelſcheimer*. It did not occur to us at the time that *Goodenovia* might have come nearer to the original, and have been equally unexceptionable. It is now too late to make any ſuch alteration. Linnæus named *Richardia* after Dr. *Richardſon*, *Stillingia* after Mr. *Stillingfleet*, and theſe are ſufficient precedents. Sm. Tr. of Linn. Soc. v. 2. 346. Brown. Prodr. Nov. Holl. v. 1. 574. Willd. Sp. Pl. v. 1. 954. Mart. Mill. Dict v. 2. Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Campanaceæ*, Linn. *Campanulaceæ*, Juſſ. *Goodenoviæ*, Brown.

Gen. Ch. *Cal.* Perianth ſuperior, of five, nearly equal, linear leaves, permanent. *Cor.* of one petal, much longer than the calyx, irregular; tube ſlit from top to bottom at the back; limb of five deep, firm, lanceolate ſegments, with thin dilated longitudinal borders, turned moſt to one ſide, forming one lip, or generally two. *Stam.* Filaments five, ſhorter than the tube, often projecting through its fiſſure, capillary, equal; anthers vertical, oblong, of two lobes. *Piſt.* Germen inferior, oblong, crowned with the calyx-leaves, which run down its ſides and form ribs; ſtyle taper at the baſe, ſwelling upwards, undivided, nearly as long as the tube; ſtigma large, firm, obtuſe, enveloped with a cup-ſhaped cover, more or leſs two-lipped, its margin fringed with denſe upright hairs. *Peric.* Capſule oblong or elliptical, of two valves ſeparating at the top, and two (rarely four) cells, the partition flat, parallel to the valves. *Seeds* numerous, imbricated, compreſſed.

Eſſ. Ch. Corolla of one petal, ſlit longitudinally at the back; limb in five deep ſegments turned one way. Anthers ſeparate, beardleſs. Stigma with a cup-ſhaped fringed integument. Capſule inferior, of two or four cells, with a parallel partition. Seeds numerous, imbricated.

Obſ. Mr. Brown has remarked, in ſome ſpecies, a ſmall bag of honey attached to the germen, oppoſite to the fiſſure in the corolla.

Eight ſpecies of this very curious genus were originally defined in the Linnæan Society's Tranſactions, three of which, having been deſcribed without a knowledge of their fruit, are now, on more full examination, removed by Cavanilles and Brown to other genera. Theſe are the *albida*, *ſtricta*, and *ramoſiſſima*; the latter, which, like the *albida*, is a *Scævola*, may be ſeen in Sm. Bot. of N. Holl. t. 5. The *ſtricta* belongs to Mr. Brown's *Dampiera*. But on the other hand the diſcoveries of this indefatigable collector and accurate botaniſt have increaſed *Goodenia* to 32 ſpecies, all natives of New Holland or of Van Diemen's land. Of theſe the firſt 28 have a two-lipped corolla, and the firſt 24 of them have yellow flowers, the reſt blue or purple. Of the remaining four, two have a ſingle-lipped corolla, and the others are doubtful in this reſpect, it being doubtful whether theſe laſt properly belong to the genus. One of them is *Selliera radicans*; Cavan. Ic. t. 474. f. 2. *Goodenia repens*; Billard. Nov. Holl. t. 76.

Satisfactory examples of the genus are,

G. *paniculata*. Sm. n. 2. Cavan. Ic. t. 507. This has yellow *flowers* in terminal panicles. *Leaves* moſtly radical, ſtrongly toothed. *Herbage* hairy.

G. *ovata*. Sm. n. 1. Cav. Ic. t. 506. Andr. Repoſ. t. 68. The firſt ſpecies that flowered in England, and from which the genus was deſcribed. This has rather ſhrubby *ſtems*, ovate neatly ſerrated ſmooth *leaves*, and axillary forked ſtalks, bearing elegant yellow *flowers*. It is a deſirable ornament for a greenhouſe, and not difficult of culture.

G. *grandiflora*. Sims in Curt. Mag. t. 890. Differs from the laſt in being downy, with lyrate *leaves* and larger *flowers*, whoſe tube is ſplit into four ſegments, and ſingularly rough or bearded within.

G. *elongata*. Billard. Nov. Holl. t. 75. Is a very ſlender ſpecies, with long ſimple flower-ſtalks deſtitute of bracteas.

GOODENOVIÆ, a natural order of plants recently eſtabliſhed by Mr. Brown, Prodr. Nov. Holl. v. 1. 573, being ſeparated by him from the *Campanulaceæ* of Juſſieu, and eſſentially diſtinguiſhed by a peculiar cup-ſhaped integument, either undivided or two-lobed, which contains the ſtigma, and has hitherto been deſcribed by botaniſts as the ſtigma itſelf. See Campanulaceæ.

Mr. Brown deſcribes his new order as follows:

Calyx ſuperior or half ſuperior, rarely inferior, five-cleft, ſometimes in five or three deep diviſions, ſometimes ſhort, undivided, and occaſionally obſolete; its ſegments equal, rarely unequal, permanent.

Corolla of one petal, more or leſs irregular, deciduous or withering. Tube ſplit longitudinally, ſometimes ſeparable into five portions, while the calyx is merely attached to the baſe of the germen. Limb in five deep ſegments, compoſing one lip or two, their diſk lanceolate, flat, their ſides, or wings, of a thinner texture, elevated, folded inwards when young, rarely obſolete or deficient.

Stamens five, unconnected with either corolla or ſtyle, and alternate with the diviſions of the former. Filaments diſtinct. Anthers either ſeparate or cohering, linear, vertical, attached by their baſe, undivided, two-celled, the cells opening lengthwiſe. Pollen ſimple, rarely compound.

Germen of two or four cells, rarely of one only; the rudiments of the ſeeds either indefinite or definite, erect; ſometimes bearing a gland between the two anterior filaments. Style one, ſimple, very rarely divided. Stigma fleſhy, obtuſe, either undivided or two-lobed, encompaſſed from beneath with a ſomewhat membranous, cup-ſhaped, entire or two-lobed integument, the great peculiarity of the order.

Pericarp, when the number of the ſeeds is indefinite, a capſule of two cells, rarely four, or ſometimes, from the ſhortneſs of the partition, of ſcarcely more than one. Partition moſtly parallel, rarely contrary, to the valves, which are either undivided or cloven, bearing the ſeeds on its midrib. When the number of the ſeeds is definite, one being in each cell, the pericarp is a drupa or a nut, rarely an *utriculus* (or membranous undividing capſule), bearing the ſeed from its baſe.

Seeds often with a thickiſh coat, ſometimes with a hard ſhell. Albumen fleſhy, ſhaped like the ſeed, ſeldom wanting.

Embryo ſtraight, about as long as the albumen. Cotyledons of a middling ſize, often leafy. Plumula inconſpicuous.

Theſe plants are either herbaceous or ſhrubby, not milky, chiefly found in the ſouthern hemiſphere, rarely within the northern tropic. Their pubeſcence when preſent is generally ſimple, ſometimes glandular, rarely ſtellated. Leaves ſcattered, without ſtipulas, ſimple, moſtly undivided, ſometimes lobed, often toothed. Infloreſcence terminal or axillary, various. Flowers diſtinct, very rarely aggregate, yellow, blue or purpliſh, ſeldom reddiſh.

The firſt ſection, with indefinite ſeeds, contains ſix genera; *Goodenia*, *Calogyne*, *Euthales*, *Velleia* of Smith, *Lechenaultia* and *Anthotium:* the ſecond, with definite ſeeds, three genera; *Scævola* of Linnæus, much augmented, *Diaſpaſis* and *Dampiera:* the third ſection, with a ſingle-ſeeded *utriculus*, is contrived to admit the *Brunonia*, named after the worthy and intelligent author, by Dr. Smith in the 10th volume of the Linnæan Society's Tranſactions not yet publiſhed. The place of this genus in a natural ſeries is extremely difficult to determine. It agrees with the *Goodenoviæ* chiefly in having an integument to the ſtigma, but in habit, aggregate flowers, four diſtinct bracteas, and ſome other marks, agrees with the *Dipſaceæ* of Juſſieu, to which it is referred, not without doubt, in the Linnæan Tranſactions. It conſiſts of two ſpecies, *Brunonia ſericea*, and *auſtralis*, herbaceous plants, with the aſpect of ſimple-leaved *Scabioſæ*.

GOODEROE, in *Geography*, a town of Abyſſinia; 94 miles S.S.E. of Miné.

GOOD HOPE, or HOPE ISLAND, an iſland in the S. Pacific ocean, diſcovered by Le Maire and Schooten in 1616. The land is mountainous, not very high, and abounds with cocoa-nut trees; the coaſt affords no anchorage. S. lat. 16°. E. long. 174° 15'.—Alſo, the name of a Daniſh colony in Weſt Greenland. N. lat. 64°.

GOOD HOPE, *Cape of*. See CAPE.

GOODIA, in *Botany*, in memory of Mr. Peter Good, an induſtrious gardener, employed in collecting ſeeds in New South Wales for the Kew garden. He died, ſome years ſince, in that remote country, and Mr. Brown has always been ſo ſenſible of his merits, that he has long deſtined a genus to his honour.—Saliſ. Parad. Lond. t. 41. Sims. in Curt. Mag. t. 958.—Claſs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminoſæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, ſomewhat bell-ſhaped; its upper lip with two, lower with three, longer and ſharper, teeth. *Cor.* papilionaceous. Standard broad, inverſely heart-ſhaped, erect. Wings horizontal, obovate, rather ſhorter. Keel nearly equal to the wings, abrupt, of two petals united in their lower part. *Stam.* Filaments ten, diadelphous, nine in one ſet, one diſtinct; anthers roundiſh. *Piſt.* Germen ſtalked, ovate, compreſſed; ſtyle awl-ſhaped, aſcending; ſtigma ſimple, obtuſe. *Peric.* Legume ſtalked, ovate, compreſſed, of one cell, gibbous and flat at the back. *Seeds* two, roundiſh, compreſſed.

Eſſ. Ch. Calyx two-lipped; the upper cloven, broadeſt and ſhorteſt. Legume ſtalked, compreſſed, flat at the upper edge, of one cell. Seeds two.

Obſ. This genus, as Dr. Sims obſerves, ought to be placed next to *Boſſiæa*, Tr. of Linn. Soc. v. 9. 302, from which it differs eſſentially in its legume, which has no dilated thickened edges, nor is it internally ſpongy nor many-celled. The ſtamens are truly diadelphous, in which it differs from *Crotalaria*, as alſo in not having an inflated legume, though its habit comes neareſt to that genus.

Two ſpecies are known.

1. G. *lotifolia*. Curt. Mag. t. 958.—Leaflets ſmooth, as well as the branches and flower-ſtalks.—Native of Van Diemen's land. One of the firſt New Holland plants raiſed in this country, and very hardy in the green-houſe, poſſibly able to bear our climate. Mr. Aiton favoured us with ſpecimens from Kew in 1796. It is a delicate ſmooth *ſhrub*, with ternate ſomewhat glaucous *leaves*, and terminal cluſters of numerous yellow *flowers*, the baſe of whoſe ſtandard, and part of the wings, are ſtained with crimſon, as in many New Holland flowers of this family. The *legume* is ſomewhat ovate, with a taper baſe, ſmooth, but marked with numerous, tranſverſe, parallel, reticulated veins. One *ſeed* only is uſually perfected.

2. G. *pubeſcens*. Curt. Mag. t. 1310.—Leaflets downy, as well as the branches and flower-ſtalks.—Very like the former, and brought from the ſame country. It flowered at Mr. Loddige's at Hackney. We think with Dr. Sims it has ſufficiently the aſpect of a diſtinct ſpecies, though its downineſs, often a variable circumſtance, affords the only ſpecific character. The *leaflets* in the plate do not anſwer to his definition of obcordate, and we believe they vary in ſhape, as in many leguminous plants.

GOODIANELLI, in *Geography*, a town of Hindooſtan, in Myſore; 19 miles N. of Seringapatam.

GOODIMANELLE, a town of Hindooſtan, in Myſore; 20 miles W. of Bangalore.

GOODINGARY, a town of Hindooſtan, in Tinevelly, near the coaſt; 50 miles S. of Palamcotta.

GOODLUCK BAY, a ſmall bay in the ſtrait of Magellan, entirely ſurrounded by rocks. This bay ſupplies a little wood, and plenty of good water, but it is very difficult of acceſs. S. lat. 53° 23'. W. long. 74° 33'. Variation two points eaſterly.

GOODNESS, in *Theology*, expreſſes one of the attributes of the Deity, ſometimes denominated *Benevolence*. (See ATTRIBUTES and BENEVOLENCE.) Dr. Paley, in his "Natural Theology," illuſtrates and proves the divine goodneſs by two propoſitions, which may be evinced by obſervations drawn from the appearances of nature. The *firſt* of theſe propoſitions is, that in a vaſt plurality of inſtances in which contrivance is perceived, the deſign of the contrivance is *beneficial*. No productions of nature diſplay contrivance ſo manifeſtly as the parts of animals, and all theſe parts have a real, and, with very few exceptions, a known and intelligible, ſubſerviency to the uſe of the animal. Nor is the benevolent deſign of the creator abortive. The world, made with this deſign, is a happy world. The air, the earth, the water, teem with delighted exiſtence. This argument is ſtated by the author in his "Moral Philoſophy" in the following manner; "Contrivance proves deſign; and the predominant tendency of the contrivance indicates the diſpoſition of the deſigner. The world abounds with contrivances, and all the contrivances which we are acquainted with are directed to beneficial purpoſes. Evil no doubt exiſts; but is never, that we can perceive, the object of contrivance. Teeth are contrived to eat, not to ache; their aching now and then is incidental to the contrivance, perhaps inſeparable from it; or even, if you will, let it be called a defect in the contrivance; but it is not the object of it. This is a diſtinction which well deſerves to be attended to. In deſcribing implements of huſbandry, you would hardly ſay of the ſickle, that it is made to cut the reaper's hand, though, from the conſtruction of the inſtrument, and the manner of uſing it, this miſchief often follows. But if you had occaſion to deſcribe the inſtruments of torture or execution, this engine, you would ſay, is to extend the ſinews; this to diſlocate the joints; this to break the bones; this to ſcorch the ſoles of the feet. Here pain and miſery are the very objects of the contrivance. Now, nothing of this ſort is to be found in the works of nature. We never diſcover a train of contrivance to bring about an evil purpoſe. No anatomiſt ever diſcovered a ſyſtem of organization, calculated to produce pain and diſeaſe; or in explaining the parts of the human body, ever ſaid, this is to irritate; this to inflame; this duct is to convey the gravel to the kidnies; this gland to ſecrete the humour which forms the gout; if by chance he come at a part of which he knows not the uſe, the moſt he can ſay is, that it is uſeleſs; no one ever ſuſpects that it is put there to incommode, to annoy, or to torment."

Our author's *ſecond* propoſition is, "that the Deity has added *pleaſure* to animal ſenſations, beyond what was neceſſary for any other purpoſe, or when the purpoſe, ſo far as it was neceſſary, might have been effected by the operation of pain." There is a claſs of properties, pertaining to animals, which may be ſaid to be ſuperadded from an intention expreſsly directed to happineſs; an intention to give a happy exiſtence diſtinct from the general intention of providing the means of exiſtence, with which other capacities are connected; and that is, of capacities for pleaſure, in caſes, wherein, ſo far as the conſervation of the individual, or of the ſpecies, is concerned, they were not wanted, or wherein the purpoſe might have been ſecured by the operation of pain. The proviſion which is made of a variety of objects, not neceſſary to life, and adminiſtering only to our pleaſures; and the properties given to the neceſſaries of life themſelves, by which they contribute to pleaſure as well as to preſervation; ſhew a farther deſign than that of giving exiſtence. This obſervation is illuſtrated by our ingenious author in a variety of familiar inſtances, deduced from the ſenſes of taſte, hearing, ſmell, and ſight. The ſenſes appear to be ſpecific gifts, miniſtering not only to preſervation, but to pleaſure. But the ſenſes, as they are uſually called, are far from being the only vehicle of enjoyment, or the whole of our conſtitution, which is calculated for the purpoſe. We have many internal ſenſations of the moſt agreeable kind, hardly referable to any of the five ſenſes. Beſides theſe there are exerciſes of the underſtanding in volition, &c. of the imagination, and of other faculties of the mind, which furniſh unmixed gratifications, without any counterbalancing pains. Whilſt the above-ſtated propoſitions can be maintained, we are authorized to aſcribe to the Deity the character of benevolence; and what is benevolence at all, muſt in him be *infinite* benevolence, by reaſon of the infinite, that is to ſay, the incalculably great, number of objects, upon which it is exerciſed. But beſides the evidences of divine goodneſs that are furniſhed by a ſurvey of the creation of the world, and eſpecially of mankind; the ſame attribute is evinced in the providential government of the univerſe, and in the extraordinary means which the Deity has ſelected and purſued for meliorating the preſent condition of the human race, for recovering mankind from the degeneracy and miſery that have prevailed in conſequence of their own folly and vice, and for conducting them to the perfection of knowledge and virtue, and a happy immortality in a future world.

The character and undertaking of Jeſus Chriſt, and all the benefits that reſult to mankind from his miſſion and mediation, reflect peculiar luſtre on the benevolence of the Deity.

GOODOOR, in *Geography*, a town of Hindooſtan, in Golconda; 35 miles S.E. of Warangole.—Alſo, a town of Hindooſtan, in the circar of Adoni; 15 miles N.N.E. of Condanore.

GOODS, in *Mining*, ſignify, in Derbyſhire, the large and ſizable lumps of lead ore, otherwiſe called bing or potter's ore.

Goods, among public brewers, denote the malt or grains and liquor in their maſh-tun.

Goods, *bona*, in *Law*, and particularly the *Civil Law*, include all kinds of effects, riches, lands, poſſeſſions, &c. There are two kinds of goods; *moveable*, *res moventes*, or *mobiles*; and *immoveable*, called *res non moventes*, or *immobiles*.

It is a maxim in the civil juriſprudence, that he who confiſcates the body, confiſcates the goods; meaning, that all the effects of a perſon condemned to a capital puniſhment, or perpetual baniſhment, are forfeited to the king.

A man is ſaid to bind himſelf body and goods; meaning, that beſides his goods, he obliges his perſon, and ſubmits to remain in priſon, provided he do not execute his promiſe.

Goods, again, are divided into, 1. *Proper*, *paternal*, *patrimonial*, *hereditary*; 2. *Acquired* or *acqueſts*, *alio quam hæreditatis jure acquiſita*, and, 3. *Conqueſts*, *viro & uxori ſtante ſocietate acquiſita*.

Goods, again, are divided into *real* and *perſonal*. (See CHATTELS and ESTATE.) And, laſtly, into *noble* or *free*, and *ſervile* or *baſe*.

Goods belonging to the domain of the crown, *ad fiſcum ſpectantia*, cannot be alienated for ever, unleſs it be done by way of exchange: they may be ſold under the faculty of perpetual redemption.

Goods, *Adventitious*, *adventitia*, are thoſe which ariſe otherwiſe than by ſucceſſion from father or mother, or from direct anceſtor to deſcendant. See ADVENTITIOUS.

Goods, *Dotal*, *dotalia*, thoſe accruing from a dowry, and which the huſband is not allowed to alienate. See DOWRY.

Goods, *Fugitives*. See FUGITIVE.

Goods, *Paraphernal*. See PARAPHERNALIA.

Goods, *Prohibited*. See PROHIBITED.

Goods, *Profectiticus*, *profectitia*, are thoſe ariſing by direct ſucceſſion.

Goods, *Receptitious*, were thoſe which the wife might reſerve the full property of to herſelf, and enjoy them independently of her huſband; ſo called, in diſtinction from *dotal* and *paraphernal goods*.

Goods, *Vacant*, *vacantia*, are thoſe abandoned, or left at large, either becauſe the heir renounces them, or that the defunct has no heir. See BONA.

Goods, *Allotting of*. See ALLOTTING.

Goods, *Conſignment of*. See CONSIGNMENT.

Goods, *Running of*. See RUNNING.

GOODWIN, John, in *Biography*, a learned divine in the ſeventeenth century, who is ſaid to have made more noiſe in the world than any other perſon of his age, rank, and profeſſion. He was born in 1593, and received his academical education at Queen's college, Cambridge; and, immediately after he was admitted to orders, he was much admired for the erudition and elegance which diſtinguiſhed his pulpit compoſitions. In 1633 he was inducted to the living of St. Stephen, Coleman ſtreet, London, from which he was ejected in 1645, becauſe he refuſed to baptiſe the children of his pariſhioners promiſcuouſly, and to adminiſter the ſacrament to his whole pariſh. He embraced the Arminian doctrines, and eagerly pleaded their cauſe in his ſermons and writings; he adopted and maintained the independent form of church government, and he was reckoned to be exceedingly ſkilful and courageous in attacking or repelling thoſe who oppoſed him. His tenets were not thoſe generally embraced, and at one period he is characterized as a man by himſelf; as being againſt every man, and having almoſt every man againſt him. He had a clear head, a fluent tongue, a penetrating ſpirit, and a marvellous faculty in deſcanting on ſcripture. In politics he was a decided and ſtrenuous republican, and, being eager in whatever he engaged, diſtinguiſhed himſelf by his diſcourſes and writings to promote, and afterwards to juſtify, the condemnation of the king. He lived, however, long enough to feel the weight of government directed againſt himſelf and his writings. He was obliged to abſcond for a ſeaſon, and one of his pieces was burnt by the common hangman, and in the ſame fire which executed its commiſſion on the "Defenſio pro populo Anglicano," by John Milton of immortal memory. The friends which his Arminian principles had procured him, found means to pacify the people in power, and to aſſure themſelves that Goodwin ſhould not be proſecuted for the part which he had taken in the late reign. He returned from ſolitude, and became miniſter of a private congregation in the neighbourhood of Coleman ſtreet, and, diſapproving of the act of uniformity afterwards paſſed, continued a diſſenter from the eſtabliſhed church of the Independent denomination, till his death in 1665, in the ſeventy-ſecond year of his age. His works, which are chiefly theological, are very numerous, among which the following may be mentioned; "Redemption Redeemed," in folio. "The divine Authority of the Scriptures," 4to. "An Expoſition of the ninth Chapter of the Epiſtle of St. Paul to the Romans," 4to. Neal's Hiſt. of the Puritans, &c.

Goodwin, Thomas, who is ſtyled by Anthony Wood "One of the Atlaſſes and patriarchs of independency," was born in the year 1600 at Rolesby in Norfolk. Having received the elements of a grammatical learning, he was ſent, when he was thirteen years old, to Chriſt-church college, Cambridge, where he applied himſelf with ſo much diligence to his ſtudies, as to ſecure the eſteem of his tutors, and to attract much notice in the univerſity. In 1619 he was removed to Catherine Hall, of which he became a fellow. He ſoon ſhewed a decided inclination to the views and ſentiments of thoſe who were denominated Puritans, and taking them as his models, he prepared himſelf for the office of a Chriſtian miniſter. It is not known when he took orders, but he was elected lecturer of Trinity church, in Cambridge, in the year 1628, and in 1632 he was preſented by the king to the vicarage of the ſame church. In theſe employments he was greatly admired and followed by the Puritans, who began to look up to him as a leader, but becoming diſſatisfied with the terms of conformity, he relinquiſhed his preferments, and quitted the univerſity in the year 1634. In 1639 he was ſelected as an object of perſecution by the epiſcopal conſiſtories, and to enjoy liberty of conſcience he fled to Holland, where he was choſen paſtor to an independent congregation at Arnheim. During the ſittings of the Long Parliament he returned to London and became paſtor of a church there, and alſo a member of the aſſembly of divines. His conduct, in their various meetings, and his zealous ſupport of the Preſbyterians, contributed to render him a favourite with Cromwell, through whoſe influence he was, in 1649, made one of the commiſſioners for the approbation of public preachers, and alſo appointed preſident of Magdalen college, Oxford. Here he formed a church upon the independent plan, and was exceedingly diligent in promoting the intereſts of learning and piety. His public duties as a preacher did not prevent him from thoſe ſtudies which enabled him to become diſtinguiſhed as a writer. He attended Cromwell upon his death-bed, and was overheard to expreſs himſelf boldly and enthuſiaſtically confident of the protector's recovery; and it is affirmed that when the event proved him miſtaken, he exclaimed in a ſubſequent addreſs to God "thou haſt deceived us, and we are deceived." After the reſtoration he was diſmiſſed from his preſidentſhip, when he retired to London, where, however, he was permitted to continue in the exerciſe of the miniſtry till his death in 1679, when he had attained to his eightieth year. He was a conſiderable ſcholar, and a learned and eminent divine. In the common regiſter at Oxford he is deſcribed "in ſcriptis in re theologica quam plurimis Orbi notus." He was a high Calviniſt, but while he zealouſly enforced what he conceived to be the doctrines of Chriſtianity, he did not forget to enforce by every incitement in his power the neceſſity of pure moral conduct. He was author of numerous pious and controverſial pieces, ſermons, expoſitions, &c. ſome of which were printed during his life time, and inſerted, after his death, in a collection of his works publiſhed in five volumes folio, which continue to be read and quoted by Calviniſts of the preſent day. Neal's Hiſt of Puritans, by Toulmin.

Goodwin *Sands*, in *Geography*. See Godwin *Sands*.

GOOGINGS, in *Sea Language*, are clamps of iron bolted on the ſtern-poſt of a ſhip, whereon to hang the rudder and keep it ſteady; for which purpoſe there is a hole in each of them, to receive a correſpondent ſpindle bolted on the back of the rudder, which turns thereby as upon hinges.

GOOGOOS, in *Geography*, inhabitants of the inland territory of the iſland of Sumatra, covered with long hair, and little ſuperior to the ourang outangs of Borneo. See Sumatra.

GOOJINDERGUR, a town of Hindooſtan, in Sanore; 25 miles N.N.W. of Sanore.

GOOL, a river of Hindooſtan, which riſes near Burrawny, and runs into the Tapty, 8 miles S. of Chuprah.

Gool, ſignifies a ditch or trench for water; called alſo a goit, gurt, leat, &c.

GOOLE, a breach in a ſea-bank or wall; or a paſſage worn by the flux and reflux of the ſea. Vide 16 and 17 Car. II. cap. 11.

The word comes from the French, *goulet*, the gullet or neck.

GOOLGUNGE, in *Geography*, a town of Hindooſtan, in the circar of Chanderee; 25 miles E. of Chanderee.

GOOLLAH, a ſmall circar or province of Bengal, ſituated E. of Coos-Beyhar.

GOOMAH, a town of Bengal, 45 miles N. of Ramgur. N. lat. 24° 23'. E. long. 85° 54'.—Alſo, a town of Hindooſtan, in Bahar; 40 miles N.E. of Chittra.

GOOMBO, a town of Africa, in Bambarra. N. lat. 15° 3'. W. long. 5° 10'.

GOOMBOGANO, a town of Africa, in Kaſſan. N. lat. 14° 20'. W. long. 8° 50'.

GOOMGONG, a town of Hindooſtan, in Berar; 12 miles S of Nagpour.

GOOMERPUN, a town of Hindooſtan, in Oude; 16 miles S.W. of Azimgur.

GOOMPINA, a town of Hindooſtan, in Golconda; 20 miles N.E. of Culloor.

GOOMREPOUR, a town of Hindooſtan, in Allahabad; 20 miles E.N.E. of Jionpour.

GOOMTY, a river of Aſia, which riſes in the mountains of Kemaoon, and croſſing the country of Oude, joins the Ganges, about 15 miles N. of Benares.

GOONANGAPY, a ſmall iſland in the Eaſt Indian ſea, near the N. E. coaſt of Cumbava. S. lat. 8° 10′. E. long. 119° 24′.

GOONDWANAH, the ancient name of the province of *Nagpour*, which ſee.—Alſo, mountains of Hindooſtan, called "Konduannah," ſituated in the S. E. part of the country of Malwa, extending from Huſſingabad to Mundellah, about 170 miles long. N. lat. 22° 40′, to 23°. E. long. 78° to 81°.

GOOPAMOW, a town of Hindooſtan, in Oude; 20 miles W. of Kairabad.

GOOPIGUNGE, a town of Hindooſtan; 32 miles W. of Benares.—Alſo, a town of Hindooſtan, in the ſoubah of Agra. N. lat. 26° 24′. E. long. 79° 18′.

GOORACKPOUR, a province of Oude, bounded on the N. by Thibet, on the E. by Bettiah and Sarun, on the S. by Gazypour, and on the W. by Oude proper and Bahraitch, about 60 miles long and 50 broad. The capital of the ſame name is ſituated 65 miles E. of Fyzabad. N. lat. 26° 44′. E. long. 83° 30′.

GOORAH, the name of two towns of Hindooſtan; one in Oude and another in Allahabad.

GOORUNTY, a town of Hindooſtan, in the circar of Cicacole; 17 miles S. W. of Ganjam.

GOOS, a town of Nubia. N. lat 18°. E. long. 34° 18′.

GOOSANDER, in *Ornithology*. See Mergus *Merganſer*.

GOOSE, Anser, forms an order of birds in the Linnæan ſyſtem. (See Anseres.) The ſeveral ſpecies of geeſe belong to the genus of anas or duck under this order. See Duck.

Goose, a well-known bird, which, in many ſituations, may be highly beneficial to the farmer, as, where there are large waters and commons, and where the ſtubbles are abundant. It is valuable both for its fleſh, fat, and feathers.

The varieties of geeſe are numerous, but the large common kinds are probably the beſt for the uſes of the farmer.

Goose, *Ember*. See Colymbus *Immer*.

Goose, *Soland* or *Solan*, ſometimes called *gannet*, the Engliſh name of a large water-fowl, called by authors *Anſer Baſſanus*, and by Linnæus Pelecanus *Baſſanus*, which ſee.

Goose *Creek*, in *Geography*, a river of New Jerſey, which runs into the Atlantic, N. lat. 39° 53′. W. long. 74° 16′.—Alſo, a river of Kentucky, which runs into the Ohio, N. lat. 38° 10′. W. long. 86° 3′.—Alſo, a river of North Carolina, which runs into the Atlantic, N. lat. 34° 40′. W. long. 77° 21′.—Alſo, a river which falls into the Potowmac, about a mile S. E. of Thorpe, in Fairfax county, Virginia.

Goose-*dung*, in *Agriculture* and *Medicine*. See Dung and Chenocoprus.

Goose-*foot*, or *Wild Orach*, or *Good Henry*, in *Botany*. See Chenopodium.

Goose-*graſs*, the common name of a troubleſome weed that is frequently met with on clayey ſoils. It is beſt deſtroyed by cutting it in the ſummer, and keeping the land under the plough in good condition. See Galium *Aparine*.

Goose-*graſs*, *Great*. See Asperugo.

Goose *Iſland*, in *Geography*, a ſmall iſland in the gulf of St. Lawrence, near the coaſt of Labrador. N. lat. 50° 52′. W. long. 59° 10′.—Alſo, a ſmall iſland in Chriſtmas Sound, on the coaſt of Terra del Fuego.

Goose *Lake*, a lake of North America. N. lat. 52° 55′. W. long. 94° 45′.—Alſo, a lake of North America. N. lat. 54° 30′. W. long. 101° 21′.

Goose-*neck*, in *Sea Language*, is a ſort of iron hook fitted on the inner end of a boom, and introduced into a clamp of iron or eye-bolt, which encircles the maſt, or is fitted to ſome other place in the ſhip, ſo that it may be unhooked at pleaſure.

Goose *River*, in *Geography*, a river of America, which runs into the Miſſiſippi. N. lat. 43° 14′. W. long. 93° 56′.—Alſo, a river of South Carolina, which runs into Cooper's river. N. lat. 33° 2′. W. long. 79° 57′.

Goose-*wings of a ſail*, in *Sea Language*, denote the clues or lower corners of a ſhip's main-ſail, or fore-ſail, when the middle part is furled or tied up to the yard.

Goose-*wing*, at *Sea*, a certain manner of fitting a ſail, which is thus performed: when a ſhip ſails before a wind, or with a quarter-wind, and in a freſh gale, the ſeamen ſometimes, to make the more haſte, unparal the mizen-yard, and then they launch out both ſail and yard over the quarter on the lee-ſide, fitting guyes at the farther end, to keep the yard ſteady with the boom, and this booms out the mizen-ſheet. This they do to give the ſhip the more way, which otherwiſe, with theſe winds, the mizen-ſail could not do; and this ſail, ſo fitted, is called a *gooſe-wing*, and ſometimes a *ſtudding-ſail*.

GOOSEBERRY Bush, *Groſſularia*, in *Botany*, is a ſpecies of the *ribes* in the Linnæan ſyſtem. See Ribes.

The gooſeberry-buſh is propagated either by ſuckers or cuttings, but the latter way is preferable, as the roots are leſs ſubject to ſhoot out ſuckers afterwards.

The beſt ſeaſon for planting the cuttings is in autumn, juſt before the leaves begin to fall; obſerving always to take the handſomeſt ſhoots, and to pick them from ſuch branches as produce the greateſt quantity of fruit. The cuttings ſhould be about ſix or eight inches long, and ſhould be planted in a bed of light earth expoſed to the morning ſun; they muſt be planted about three inches deep, and watered to help their taking root. The ſhoots ſhould be rubbed off from theſe plants as they put out, except thoſe at the top, that there may be a regular ſtem. In the October following, they ſhould be removed to a bed of fine light earth, and planted in rows at three feet diſtance, and one foot aſunder in the rows. They ſhould remain here one year, and the croſs branches at times be cut off, as alſo the lower ones, ſo as to keep a clean ſtem about a foot above the ground. They will be then fit to plant out where they are to ſtand, which ſhould be in a light ſandy loam. They ſhould be kept from the ſhade of other trees; and to have the fruit in its utmoſt perfection, ſhould be ſet in an expoſed place in rows of eight feet aſunder, and each of the ſhrubs ſix feet from the others in the rows. The beſt time for tranſplanting them is in October, when the leaves begin to decay. Miller.

Gooseberry, in *Agriculture*, is a plant that may ſometimes be employed in the forming of hedge-fences, eſpecially that ſort known in the North by the title of Ironmonger.

Gooseberry *Caterpillar*, in *Gardening*, the common name of a very deſtructive inſect to the gooſeberry and ſome other plants. Many different methods of deſtroying it have been propoſed, but with little ſucceſs.

Gooseberry *of Barbadoes*. See Cactus.

Gooseberry *Tree*. See Melastoma.

Gooseberry-*galls*, in *Natural Hiſtory*, the name given by authors to a ſpecies of protuberances of the gall kind, found very frequently on the oak. They are of a roundiſh figure, and ſometimes adhere to the tree by a ſhort pedicle, but more frequently by a part of their ſpheric ſurface. They are uſually found on the under ſide of the leaves of the oak, but ſometimes on the young ſhoots, and ſometimes on the pedicles of the leaves.

They are moſt frequent in ſpring, but they are found at all times when the leaves are upon the trees. Theſe galls are greeniſh at firſt, and afterwards become yellowiſh, and finally red; in which laſt ſtate they very much reſemble the ſmall red gooſeberry. They are very ſoft to the touch, and when opened are found to contain a juicy ſubſtance, with a cavity in the midſt, in which there is lodged a ſingle inſect. This, according to the time in which the gall is opened, is found in the form of a white worm, or elſe of a white chryſalis, or finally of a ſmall ſhort-bodied four-winged fly of a black colour; for the creature does not leave the gall to go through any of its changes, but paſſes all its ſtates in it. The gall, in all theſe caſes, is found whole and unhurt; but if one is opened in which there is a hole pierced, this is ſure to be found empty, that being the paſſage by which the fly has made its way out. Reaum. Hiſt. Inſ. vol. vi. p. 214.

Gooseberry *Iſlands*, in *Geography*, ſmall iſlands near the E. coaſt of Newfoundland; 24 miles N.W. of Cape Bonaviſta.

Gooseberry *Rocks*, dangerous rocks lying on the coaſt of Eſſex county, in the ſtate of Maſſachuſetts.

GOOTA, a town of Hindooſtan, in Goondwanah; 10 miles S. of Nagpour.

GOOTOKA, a town of Hindooſtan, in the circar of Ruttunpour; 5 miles S. of Ruttunpour.

GOOTY, or Gutti, a town and fortreſs of Hindooſtan, the capital of a diſtrict in Myſore; 170 miles N. of Seringapatam. It is ſituated on a hill beyond the river Pennar, or Pen-aur, and towards Adoni; and was formerly the ſeat of government of a Mahratta prince; but at the death of Tippoo, the town and diſtrict were aſſigned to the Nizam. N. lat. 15° 15'. E. long. 77° 48'.

GO-OUT, in *Mining*, is ſometimes uſed to expreſs the appearance of the edge of a ſtratum at the ſurface; otherwiſe called the baſſet, crop, out-going, or out-burſt of that ſtratum; and ſuch ſtrata are ſaid to go-out, burſt-out, run-out, head-out, want-cover, &c.

When the ore in a vein ſuddenly ends in the deads or gangue, it is ſaid to go-out; alſo, when a ſtratum of coals ends abruptly againſt a fault, or wall of gravel filling a fault, or baſſet under a heap of gravel, as is not uncommon in the ſouth of Derbyſhire, it is ſaid to go-out, and ſo of the irregular or feather-edge maſſes which are ſometimes met with in the ſtrata accidentally, or without being continuous like all the regular ſtrata, however thin.

GOPALCHITTY, in *Geography*, a town of Hindooſtan, in Coimbétore; 18 miles N.W. of Erroad.

GOPALGUNGE, a town of Bootan; 58 miles N. of Dinagepour.

GOPALNAGUR, the name of two towns in Bengal; one 25 miles S.S.E. of Kiſhenagur, and another 30 miles E.S.E. of Dacca.

GOPALPOUR, the name of ſeveral towns in Hindooſtan, one 8 miles N. of Hurdah, a ſecond, 12 miles N. of Goragot, a third, 15 miles N. of Gurrah, a fourth, 23 miles S. of Bahar, a fifth, 20 miles N.W. of Narva, a ſixth, 20 miles S. of Goorackpour, a ſeventh, 38 miles S. of Fyzabad, an eighth, 25 miles N. of Amedabad

GOPALDROOG, a fortreſs of Myſore; 36 miles E. of Seringapatam.

GOPAULGUNGE, a town of Bengal. N. lat. 23° 2'. E. long. 89° 56'.

GOPAULNAGUR, a town of Bengal, 42 miles S. of Burdwan. N. lat. 22° 31'. E. long. 88 .

GOPEER, a town of Bengal; 15 miles E.N.E. of Ramgur.

GOPERAPILLY, a town of Golconda; 20 miles E.S.E. of Hydrabad.

GOPHNA, Gophnith, or *Gaphna*, in *Ancient Geography*, a town of Paleſtine, and chief place of one of the ten toparchies of Judah. Euſebius places it fifteen miles from Jeruſalem, towards Sichem.

GOPLO, in *Geography*, a lake of Poland, in the palatinate of Brzeſc, 16 miles long, and four wide.

GOPPINGEN, a town of the kingdom of Wurtemberg, ſituated on the Vils, in a fertile country, having conſiderable woollen manufactures, and near it a medicinal ſpring; 20 miles N.N.W. of Ulm. N. lat. 48° 47'. E. long. 9° 41'.

GOR, a town of Perſia, in the province of Farſiſtan; 57 miles N.W. of Schiras.—Alſo, a town of Italy, in the department of the Mela; 8 miles S. of Breſcia.

Gor, a name given by ſome writers to a very lofty tree, which bears a fruit like the cheſnut; it grows principally on the banks of the river Niger, and that not near the ſea, but far up the country.

Gor-*cock*, in *Ornithology*, the name of a bird of the gallinaceous kind, called by authors the lagopus altera, and by many the moor-cock, or red game; it is of the ſhape of the partridge, but is half as large again. See Grouse and Tetrao *Lagopus*.

GORA, in *Geography*, a town of Hindooſtan, in the circar of Chandail; 20 miles W. of Saipour.

GORACALLY, a town of Bengal; 12 miles S.S.W. of Mahmudpour.

GORAGOT, a province of Bengal, bounded on the N. by Rungpour, on the E. by Radjoohow, Patladah, and Iſlamabad, on the S. by Bettoriah and Pargunnah, and on the W. by Dinagepour; about 55 miles long, and from 12 to 30 broad. Its capital, Goragot, is diſtant 80 miles N.N.E. from Moorſhedabad. N. lat. 25° 14'. E. long. 89° 22'.

GORAI, a town of Poland, in Galicia.

GORAM, a ſmall iſland, being one of the Moluccas, in the Eaſt Indian ſea, S.E. of Ceram; reputed the moſt eaſtern boundary of Mahometaniſm. It has thirteen moſks. S. lat. 3° 42'. E. long. 121° 36'.

GORANTO, a town of Aſiatic Turkey, in Caramania; 80 miles S.W. of Satalia.

GORAPARI, a town of Brazil, at the mouth of a river of the ſame name, which runs into the Atlantic. S. lat. 20° 40'.

GORBARA, a town of Corſica; 8 miles N.E. of Calvi.

GORBATA, a town of Africa, in Biledulgerid, anciently "Orbita;" 12 miles S.W. of Gafſa.

GORBATOV, a town of Ruſſia, in the government of Niznei Novogorod. N. lat. 56 5'. E. long. 43° 14'.

GORCA. See Gorkah.

GORCE, or Gourt, denotes a weir. By ſtat. 25 Edw. III. cap. 4. it is ordained, that all gorces, mills, weirs, &c. levied or ſet up, whereby the king's ſhips and boats are diſturbed, and cannot paſs in any river, ſhall be utterly pulled down, without being renewed. Sir Edward Coke derives this word from *gurges*, *a deep pit of water*, and calls iſ a *gors*, or *gulf*; but this ſeems to be a miſtake, for in Doomſday it is called *gourt* and *gort*, the old French word for a *weir*.

GORCHWICH, in *Geography*, a town of Saxony, in the Vogtland, 18 miles S.S.W. of Gera. N. lat. 50° 22′. E. long. 11° 53′.

GORCUM, probably a corruption of *Gorichem*, a town of Holland, ſituated on the river Linge, at its union with the Wahal. From the ſteeple of the principal church may be ſeen 22 walled cities, beſides a great number of towns and villages; before the revolution it had one pariſh-church, and three religious houſes; 12 miles E. of Dort. N. lat. 51° 52′. E. long. 4° 50′.

GORDENE′, in *Ancient Geography*, a country of the Greater Armenia, according to Ptolemy; which country is called "Gordyené" by Strabo and by Plutarch in his life of Lucullus.

GORDES, in *Geography*, a town of France, in the department of Vaucluſe, and chief place of a canton in the diſtrict of Apt; 9 miles W. of Apt. The place contains 2812, and the canton 6430 inhabitants, on a territory of 167½ kiliometres, in 8 communes.

GORDEWARE Point, a cape of Hindooſtan, on the coaſt of Rajamundry, at the mouth of the Godavery. N. lat. 16° 42′. E. long. 82° 28′.

GORDIÆUS Mons, in *Ancient Geography*, a mountain of the Greater Armenia. Ptol.

GORDIANI, M. Antonius Gordianus, in *Biography*, Roman emperor, born A.D. 157, was ſon of Metius Marullus, a ſenator deſcended from the Gracchi, by Ulpia Gordiana, of the family of the emperor Trajan. He became poſſeſſed of a great eſtate, with which he lived in a ſtyle of magnificence, but without paſſing the bounds of moderation. He was a patron of literature and literary men, and a proficient in eloquence and poetry. He wrote a poem in thirty books, to celebrate the reigns of Titus and M. Aurelius Antoninus. When he ſerved the office of edile, he entertained the people with a ſplendour which no private perſon had for a long time exhibited, and his ſhows were exhibited every month in the year while he was in office. There is, however, no reaſon for ſuppoſing that he was over ambitious of coming forwards into public life, for it was not till his fifty-fifth year that he was elected conſul in conjunction with the emperor Caracalla. He might, perhaps, be unwilling to riſque the ſafety of his perſon in thoſe turbulent times; and it has been thought extraordinary that under ſo jealous a tyrant he ſhould venture upon the profuſe expences which diſtinguiſhed his conſulſhip not only in the imperial city, but in various parts of Italy alſo. He enjoyed the ſame honour a ſecond time in the reign of Alexander Severus, who expreſſed his high eſteem for him by confirming his nomination to the government of Africa as proconſul. In this important poſt he diſplayed ſo much equity and beneficence, that he was more beloved in the province than any of his predeceſſors. Under the emperor Maximin, in the year 237, a ſedition was excited againſt the rapacity of an officer in the government of Africa, and the perpetrators, to avoid the vengeance of a cruel and incenſed ſovereign, appeared in open rebellion and inſiſted upon Gordian's aſſuming the purple. He remonſtrated with the conſpirators, but their reſolution was formed, and at the age of fourſcore he was forced to appear in a character, after which he had never aſpired. They aſſociated with him, to alleviate his cares, the younger Gordian, a man of voluptuous habits, but who was of a mild diſpoſition, and attached to letters. A library of ſixty-thouſand volumes, bequeathed him by his tutor Serenus Sammonicus, gave him reputation in the literary world, which he maintained by writing both in proſe and verſe. This young man had been elevated to the office of queſtor by the deſpicable Heliogabalus; nevertheleſs, the confidence placed in his integrity, and knowledge of the laws, by Alexander, who created him prefect of Rome, and who always paid great deference to his advice, was much in his praiſe. He ſhared in the elevation of his father, and they were declared joint emperors. The Gordians removed to Carthage, whence they ſent letters to Rome, announcing their election. Maximin was at that time abſent, and the ſenate willingly ſanctioned the choice of the Africans, and declared Maximin a public enemy. In the mean time, a change took place in Africa, which annulled all their projects. Capelianus, governor of Mauritania, who had been always upon ill terms with Gordian, aſſembled a body of veterans, declared for the reigning emperor, and marched to Carthage. The younger Gordian ſallied out to oppoſe him with his guards, but he was ſoon defeated and ſlain. Capelianus entered the city, which ſo much alarmed the elder Gordian, that to prevent his falling into the hands of his enemy, he ſtrangled himſelf in his apartment with his girdle. This event happened in June 237, and within a few weeks of his aſſuming the office of emperor. Gibbon.

Gordian III., Roman emperor, grandſon of the elder Gordian, was but thirteen years old when he was choſen emperor, in connection with Maximus and Balbinus. He was created Cæſar, and aſſumed the family name. His two colleagues were in a few months murdered by the Pretorian bands, and the youthful Gordian remained ſole emperor. His perſon and manners excited univerſal favour, and the ſenate, people, and army united in giving him the endearing appellation of their ſon. In the commencement of his reign he was governed by his mother's eunuchs, who abuſed his authority, and ſet the honours and offices of the empire up to ſale. He was, however, happily reſcued from this diſgraceful condition by Miſitheus, a man of learning, to whom he was alſo indebted for literary inſtruction and advice. In the year 241 he married the daughter of Miſitheus; and raiſing his father-in-law to the poſt of præfect-prætorio, committed to him the principal direction of public affairs. He proved himſelf worthy of the important truſt confided in him, and diſcharged the duties of a ſtateſman and general, as well as he had maintained thoſe of a more private ſtation. By his perſuaſion, the young emperor accompanied him in 242, in an expedition to the Eaſt, for the purpoſe of repelling an invaſion from Sapor king of Perſia. Under his guidance, Gordian relieved Antioch, croſſed the Euphrates, defeated Sapor, and recovered the whole of Meſopotamia. The young emperor did not aſſume the glory of the deeds, but, in a letter to the ſenate, announcing the ſucceſſes, he modeſtly aſcribes them to the conduct, the experience, and wiſdom of Miſitheus, who ſhortly after died. During the whole expedition Miſitheus had watched over the ſafety and diſcipline of the army, while he prevented their murmurs by maintaining a regular plenty in the camp, and by eſtabliſhing ample magazines of vinegar, bacon, ſtraw, barley and wheat, in all the cities of the frontiers. The proſperity of the emperor expired with Miſitheus; he was ſucceeded in the office of præfect by Philip, an Arab by birth, and conſequently, ſays Gibbon, in the earlier part of his life, a robber by profeſſion. He was a man of conſiderable military talents, but ambitious, and deſtitute of true moral principle. His energy and boldneſs prompted him to aſpire to the throne, and his abilities were employed to ſupplant, not to ſerve his indulgent maſter. By his arts diſcontents were fomented among the troops, which induced them to demand that his miniſter Philip ſhould be aſſociated with Gordian as partner in the empire. This was not ſufficient to ſatisfy his ambitious views; the young emperor was ſacrificed at his inſtigation; he was put to death near the banks of the Euphrates, in March 244, after a reign of five years and eight months. A ſepulchral monument was erected to his memory on the ſpot where he was killed. Gibbon.

Gordian, a term in *Hiſtory*. Gordian knot was a knot made in the leathers or harneſs of the chariot of Gordius, king of Phrygia, and father of Midas; ſo very intricate, that there was no finding where it began or ended.

The inhabitants had a tradition, that the oracle had declared, that he ſhould be maſter of Aſia who could untie this knot. Alexander having undertakan it, and fearing that, if he ſhould not be able to effect it, it would be deemed an ill augury, and prove a check in the way of his conqueſts, cut it aſunder with his ſword; and thus, ſay Quintus Curtius, either accompliſhed the oracle, or eluded it. But Ariſtobulus gives a different account of this matter. See Arrian, lib. iii. cap. 20. and Plut. in Vit. Alex.

Some will have the phraſe derived from Gordius who tied the fatal knot; others from Gordium, a city in Phrygia, where the knot was made.

GORDIUM, in *Geography*, a town of Aſia, in Phrygia, ſituated on the river Sangar; afterwards called Juliopolis.

GORDIUS, in *Zoology*, a genus of Vermes, the eſſential character of which conſiſts in the body being round, filiform, naked or ſmooth, and of equal thickneſs throughout.

Linnæus, and after his example the French naturaliſt Bruguière, has placed the animals of this genus among the inteſtinal vermes, an order of beings to which, from their general ſtructure, they ſeem to bear no very remote alliance: and this ſimilarity is ſtill more ſtrongly evinced in the habits of thoſe ſpecies which occaſionally penetrate into the fleſh of men and animals, and therein for a while derive their ſuſtenance from the blood and other fluids. Notwithſtanding this analogy, under ſuch circumſtances we cannot but agree with Lamarck that it is impoſſible to conſider them as internal vermes with propriety, ſince they only occaſionally reſide in the bodies of animals as before mentioned, and in their habits and manners of life at other periods differ moſt eſſentially: they are literally aquatic animals, with carnivorous appetites; though for a certain length of time they can ſubſiſt like the true inteſtinal vermes, when by any accidental circumſtance they happen to inſinuate themſelves into the fleſh of a living animal.

At the head of this tribe we may juſtly place the ſpecies *medinenſis*, or hair worm of the Indies, a pernicious creature, referred to the genus Gordius by Linnæus in the lateſt edition of his Syſt. Nat., but from which it was afterwards removed by his editor Gmelin to that of Filaria. This removal we deem unneceſſary, and under this perſuaſion wiſh to reſtore the ſpecies to its former ſituation in the genus Gordius.

Species.

Medinensis. Body entirely pale. Linn. Sloane Jam. &c.

This very remarkable creature is often from ten to twelve or even fifteen feet in length, and in thickneſs not exceeding a horſe-hair. It is well known by its diſaſtrous effects as an inhabitant of both the Indies, where it lives in marſhy places, and is frequently obſerved on the ground in the morning dew. In this ſituation it eaſily creeps up, and entwines itſelf round the naked legs of the negro ſlaves, or animals, and penetrating the ſkin, buries itſelf ſpeedily in the fleſh, where it cauſes the moſt violent pains, accompanied with troubleſome itchings, and oftentimes inflammation and fever. The moſt certain means of extricating the worm is to make an inciſion in the part of the fleſh at which its entrance was effected, ſo as to obtain ſecure hold of either of the extremities, or the head if poſſible, and this being made faſt to a ſmall ſtick by means of a piece of ſilk, the animal may be gradually drawn out of the wound by turning the ſtick round a little each day. The utmoſt circumſpection is requiſite in performing this operation, for if by being too much ſtrained the worm ſhould break, the part remaining within the fleſh grows with increaſed vigour, gangrene appears almoſt immediately, and death itſelf enſues very ſhortly.

Aquaticus. Pale brown, with blackiſh extremities. Linn. *Gordius ſeta*, Müll. *Vitulus aquaticus*, Geſn. *Meerwijn*, Jonſt. *Chætia*, Hill. &c.

This ſo entirely reſembles a hair of from four to ſix inches in length, that except by its motions it could be in no manner diſtinguiſhed from a ſubſtance of that kind by the caſual obſerver; its internal ſtructure is equally remarkable alſo for its ſimplicity, conſiſting merely, as it appears, of a canal extending from one end to the other, and both the mouth and vent are the moſt ſimple poſſible, ſince a ſmall vent conſtitutes the firſt, and a groove or hollow the latter. Its ordinary places of reſidence are ſtagnant waters; in pools and ditches, or in very tranquil rivers, as the agitation of turbulent waters would deſtroy its tender frame. During winter it remains buried deep in the clay, from whence it emerges in ſpring, and is found in the water during the ſummer months, where it is frequently obſerved, and from its appearance is vulgarly imagined to be the offspring of *horſe hair* dropped by accident into the water. It twiſts itſelf into various contortions; and it is affirmed that its bite will occaſion the complaint called a whitlow. A fact ſtill more extraordinary, and which appears in ſome meaſure to be authenticated with tolerable accuracy, is the retentive power of animation, which this creature poſſeſſes in a very ſuperior degree, though not by any means to the extent that certain naturaliſts conceive. Some writers affirm, indeed, that it has been known to recover the free exerciſe of its vital functions upon being ſteeped for a ſhort ſpace of time in water, after having remained in a dried ſtate for weeks, months, and even years, and when of courſe it might be naturally conceived the moſt latent ſpark of life muſt be extinct. If theſe latter aſſurances have not ariſen from the reſult of ſome very ſuperficial experiments, they are at leaſt to be received with caution, ſince their obſervers ſeem to believe that theſe animals partook alſo in ſome meaſure of the reproductive properties of the polype, and which more recent obſervations prove to be erroneous; we cannot, therefore, upon the whole, avoid concluding that although the animals of this kind are extremely tenacious of life, there is no foundation in truth for the very extraordinary aſſertions above related.

Argillaceus. Body uniformly yellowiſh. Linn.

Very much reſembles the laſt, and like that ſpecies is found in the clay at the bottom of ſtagnant waters.

Filum. Body filiform and whitiſh, Müll.

Extremely ſlender, tapering at one end, and hyaline. Found in the bark of old wooden pipes which had been placed in the ground for the conveyance of water.

Lacteus. Body uniformly white and opaque. Müll.

Occurs in myriads in ſtagnant water from the month of July till September. When touched, this ſpecies contracts itſelf in a moment, and then again expands immediately.

Arenarius. Fulvous and obtuſe. Müll.

Inhabits the bottom of Chriſtians bay, in Norway.

GORDON, Bernard, in *Biography*, a French phyſician of the thirteenth century, is ſaid to have conferred honour on the medical faculty of Montpellier, where he began to teach in the year 1285. As was the cuſtom of the time, he took his ſurname from the place of his birth, (Gordon in Rouvergne,) and called himſelf Bernardus de Gordonio, and not Gordonus, as it is commonly written. According to the accounts of ſome writers, who place the death of this phyſician in 1305, he taught at Montpellier only twenty years; but Renchin affirms, that he was living in 1318. He left a conſiderable number of treatiſes, which were publiſhed together at Ferrara in 1487, at Venice in 1494, at Paris in 1542, and at Lyons in 1550. Eloy. Dict. Hiſt.

Gordon, Mr., in the year 1744 played the firſt violin in Drury-lane play-houſe. He was a young man, born in Norfolk, who had travelled to Italy for improvement. He was very near-ſighted, and always played in ſpectacles. He ſucceeded Charke, had a ſtrong hand, good tone, and was well fitted to his ſtation. He generally played a concerto in the ſecond muſic, as was then the practice, which was very attractive. He was brother to the ſubject of the following article.

Gordon, ———, an eminent performer on the violoncello, the ſon of a clergyman in Norfolk, and many years the firſt violoncello at the opera. He was remarkable for the fulneſs of his tone, and perfect execution of whatever he undertook, though far ſurpaſſed by ſubſequent players in the uſe of the bow, and knowledge of the finger-board. He lived reputably, had many powerful friends, and realiſed a competence by his profeſſion.

In 1765, Meſſrs. Gordon, Vincent, and Crawford, undertook the opera regency in the Haymarket. The two firſt were experienced profeſſors, and the third had been many years treaſurer under different managers. Gordon, an excellent performer on the violoncello; and Vincent, a ſcholar of the celebrated Martini, long a favourite on the hautbois. His father was a baſſoon player in the Guards, and his brother, James Vincent, who died young, was joint organiſt of the Temple with Stanley, and a brilliant performer. Mr. T. Vincent, the impreſario, had been in great favour with the late prince of Wales, father to his preſent majeſty; had acquired a conſiderable ſum of money in his profeſſion, which he augmented by marriage. However, the ambition of command, though of ſo froward a family as an opera, vocal, and inſtrumental band, turned his head and his purſe inſide out; in ſhort, he ſoon became a bankrupt, ſculked in indigence during the reſt of his life; and his colleagues, though they eſcaped utter ruin, were not enriched by the connection.

Gordon, Alexander, a learned writer of the eighteenth century, was a native of Scotland. He was well acquainted with the Greek and Latin languages, and being a good draughtſman, he was enabled to derive peculiar advantages from a long reſidence in Italy, and from his travels in other parts of Europe. He was engaged as ſecretary to the ſociety for the encouragement of learning; and to the Egyptian club, and to the Antiquarian ſociety. He afterwards accompanied governor Glen to Carolina, where he occupied various poſts in the province, and received a handſome grant of land. Here he died, leaving a good eſtate to his family. He was author of “Itinerarium Septentrionale,” or a journey through moſt parts of Scotland, illuſtrated with copper plates. This was publiſhed in 1726, and in 1732 he gave additions and corrections to it, containing an account of Roman antiquities in Scotland, and ancient monuments in the north of England. He wrote likewiſe “The Lives of Pope Alexander VI., and his Son Cæſar Borgia.” “A complete Hiſtory of ancient Amphitheatres, tranſlated from the Italian.” “An Eſſay towards explaining the hieroglyphical Figures on the Coffin of a Mummy.” “Twenty-five Plates of all the Egyptian Mummies in England, and other Egyptian Antiquities.” Gen. Biog.

Gordon, Andrew, was born in 1712 near Aberdeen. He was ſent to Ratiſbon, where he applied himſelf to polite literature. In 1731 he made a tour through Auſtria, Italy, and France, and on his return in the following year entered into the order of the Benedictines in the Scots monaſtery, where he applied to philoſophy, and was ordained prieſt. In 1735, he went to Salzburg to ſtudy the law, and he attended the theological lectures till he was invited, in 1737, to be profeſſor of philoſophy at Erfurt. His diſcoveries in electricity made his name known to the philoſophers in Holland, France, Italy, and England, and he is mentioned by Dr. Prieſtley as the firſt perſon who uſed a cylinder inſtead of a globe in electric experiments. His firſt work on this ſubject was entitled “Phenomena Electricitatis Expoſita,” 1744; and in the following year he publiſhed in 3 vols. 8vo. “Philoſophia utilis et jucunda.” He was author of an “Impartial Account of the Origin of the preſent War in Great Britain,” and of “Phyſicæ Experimentalis Elementa.” Gen. Biog.

Gordon, James, a Scotch Jeſuit, was born in the year 1543. He left his native country, and went to Rome, where he entered the ſociety of Jeſus, in 1563. He became diſtinguiſhed for deep and extenſive learning, and was ſent on religious miſſions into Germany, Denmark, and the Britiſh iſles, where he is ſaid to have ſuffered much on account of his attachment to the Catholic faith. He died at Paris in 1620, leaving behind him a work in two volumes 8vo. entitled “Controverſiarum Chriſtianæ Fidei Epitome.”

There was another Scotch Jeſuit of the ſame name, and contemporary with the above, who wrote a commentary on the whole bible, which he publiſhed at Paris, in three volumes folio, under the title of “Biblia ſacra, cum Commentariis ad ſenſum Literæ, et explicatione Temporum, Locorum, Rerumque omnium quæ in ſacris Codicibus habent obſcuritatem: una cum Textu Biblico.” This work is well ſpoken of by Dupin. He was author likewiſe of a work on Chronology: and of “A Syſtem of moral Theology,” &c. Moreri.

Gordon, Thomas, a native of Kirkcudbright, in Scotland, after having received an academical education in his own country, came to London, and maintained himſelf by teaching the learned languages. His talents were made known to people of conſequence, and he was employed by the earl of Oxford in queen Anne's reign as a political writer. He wrote in defence of biſhop Hoadley in the Bangorian controverſy, and became the aſſiſtant and partner of Mr. Trenchard, in his literary undertakings. They publiſhed, in conjunction, a ſeries of papers, entitled “Cato's Letters;” and the “Independent Whig,” which Mr. Gordon continued alone after the death of Trenchard. When this event took place, ſir Robert Walpole engaged Gordon as one of the writers in defence of his meaſures, and procured him a place, which he held as long as he lived. Mr. Gordon made himſelf known by tranſlations of Tacitus and Salluſt, as well as by his political pieces. To theſe tranſlations he prefixed diſcourſes relative to ſubjects of each original author. He died in 1750, at the age of ſixty-ſix. Some of his poſthumous tracts appeared in two works, entitled “A Cordial for Low Spirits;” and “The Pillars of Prieſtcraft and Orthodoxy ſhaken.” He was a diſtinguiſhed writer in favour of civil and religious liberty, and is highly eſteemed by the friends of freedom for the manly ſpirit with which he ſupported its cauſe againſt tyranny of every kind. Gen. Biog.

GORDONA, in *Geography*, a town of Naples, in the county of Moliſe; ſix miles S.W. of Moliſe.

GORDONIA, in *Botany*, named by Mr. Ellis, in the Philoſophical Tranſactions for 1770, in honour of Mr. James Gordon, an eminent nurſeryman at Mile-end, near London, who introduced many new plants to the knowledge of the curious, or rather cultivated with great ſkill and ſucceſs ſuch as were communicated to him, from various quarters, by the collectors and naturaliſts of that day, among whom were Bartram, Collinſon, Ellis, and many others. He was a frequent correſpondent of Linnæus, and ſent him ſeveral living plants, eſpecially of North American origin. Linn. Mant. 556. Syſt. Nat. ed. 14. 631. Schreb. 471. Willd. Sp. Pl. v. 3. 840. L'Herit. Stirp. Nov. 156. Cavan. Diſſ. faſc. 6. 307. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 2. 231. Juſſ. 275, Lamarck. Illuſtr. t. 594. Dict. v. 2. 770. Claſs and order, *Monadelphia Polyandria*. Nat. Ord. *Columniferæ*, Linn. *Malvaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſimple, inferior, of five roundiſh, concave leaves. *Cor.* Petals five, large, obovate, or obcordate, concave, cohering at their baſe, ſomewhat unequal. *Stam.* Filaments very numerous, thread-ſhaped, united at their baſe into a thick cup-ſhaped body; anthers oval, erect. *Piſt.* Germen ſuperior, ovate or nearly globoſe; ſtyle ſhort, columnar, obſcurely five-ſided, ſometimes five-cleft; ſtigmas five, acute, horizontal. *Peric.* Capſule ovate or globular, of five cells and five valves, the partitions from the middle of the valves, which are deeply cloven at their baſe. *Seeds* in two rows in each cell, angular, winged, inſerted into a five-angled central column.

Eſſ. Ch. Calyx ſimple. Style columnar. Stigma five-cleft. Capſule of five cells. Seeds ſeveral, in two rows, winged.

1. G. *Laſianthus.* Linn. Mant. 570. Curt. Mag. t. 668. Cavan. Diſſ. t. 161. (Hypericum Laſianthus; Linn. Sp. Pl. 1101. Alcea floridana quinquecapſularis, &c.; Pluk. Amalth. t. 352. f. 3.) Loblolly Bay.—Flower-ſtalks elongated. Leaves coriaceous, ſmooth. Capſules ovate.—Native of ſwamps in South Carolina, where it forms a very handſome tree, but is with great difficulty cultivated in England. It blooms in Auguſt and September. We have ſeen this plant flowering in great perfection at Kew 25 years ago. The *leaves* are ſcattered, on ſhort ſtalks, elliptic-lanceolate, three to five inches long, bluntiſh, with numerous ſhallow ſerratures, veiny, ſmooth on both ſides, of a fine ſhining green, like thoſe of *Prunus Lauro-ceraſus* above, paler beneath. *Stipulas* none. *Flowers* ſolitary, on ſimple axillary ſtalks, thrice as long as the footſtalks, as large as a moderate roſe, white with yellow ſtamens, very handſome but inodorous. A pair of deciduous fringed bracteas, a little below the flower, are called by Cavanilles an outer calyx. Authors have differed about the claſs of this plant in the Linnæan ſyſtem, the filaments cohering imperfectly and irregularly together in parcels, beſides being connected by one common fleſhy baſe. If this baſe be called a nectary, for which there is no good reaſon, the flower is polyadelphous, but we think, with Dr. Sims, and moſt others, that it is monadelphous.

2. G. *Hæmatoxylon.* Swartz. Ind. Occ. 1199.—Blood-red Wood Tree.—Flower-ſtalks very ſhort. Leaves elliptic-lanceolate, pointed, ſerrated, ſmooth. Petals inverſely heart-ſhaped. Style deeply five-cleft.—Native of dry woody places on lofty mountains, in the weſt ſide of Jamaica; Dr. Swartz, from whom we have ſpecimens. A *tree*, whoſe ſtem is from twelve to ſixteen feet high, with a ſmooth greyiſh bark, and round ſlender ſtraight compound leafy branches, *Leaves* two or three inches long, ſcattered, on footſtalks. elliptic-lanceolate, tapering at both ends, with a bluntiſh recurved point, ſmooth on both ſides, leſs coriaceous than in the former, their margin ſomewhat revolute, with numerous ſhallow ſerratures. *Flowers* from the boſoms of the upper leaves, ſolitary, on very ſhort ſtalks, not ſo long as the footſtalks, bearing one or two unequal bracteas; their petals pale fleſh-coloured, unequal, deeply lobed, ſcarcely ſo large as thoſe of *G. Laſianthus*, but flatter and more ſpreading. *Germen* ſilky, furrowed. *Style*, according to Dr. Swartz, divided into five. *Capſule* oblong, rather pointed. *Seeds* two in each cell, with an abrupt wing.—This tree was omitted by Dr. Swartz in his Prodromus, and is little known to botaniſts, having never yet been brought to Europe. It flowers in February and March. The wood is hard and of a blood-red, valued in Jamaica for making ornamental furniture, but as yet not known, or not diſtinguiſhed, by European workmen. The peculiar ſtructure of the ſtyle does not conſtitute any generic diſtinction here, any more than in the neighbouring genus *Stuartia*. See Sm. Exot. Bot. v. 2. 101.

3. G. *pubeſcens.* L'Herit. Stirp. Nov. 156. Cavan. Diſſ. t. 162. Vent. Jard. de la Malmaiſon, t. 1.—Flowers nearly ſeſſile. Leaves downy beneath. Capſules globoſe.—Native of South Carolina, now not uncommon in green-houſes, flowering in autumn. A handſome *ſhrub*, whoſe branches, calyx, and the backs of its leaves, are clothed with fine white depreſſed down. The *flowers* moſt reſemble thoſe of the firſt ſpecies, but one petal is conſiderably more concave than the reſt, ſhorter, and downy, approaching to the nature of the calyx. The flower-ſtalks are extremely ſhort and thick. *Leaves* obovato-lanceolate, acute, with ſhallow ſerratures, ſmooth and of a fine green above. Ventenat's figure, drawn by Redouté, the firſt in the ſplendid Jardin de la Malmaiſon, is one of the fineſt repreſentations of a plant that can any where be ſeen, except that the French mode of printing in colours gives indiſcriminately an idea of a downy ſurface, ſo that in this caſe both ſides of the leaves look alike.

4. G. *Franklini.* L'Herit. Stirp. Nov. 156. (Franklinia Alatamaha; Marſhall. Arbuſt. 49.)—"Flowers ſeſſile. Leaves ſmooth. Capſules globoſe."—Native of South Carolina. *Flowers* ſeſſile, ſolitary, large, white, very much admired in their native country, but we have not heard of their being produced in Europe, nor have we ſeen even a dried ſpecimen. The *capſule*, according to L'Heritier, is "globoſe and umbilicated. *Seeds* numerous in each cell, imbricated in two rows, ſlightly angular, much like thoſe of the Cypreſs, the angles ſomewhat bordered. *Leaves* alternate, on ſhort foot-ſtalks, oblong, toothed, attenuated at the baſe, and ſmooth."—Marſhall and Bartram ſay the flowers ſmell like a china orange, and are often five inches in diameter, the lower petal hollow, enfolding the reſt till they expand, as in G. *pubeſcens*. It was firſt obſerved by Mr. John Bartram in 1760, on the borders of the Alatamaha river, in Georgia.

GORDYGONG, in *Geography*, a town of Hindooſtan, in Viſiapour; 22 miles N.E. of Poonah.

GORE, in *Heraldry*, denotes one of the regular abatements, uſed, according to Guillim, to denote a coward. It conſiſts of two arches or curve lines, drawn, one from the ſiniſter chief, the other from the ſiniſter baſe, and meeting in an acute angle in the middle of the feſſe-point.

GOREE, or GOEREE, in *Geography*, an iſland in the German ocean, near the mouth of the Meuſe, about 10 miles in circuit; two miles N. of Schowen. N. lat. 51° 49′. E. long.

E. long. 3° 50′.—Alſo, a ſea-port town of this iſland, near the E. coaſt, on a canal communicating with the Meuſe; formerly carrying on a conſiderable trade, but the harbour is now choaked with ſand; 6 miles W. of Helvoetſluys.

Goree, a ſmall iſland in the Atlantic, within cannon-ſhot of the coaſt of Africa, about two miles in circumference. The air is cool and temperate, being refreſhed by alternate breezes from the land and ſea. It is almoſt inacceſſible on account of its ſurrounding rocks; but it has two bays, and a fort with ſeveral new buildings conſtructed by a late director M. de St. Jean, who has alſo rendered it a very ſtrong place. By his perſevering aſſiduity, ſprings of freſh water have been diſcovered, and a variety of vegetables and fruit trees have been planted; ſo that the iſland, once barren and deſpicable, is now made one of the moſt ſafe, pleaſant, and important ſettlements in Africa. Goree was ceded to the Dutch in 1617 by a king of Cape Verd, and by them fortified. The Dutch were driven out by admiral Holmes in 1663, and the iſland was garriſoned by the Engliſh. It was two years after taken by De Ruyter, and its fortifications augmented by the Dutch; but in 1667 a French ſquadron compelled the Dutch to abandon Orange fort, and retire to fort Naſſau; but here, incapable of defending themſelves, they were obliged to ſurrender at diſcretion. Upon the arrival of M. du Caſſe, the iſland was formally taken poſſeſſion of in the name of the Senegal company, and a treaty was concluded with the king and negroes of the neighbouring country on the ſame conditions with thoſe by which the Dutch had poſſeſſed the iſland. The conqueſt was ſecured to the company by the treaty of Nimeguen. The French immediately repaired the forts, and changed their names, calling the lower fort "Vermandois," and the higher "St. Michael." In 1750 Goree was taken by the Engliſh. By the treaty of 1763 Goree and its dependencies were left to the French. In 1778 it was taken by the Engliſh. N. lat. 14° 40′. W. long. 17° 30′.

Goree, a ſmall iſland on the coaſt of Brazil, at the mouth of the Rio dos Reyes Magos. S. lat. 19° 10′.

GOREING, or Goring, is ſaid of a ſail when cut ſlanting, ſo that it is broader at the clew than at the earing, as all top-ſails and top-gallant-ſails are.

GOREL, a name or title given to the prince of Georgia. The gorel is always a Mahometan. The ſophy of Perſia obliges him to obſerve the religion of the Alcoran, in order to preſerve the dignity of gorel in his family.

GORE's Bay, in *Geography*, a bay on the S. W. coaſt of the iſland of Tavai-Poenammoo. S. lat. 43° 12′. W. long. 186° 36′.

Gore's *Iſland*, an iſland in the N. Pacific ocean, ſo named by captain Cook in the year 1778. This is a narrow iſland, particularly at the low necks of lands which form a junction between the hills; it is about 30 miles long from N.W. to S.E.; and it appeared barren and uninhabited. Some ſea-otters were ſeen. N. lat. 60° 40′. W. long. 172° 30′.

GORESBRIDGE, a ſmall poſt town of the county of Kilkenny, Ireland, 51 miles S.W. from Dublin, on the road to Waterford.

GOREY, a poſt town of the county of Wexford, Ireland, alſo called Newborough, which, before the Union, was repreſented in parliament. It is 45½ miles S. from Dublin, and 21 N. from Wexford.

Gorey-*Mountains* of Ireland, in the county of Donegal, near Raphoe.

GORGA, a town of Mingrelia, on the Black ſea; 30 miles S. of Anarghia.—Alſo, a river of Naples, which runs into the Liban, in Calabria Citra.

GORGE, in *Falconry*, is the uppermoſt bag or ſtomach of a hawk or falcon, being that which receives the food the firſt.

The gorge, *ingluvies*, is the ſame, in birds of prey, with what we call the *craw* or *crop*. When the bird is fed, he is ſaid to be *gorged*.

Gorge, in *Architecture*, denotes a ſort of concave moulding, wider but not ſo deep as a ſcotia; uſed chiefly in frames, chambranles, &c.

Gorge *of a Chimney*, is that part between the chambranle and the crowning of the mantle. Of this there are divers forms; ſtraight, perpendicular, in form of a bell, &c.

Gorge is ſometimes alſo uſed for a moulding that is concave in the upper part, and convex at bottom; more properly called gula and cymatium.

Gorge is alſo uſed for the neck of a column; more properly called colarin and gorgerin.

Gorge, in *Fortification*, the entrance of a *Baſtion*, or of a *Ravelin*, or other *Out-work*. See each article.

The Gorge *of a Baſtion* is what remains of the ſides of the polygon of a place, after retrenching the curtains; in which caſe it makes an angle in the centre of the baſtion.

In flat baſtions, the gorge is a right line on the curtain, reaching between the two flanks.

Gorge *of a Half moon*, or *Ravelin*, is the ſpace between the two ends of their faces next the place.

Gorge of the other out-works is the interval betwixt their ſides next the ditch.

All the gorges are to be made deſtitute of parapets; otherwiſe the beſiegers, having taken poſſeſſion of a work, might make uſe thereof to defend themſelves from the ſhot of the place: ſo that they are only fortified with paliſadoes, to prevent a ſurpriſe.

Gorge, *Half the Gorge*, *demi-gorge*, that part of the polygon between the flank and the centre of the baſtion.

GORGED, in *Heraldry*, is when a crown, coronet, or the like thing, is borne about the neck of a lion, a ſwan, &c. In that caſe they ſay, the lion or cygnet is gorged with a ducal coronet, &c.

Gorged is alſo uſed when the gorge or neck of a peacock, ſwan, or the like bird, is of a different colour or metal from the reſt.

Gorged, among *Farriers*, &c. ſignifies as much as ſwelled. In which ſenſe they ſay, the legs of an horſe are gorged; the paſtern-joint is gorged; you muſt walk him out, to diſgorge his ſhoulder.

Gorged, in *Rural Economy*, a term which is ſometimes applied to ſignify being *hoven* by freſh luxuriant green food, and relates to cattle, &c.

GORGERIN, a part of the ancient armour, being that which covered the throat or neck of a perſon armed at all points.

Gorgerin, or *Gorge*, in *Architecture*, the little freeze in the Doric capital, between the aſtragal, at the top of the ſhaft of the column, and the annulets.

Some call it *collarino*. Vitruvius gives it the name *hypotrachelium*.

GORGET, in *Military Affairs*, a piece of braſs or ſilver, worn by the officers of foot upon their breaſts when on duty. The gorget hangs round the neck by a ribband; they are ſometimes gilded, and have commonly ſome device engraved on them, as the ſovereign's, or even the colonel's coat of arms, creſt, or cypher.

Gorget, an inſtrument uſed in *Surgery*, for the purpoſe of cutting an opening into the bladder, ſo as to enable the operator to introduce the pair of forceps and extract the ſtone.

It is impoſſible to give the reader a proper notion of the form and manner of uſing the gorget, without preſenting him with engravings of the inſtrument, and entering into a deſcription of the operation of lithotomy. Hence, we muſt at preſent content ourſelves with referring to the ſurgical plates, and the article LITHOTOMY.

Beſides cutting gorgets, conſtructed for the above deſign, there are alſo blunt ones, intended to be introduced into the wound, when their concavity ſerves as a guide for the forceps into the bladder.

The employment of gorgets for the performance of lithotomy has been objected to by ſeveral eminent ſurgeons of the preſent day, particularly by Mr. John Bell of Edinburgh. (See his Principles of Surgery, vol. 2.) We have ſeen the operation moſt eaſily executed by means of a common ſcalpel. Mr. Aſtley Cooper uſes, inſtead of a gorget, a common ſcalpel with a beak, which glides along the groove of the ſtaff into the bladder. Several other knives and inſtruments have been at different times invented to ſuperſede the gorget. The principal ones will be repreſented in the ſurgical plates, and due notice will be taken of them in the article LITHOTOMY.

GORGIAS, ſurnamed *Leontinus*, in *Biography*, born at Leontium in Sicily, from whence he derived his ſecond name, was a celebrated orator and learned ſophiſt, who flouriſhed in the fifth century before the Chriſtian era. He was a diſciple of Empedocles, and is reckoned one of the earlieſt writers on the art of rhetoric. He is thought to have introduced numbers into proſe, treated of common places, and ſhewed the uſe of them for the invention of arguments. Hence Plato gave the name of Gorgias to his elegant dialogue on this ſubject, which is ſtill extant. He was ſo great an orator, that in public aſſemblies he would undertake to declaim extempore upon any ſubject propoſed to him. In the war between Syracuſe and Leontium, the citizens of the latter applied to the Athenians for ſuccour, and employed Gorgias and Tiſias as their ambaſſadors, the former of whom was peculiarly qualified to influence popular aſſemblies by his bold and perſuaſive eloquence. On their arrival at Athens about the year 427 B. C., Gorgias made an oration to the people on the grievances which their countrymen ſuffered from the people of Syracuſe, and the advantages which would accrue to them from ſending a powerful army into Sicily, by which he perſuaded them to ruſh headlong into a war, that proved in the end more fatal to them than any in which they had engaged. Afterwards he made a diſplay of his eloquence at the Olympic and Pythian games, on account of which a golden ſtatue was erected to his honour at Delphi. He is ſaid to have lived to the great age of 107 or 108.

GORGOGLIONE, in *Geography*, a town of Naples, in the Baſilicata; 15 miles E. of Venoſa.

GORGONA, an iſland of ſmall extent and of a circular form, in the Mediterranean, about 16 miles from the coaſt of Etruria. The mountains, ſays Sonnini, ſeem to be of the ſame nature with thoſe of the continent. This iſland is famous for the anchovy fiſhery on its coaſts. N. lat. 43° 22′. E. long. 9° 56′.—Alſo, an iſland in the Pacific ocean, about 18 miles from the coaſt of Peru, about 10 miles in circumference. N. lat. 3° 36′. W. long. 77° 52′.

GORGONEUM, Γοργονειον, in *Antiquity*, a kind of maſque uſed on the ancient theatre to repreſent hideous and frightful figures, in imitation of the Gorgons. Mem. Acad. Inſcript. tome v. p. 184.

GORGONIA, in *Zoology*, a genus of Zoophytes, the ſtem of which is coriaceous, woody, corky, horny, or ſomewhat bony, and in general flexible; the texture glaſſy, fibrous, or like ſtone, ſtriated, tapering, fixed at the baſe, which is dilated, and covered with vaſcular or cellular fleſh, or bark of a ſpongy and friable nature in a dried ſtate; the mouths or cells covering the ſurface of the ſtem and bearing polypes.

Theſe marine productions were regarded by the ancients as a claſs of plants, and deſcribed as ſuch by their botaniſts; nor was this idea, however remote from truth, exploded till ſo late a period as the eighteenth century, when the diſcoveries of Peyſſonel upon the nature of coral, publiſhed in 1727, and thoſe of Trembley on the hydra (or polype) about fourteen years after, contributed to demonſtrate, in a very explicit manner, that the gorgoniæ in common with other zoophytes (as theſe particular bodies are now denominated), do not appertain to the vegetable, but animal kingdom, or are at leaſt the fabrication and genuine habitations of animals.

Among the various obſervers of this curious order of animal productions, few, if any, have purſued their inveſtigations with greater diſcrimination and ſucceſs than profeſſor Pallas, or our own countryman Ellis, and his friend Dr. Solander; nor indeed can we heſitate to confeſs that our knowledge of the gorgonia tribe has been enlarged only in a very inconſiderable degree by any of the ſubſequent authors on this ſubject. The lateſt obſervations tend principally to confirm the accuracy of thoſe writers who had before aſſured us the gorgoniæ are the habitations of various kinds of polypiferous animals, each of which reſides in a diſtinct cell; that they lie in general dormant or contracted during winter, and, like the bloſſoms of plants, puſh forth buds, and expand in their proper ſeaſon, which is conſtantly in ſummer. The ſtem and branches of the gorgoniæ, which are moſt commonly of a ſomewhat horny and flexible nature, may be conſidered as the true ſkeleton of theſe neſts of habitations, being covered with a fleſhy or pulpy ſubſtance, the exterior ſurface of which is porous. Theſe pores are the mouths or openings of the cells in which the polypes are lodged, and it is the number, diſpoſition, and varied ſtructure of theſe, in addition to the general aſpect of the plant-like neſt of habitations, that conſtitute the moſt material differences by which the various ſpecies are diſtinguiſhed; the figure of the animal, when it can be aſcertained, forming the ſecondary or leaſt important character. It may be laſtly obſerved, that the gorgoniæ differ exceedingly in ſize, being from one to two, or perhaps three feet in height, while other ſpecies in deep bays, and ſimilar ſituations of the ſea, no leſs favourable to their growth and increaſe, attain to the gigantic height of ten or twelve feet, and from their number as well as magnitude; their remarkable ramoſe, and foliated or flabelliform appearance; interwoven ſtructure, and coral-like texture, form a conſpicuous portion of thoſe vaſt ſubmarine "groves of coral" that are ſometimes ſeen by navigators in the hotter regions of the globe.

Species.

LEPADIFERA. Dichotomous, with crowded, imbricated, reflected, campanulated florets. Müll. *Gorgonia reſeda*, Pallas. *Gorgonia reſediformis*, Gunner. *Reſeda marina*, Bell.

Native of the Norway ſeas, from eighteen inches to two feet high; fleſh pale, with whitiſh ſkin or ſcales; ſtem white, with a ſtony baſe and cartilaginous branches.

VERTICILLARIS. Pinnate, ramoſe, with alternate parallel ſubdiviſions, covered with verticillated incurved florets. Müll. Pallas, &c. *Sea-feather*, Ellis.

From two to three feet high; ſtem brittle and white, with flexible branches. Native of the Mediterranean and North ſeas.

Placomus. Branching both ways, with flexuous, and rarely uniting or anaſtomoſing branches, covered with conic florets. Linn. *Warted-ſea-fan,* Ellis. *Lithoxylon,* &c. Breyn.

Height two feet; ſtem erect, woody, and yellow, ſcarlet or reddiſh cinereous. Inhabits the Indian and European ſeas.

Mollis. Coriaceous, dichotomous, with perpendicular tubular florets. Pallas.

Native of the Mediterranean, and about eighteen inches in height, the colour brown violet; ſtem brown; branches long and ſlender.

Succinea. Round, amber-colour, dichotomous, rigid, the ſtem covered with tubercular gaping florets. Pallas.

A very rare ſpecies, the native place of which is unknown; it is only ſix inches high, the ſtem teſtaceous.

Americana. Branched and ſub-divided, the ſub-diviſions nearly oppoſite, compreſſed, with rows of polypiferous cells on each margin; fleſh yellowiſh, within pale purple; bone horny. Gmel. *Gorgonia pinnata,* Soland. and Ellis.

Native of the Weſt Indies; fleſh purpliſh or yellowiſh.

Exserta. Round, with a few alternate branches; florets alternate, eight-valved; fleſh covered with minute white ſcales; bone browniſh, horny. Soland.

Height two feet; branches long, ſlender, and white; polypes with eight feelers and exſerted. Inhabits the Weſt Indies.

Patula. Compreſſed, with flexuous ſub-pinnate branches, crimſon, with two rows of florets each ſide, each ſurrounded with a whitiſh ring: bone browniſh, horny. Soland.

Native of the Mediterranean.

Ceratophyta. Branched, with divaricate erect ſubdiviſions, each marked with two furrows; florets white, in irregular rows; fleſh purple; bone black and horny. *Gorgonia ceratophyta,* Soland. *Corallina fruticoſa purpurea,* C. Bauh. *Lithophyton, &c.* Geſn. *Corallina fruticoſa erectior,* Cateſby.

Found in the Mediterranean, Atlantic, and South American ſeas; height twelve inches; fleſh bright purple.

Juncea. Stem ſimple, round, and tapering both ways; bone duſky, horny; fleſh orange-colour, with two furrows; florets longiſh. Soland. &c. *Junci lapidei,* Plin. *Palmjuncue albus,* Rumpf.

Inhabits the ſhores of the American iſlands adhering to ſtones; height about three feet, and very flexible when alive.

Flammea. Compreſſed, branched, and ſub-pinnated; bone flat and horny; fleſh bright red, with minute florets. Soland. and Ellis.

A beautiful ſpecies, of a fiery red or flame-colour when recent; this kind inhabits the African coaſt, and appears to be found in moſt abundance near the Cape of Good Hope.

Umbraculum. Fan-ſhaped, and ſomewhat reticulated: branches numerous, divergent and round; fleſh reddiſh, warted or covered with florets. Soland. and Ellis.

Native of the Indian ſea; ſtem ſhort, riſing from a broad baſe, divided into about two or three branches, the ſmaller ones riſing from which are numerous, and ſo intimately connected as to form a kind of net-work.

Purpurea. Somewhat dichotomous, with divaricated ſlender branches; fleſh violet and ſub-verrucoſe. Pallas.

Round, ſmooth and blackiſh, with the extremities of the branches yellow. A South American ſpecies.

Sasappo. Sub-dichotomous, round, with divaricated ſlender branches; fleſh red, with numerous hairy florets. Pallas. *Accarbaar ſaſappo ſ. virga ſanguinea,* Rumpf.

About twelve inches in length, the texture horny, and colour black. The bernacle is frequently obſerved adhering to this ſpecies.

Palma. Flat, with numerous very long and ſimple diviſions; fleſh ſmooth, ſprinkled with ſimple pores. Pallas. *Chamæripha peregrina,* Cluſius.

Grows to the height of ſix feet, though more commonly not exceeding two or three feet; the ſubſtance horny, covered with a calcareous coating, and flexible. Inhabits the Indian ocean.

Radicata. Very much branched, and corky; with minute ſcattered pores, and many-cleft at the baſe. Pallas, Seba, &c.

Native of the African ſeas; ſub-dichotomous, grey, with branched trunk, and in ſubſtance reſembling cork.

Suberosa. Woody, very much branched, diffuſe, the branches compreſſed and grooved, and covered with ſubſtellated ſcattered pores. Pallas.

Height three feet; fleſh red, ſpongy; bone pale red and corky; branches long, round and erect. Found in the Indian and African ſeas.

Coralloides. Woody, erect, ſub-dichotomous, and variouſly formed; fleſh tuberous, with ſtellated tuberculated florets. Pallas. *Corallina lignum incruſtans,* Bocc.

Native of the Mediterranean; length one foot, very tough, pale grey, with yellow florets.

Elongata. Dichotomous, divaricated, with the fleſh red, and covered with papillous ſcattered ſub-imbricated pores. Gmel. &c.

Pale and brittle, with ſquare branches with pores at the angles; grows to the height of four feet, and inhabits the Atlantic.

Scirpea. Very ſimple, ſtraight, with a decompoſite leafy baſe, and ſoft tuberculated fleſh. Pallas.

Fuſcous, tapering towards the tip; the fleſh cinereous when dry; inhabits the Indian ſeas.

Setacea. Simple, rigid, with calcareous white ſub-tuberculated fleſh. Pallas. *Iſidis plocamum,* Mercat.

Native of the American ocean.

Viminalis. Very long, depreſſed, branched, with erect ſub-diviſions; fleſh yellow; florets ſeated along each margin of the branches, and rather prominent. Pallas. *Iſidis plocamum* II. &c. Mercat.

Height eight inches; branches long and ſlender; bone blackiſh and horny; florets white; the polype furniſhed with eight feelers or claws. Native of the Atlantic and Mediterranean.

Muricata. Round, with depreſſed ſub-divided branches; fleſh thick; pores cylindrical and ſpinous. Pallas, Ellis, &c. *Epicorallum,* &c. Petiv. *Lithophyton,* Tournef.

Native of the American iſlands; height from two to three feet; coriaceous, horny, with a whitiſh medullary nerve.

Verrucosa. Bifarious, with round, ſub-dichotomous flexuous branches; fleſh calcareous, pores whitiſh and prominent. Pallas, Ellis, &c. *Lithophyton marinum,* Geſn. *Corallina alba nodoſa,* C. Bauh. *Frutex marinus flabelliformis,* &c. Ray. *Erica marina,* &c. Petiv.

Inhabits the Weſt Indian, Mediterranean, and rarely the Britiſh ſeas, adhering by the broad baſe of the principal trunk to the rocks, and riſing to the height of twelve or fifteen inches, and ſometimes rather more, in a fan-like form; colour when dry greyiſh-white; bone of a texture between horn and wood.

ANTIPATHES. Shrubby, with erect, alternate panicled branches; bone with flexuous ſtriæ; fleſh thick and ſmooth; pores large and ſcattered. Pallas, &c. *Antipathes*, &c. Lobel. *Corallium nigrum Dioſcoridis*, ib. *Lithophyton nigrum arboreum*, Tournef. *Accabaar pohon*, Valent.

Grows to the height of two feet, and inhabits the Indian and Mediterranean ſeas. This is the black coral of the ſhops.

NOBILIS. Dichotomous, the branches ſomewhat tapering; fleſh red, ſlippery, and ſoft; the ſurface ſpeckled with numerous eight-valved, conic, and rather elevated, irregularly diſpoſed pores; bone bright red, ſtriated, and ſlightly punctured externally. Soland. and Ellis, &c. *Iſis nobilis*, Linn. Syſt. Nat. XII. *Madrepora rubra*, Linn. Syſt. Nat. X. *Iſis Pallas*. *Corallum rubrum*, Donat. *Red coral*, Ellis.

The bone of this ſpecies conſtitutes that beautiful and much eſteemed marine production, the red, or true coral of the jewellers. The coral is a general inhabitant of the Mediterranean, Adriatic, and Red ſeas, and appears to be no where more abundant than in the ſea about Marſeilles, Corſica, Sicily, and the coaſt of Africa, in the vicinity of Barbary, the coral fiſheries in thoſe parts being carried on with great ſpirit, and proving highly lucrative. From the obſervations of Donati, an author who has devoted much attention to this curious ſubject of enquiry, we underſtand that the fleſh or exterior coating of the coral is of a red colour, varying from bright to paler hues, the tint of which is uniformly leſs brilliant than that of the bone or coral itſelf. The moſt prevalent colour of the bone is red, exhibiting all the tranſitions from a pale roſe colour to fine ſcarlet, and ſometimes inclining to yellowiſh or fine ſaffron. The coral grows in a ſhrubby form, and not unfrequently in an inverted form, to the height of a foot or eighteen inches, which latter it rarely exceeds, nor is the circumference of the largeſt branches more than one inch. Externally the ſurface is ſtriated, more or leſs nodulous or warted, and the ſubſtance when broken appearing compoſed of a number of concentric layers. The coral of this ſpecies is equal in hardneſs and durability to the moſt compact marble, and theſe material qualities, in addition to its beautiful texture or grain, and colour, have contributed to render it valuable in the eſtimation of the world from the earlier ages, as we learn from Pliny, and other writers of remote antiquity. At this day the true coral bears a conſiderable price throughout the Eaſt as well as in Europe; its ſuppoſed medicinal virtues have, however, fewer votaries at preſent than formerly. The polypes, by which the cells are occupied, are furniſhed each with eight arms or tentacula, in the centre of which the mouth is ſituated; theſe arms are retractile, contract immediately on being touched; the cells or pores are filled with a white liquor, and the polypes are likewiſe white.

ANCEPS. Paniculated, ſub-dichotomous; ſtem and branches compreſſed; fleſh calcareous; margin porous. Gmel. Pallas, &c. *Sea willow*, Ellis. *Epicorallum virgulis alatis*, Petiv.

Inhabits the American, and ſome of the European ſeas: height nearly two feet; bone roundiſh, tapering to the ends, and violet when recent.

CRASSA. Round, dichotomous, with long, thick, divaricated, erect branches; fleſh thick, violet, with ſmall prominent, approximate, equidiſtant pores; bone dark brown and horny. Soland. and Ellis.

Native of the American ſeas.

PINNATA. Rather compreſſed and pinnated, with very ſimple compreſſed branches; fleſh red with oblong pores. Linn. *Palma pelagica*, Theophr. *Lithoxylon*, Breyn.

Grows to the height of from one to four feet; the texture horny and brown, the branches yellowiſh. Native of the African and North ſeas.

SANGUINOLENTA. Depreſſed, very ramoſe, and pinnated; fleſh yellow, with purple pores in double rows. Pallas. *Lithophytum flavum punctatum*, Tournef.

Native of the Atlantic and Mediterranean ſeas; height one foot.

VIOLACEA. Rather depreſſed, with pinnated branches; fleſh violet: nearly ſquare, with ſomewhat prominent pores. Pallas. *Quercus marina*, Theophr.

Inhabits the American ſeas, above a foot long, and horny.

SETOSA. Round and pinnated, with diffuſe branches; fleſh purpliſh. *Antipathes hirſutum*, Pon. *Lithophytum*, Tournef.

Grows to the height of two feet; very upright, and inhabits the Mediterranean and American ſeas.

PETECHIZANS. Sub-dichotomous, very much branched, with a yellow biſulcated fleſh covered with red pores. Pallas. Gmel. &c.

Native place unknown: bone horny, black, with amber-coloured ramifications.

PECTINATA. Round, with parallel aſcending ſimple branches; fleſh red, with gibbous ſcattered pores; bone white, hard, and brittle. Gmel.

Very rare, white, with red fleſh; found in the Indian ocean.

ABIENTINA. Ramoſe pinnated; fleſh yellow, with rows of purple florets each ſide; bone horny and yellowiſh. Soland. and Ellis.

Native of the African ſhores, and ſeldom exceeds a foot in height.

CALYCULATA. Dichotomous and ſubdivided, with erect thick ramifications covered with truncated papillæ; fleſh cinereous, within purpliſh; cells large and cup-ſhaped; bone dark brown and horny. Ellis.

Inhabits the American ſeas.

BRIAREUS. Subramoſe, round, thick; fleſh pale or whitiſh within, externally cinereous; bone compoſed of ſmall purple glaſſy needles, irregularly and cloſely diſpoſed longitudinally. Soland. and Ellis.

Cells large, prominent, numerous, and irregularly diſpoſed; the ſpecies inhabits the Weſt Indies.

VENTALINA. Reticulated; branches compreſſed externally at the ſides; bark red. Gmel. *Lithoxylon retiforme, &c.* Clifford Hort. *Gorgonia ventilabrum*, Pallas. *Flabella marina*, Rumpf.

Black or brown; the ſpecies inhabits the Indian ocean.

RETICULATUM. Reticulated, branches with very cloſe ſet round ramifications, and red tuberculated bark.

Very ponderous, of a grey colour, and inhabits the Indian ocean.

CLATHRUS. Reticulated, woody; with round ramifications; fleſh ſmooth with ſimple pores. Pallas.

Native place unknown; about eight or ten inches in height, pale, with a thin reddiſh-grey fleſh.

FLABELLUM. Reticulated; branches compreſſed internally; fleſh yellow. Gmel. *Gorgonia*, Pallas. *Flabellum veneris*, Ellis. *Frutex marinus*, Cluſius. *Frondipora*, Bonann. *Keratophytum reticulatum*, Brown. *Arbre de mer*, Rochef.

The bone is black, horny, and ſlightly ſtriated on the larger branches.

Found adhering to various ſubſtances, and varying in colour from yellow to purple: this ſpecies inhabits moſt ſeas.

GORGONIUM, in *Botany*, a name given by ſome authors to the common eryngium or eryngo, the roots of which we uſe candied.

GORGONS, in *Antiquity* and *Mythology*. Authors are not agreed in the account they give of the Gorgons. The poets repreſent them as three ſiſters, whoſe names were Stheno, Euryale, and Meduſa, the daughters of Phorcus by Ceto; the latter of whom was mortal; and having been deflowered by Neptune, was killed by Perſeus; the two former were ſubject neither to age nor death. They are deſcribed with wings on their ſhoulders, with ſerpents round their heads, their hands were of braſs, and their teeth of a prodigious ſize; ſo that they were objects of terror to mankind. Æſchylus, in his Prometheus, adds, that they had but one eye and one tooth among all the three, which they made uſe of one after the other, and that they killed men with a ſingle glance of the eye.

Pindar (Pyth. 12.) improves upon Æſchylus, and heightens the fable by theſe circumſtances, unknown to his predeceſſors. The firſt is, that the Gorgons turned thoſe into ſtone whom they looked upon, and that it was by this kind of death that Perſeus, in preſenting Meduſa's head, deſolated the iſland of Seriphus, whoſe inhabitants he petrified, together with their king. The ſecond is, that Minerva, who aided Perſeus while he was ſtruggling with Meduſa, being ſurpriſed with the melody of the Gorgons' ſighs, intermingled with the hiſſings of their ſerpents, felt certain charms in that mixed compoſition of doleful accents; and to renew the idea of the harmony, ſhe invented a flute in imitation of it, which ſhe imparted to men; and in alluſion to its firſt model ſhe called the various ſounds it produced "a Harmony with many heads." The third is, that Pegaſus, whom Heſiod repreſents as having taken flight to the manſion of the gods, was afterwards broke by Minerva, and given to Bellerophon, who mounted him to combat the Chimæra; but that hero having attempted to aſcend to heaven on the wings of that horſe, was thrown down to the earth, and Pegaſus placed among the ſtars. (Pindar's Ol. iii. Pyth. vii.) The Latin poets, though faithful copiers of the Greek ones, have yet loaded the fable of the Gorgons with new circumſtances. Homer had ſaid, that the Gorgon's head was engraved upon the tremendous Ægis of Minerva: Virgil adds, and upon her cuiraſs too, in the place which covered the goddeſs's breaſt:

> " ——— Ipſamque in pectore Divæ
> Gorgona defecto vertentem lumina collo." Æn. l. viii.

After the death of Meduſa, her ſiſters, according to Virgil, were appointed to keep the gate of the palace of Pluto:

> " Multaque præterea variarum monſtra ferarum—
> Gorgones, Harpeiæque——" Æn. l. vi.

Ovid of all the poets has more enlarged upon the fable of the Gorgons, and added ſeveral particulars which are only found in his Metamorphoſes, l. iv. and v.

Diodorus Siculus will have the Gorgons and Amazons to have been two warlike nations of women, who inhabited that part of Lybia which lay on the lake Tritonidis. The extermination of theſe female nations was not effected till Hercules undertook and performed it.

Pauſanias ſays, the Gorgons were the daughters of Phorbus, probably by miſtake for Phorcus; after whoſe death, Meduſa his daughter reigned over the people dwelling near the lake Tritonidis. The queen was paſſionately fond of hunting and war, ſo that ſhe laid the neighbouring countries quite waſte. At laſt, Perſeus having made war on them, and killed the queen herſelf, when he came to take a view of the field of battle, found the queen's corpſe ſo extremely beautiful, that he ordered her head to be cut off, which he carried with him to ſhow his countrymen, the Greeks, who could not behold it without being ſtruck with aſtoniſhment.

Others repreſent them as a kind of monſtrous women, covered with hair, who lived in woods and foreſts. Others, again, make them animals, reſembling wild ſheep, whoſe eyes had a poiſonous and fatal influence.

Xenophon of Lampſacus, who is followed by Pliny and Solinus, was of opinion, that the Gorgons were female ſavages, who inhabited the iſlands Gorgades. Hanno, the Carthaginian general, penetrated as far as theſe iſlands, where he found women, who, in ſwiftneſs, outran the flight of birds. Gerard Voſſius, in his "Origin and Progreſs of Idolatry," is perſuaded, that the fable of the Gorgons took its riſe from the relation of Hanno the Carthaginian general, above cited, from Xenophon of Lampſacus. Le Clerc, on the contrary, in his notes upon Heſiod, takes them for the mares of Lybia, which the Phœnicians in a voyage to Africa had taken away. Banier (Mythol. vol. iii.) is of opinion that the Gorgons dwelt in that part of Lybia, which was afterwards called Cyrenaicum; and that Phorcys, their father, had conquered Ithaca, which was not far from the coaſt of Africa, where he reſided. It is not incredible that this prince would employ his fleet in carrying on an advantageous trade, and that Polydectes, king of Seriphus, in order to get rid of Perſeus, gave him ſome ſhips for the purpoſe of pirating on the coaſts of Africa. Perſeus accordingly, thus equipped, ſailed from the iſle of Seriphus for the coaſt of Lybia, and having fallen in with the fleet of Phorcys, made himſelf maſter of ſome of his ſhips and a part of his riches. Theſe ſhips, it is ſaid, bore the names of Meduſa, Stheno, and Euryale. They were loaded with the teeth of elephants, the horns of fiſhes, and the eyes of hyænas, which Phorcys bartered for other goods. This, it is ſaid, is the myſtery of the tooth, horn, and eye, which the Gorgons borrowed by turns; that is, the ſhips, when arrived in the port, took each of them goods proper for the place to which they were bound. The other fictions that accompany this hiſtory, ſays the author now cited, will explain themſelves.

For a farther account of them, ſee Mem. Acad. Inſcript. vol. iv. p. 72, ſeq. See Medusæ *caput*.

GORGONZUOLO, in *Geography*, a town of Italy, in the department of the Olona; 10 miles N.E. of Milan.

GORGORA, an iſland of Abyſſinia, in the lake Dembea (which ſee), where a palace was built, which is the uſual reſidence of the emperor in winter.

GORHAM, a poſt town of America, in Cumberland county and ſtate of Maine, on the N.E. ſide of Saco river, 130 miles N.E. from Boſton: incorporated in 1764, and containing 2053 inhabitants.

GORIO, Anthony Francis, in *Biography*, a learned antiquary of the eighteenth century, a native of Florence, was author of the following works, *viz.* "Muſæum Florentinum," or a deſcription of the cabinet of the Grand Duke, eleven volumes folio, with a great number of plates: "Muſæum Etruſcum," three volumes, folio. "Muſæum Cortonenſe," folio. "Ancient Inſcriptions in the Towns of Tuſcany," three volumes folio.

GORITZ, or Gorz, in *Geography*, a country of Germany, in the circle of Auſtria; bounded to the N.E. and S. by the duchy of Carniola, and on the W. by the Venetian ſtates. The chief produce of the country conſiſts in wine and fruit, with ſome corn and ſilk; the horſes and oxen are ſew, but the goats are numerous. The language of the country is Sclavenian, and the religion Roman Catholic.

GORITZ, or *Goritia*, a town of Germany, ſituated in the above-mentioned country, and divided into Upper and Lower town; the former is ancient, ſeated on a mountain, and defended by a caſtle; the latter is ſituated on a plain on the river Liſonzo. Beſides the church, ſince the year 1784, not metropolitan, it has ſeven convents, nine chapels, and a college. In 1797 it was taken by the French: 20 miles N.N.W. of Trieſte. N. lat. 46° 5'. E. long. 13° 33'.

GORITZ, a town of Brandenburg, in the New Mark, ſeated on the Oder, formerly the metropolis of the circle of Lebus.

GORKA, a town of Hindooſtan, in Mewat; 12 miles S.S.W. of Cottilah.

GORKAH, a town of Aſia, ſituated in the N.E. part of the ſmall ſtate ſo called, on the borders of Napaul; 35 miles N.W. of Catmandu. N. lat. 28° 25'. E. long. 84° 36'. The country lies between the province of Oude and Thibet, and is governed by a raja dependent of Thibet.—Alſo, a town of the duchy of Warſaw; 40 miles S. of Poſen.

GORLÆUS, ABRAHAM, in *Biography*, a celebrated medalliſt, was born at Antwerp in 1549. He devoted himſelf entirely to the collection of ancient medals, ſeals, rings, and other curioſities. He died at Delft, where he ſpent the greateſt part of his life, in the year 1609. His works are entitled "Dactyliotheca ſeu Annulorum Sigillorumque e Ferro, Ære, Argento, atque Auro Promptuarium:" "Theſaurus Numiſmatum familiarum Rom.:" "Paralipomena Numiſmatum." His works are highly valued by thoſe who are addicted to theſe ſtudies. Moreri.

GORLITZ, in *Geography*, a town of Upper Luſatia, ſeated on the river Neiſſe, and the firſt town in the county with regard to ſize, population, and wealth. Within the walls it has three churches, and as many without. The principal trade is brewing, with woollen and linen manufactures. 50 miles E. of Dreſden. N. lat. 51° 9'. E. long. 15° 31'.

GOROCHOVETZ, a town of Ruſſia, in the government of Vladimir; 72 miles E. of Vladimir. N. lat. 56° 10'. E. long. 42° 34'.

GORODITSCHE, a town of Ruſſia, in the government of Penza; 32 miles E.S.E. of Penza. N. lat. 53° 20'. E. long. 46° 34'.—Alſo, a town in the government of Kiev, 112 miles S.E. of Kiev. N. lat. 49°. E. long. 32° 54'.—Alſo, a town in the government of Tobolſk, 20 miles E.S.E. of Eniſeiſk.

GORODNIA, a town of Ruſſia, in the government of Tver, on the Volga, 23 miles E. of Tver.

GORODNITZSK, a town of Ruſſia, in the government of Tchernigof, on the Snov; 32 miles N.N.E. of Tchernigof.

GORODOK, a town of Ruſſia, in the government of Poletſk; 36 miles E. of Poletſk. N. lat. 55° 36'. E. long. 29° 5'.

GORON, a town of France, in the department of Mayenne, and chief place of a canton, in the diſtrict of Mayenne; 9 miles N.W. of Mayenne. The place contains 1800, and the canton 12,733 inhabitants, on a territory of 200 kiliometres, in 11 communes.

GORONGO, a ſmall iſland in the Eaſt Indian ſea; 20 miles S. of Gilolo. S. lat. 1° 8'. E. long. 128° 33'.

GORONTALE, or GORONTANO, a town on the E. coaſt of the iſland of Celebes.

GORPETA, a town of Hindooſtan, in Berar; 24 miles W. of Chandor.

GORRIS, JOHN DE, in *Biography*, was born at Paris in the year 1505. He took the degree of doctor of phyſic in that city about 1540, and was appointed dean of the faculty in 1548. He is ſaid to have poſſeſſed both the learning and ſagacity requiſite to form an accompliſhed phyſician, and to have practiſed with great humanity and ſucceſs. His works contributed to ſupport this reputation. The greater part of them conſiſts of commentaries on different portions of the writings of Hippocrates, Galen, and Nicander. During the civil war, which was fatal to numerous men of letters, John de Gorris was ſtopped by a party of ſoldiers, when on his journey to Melun to viſit the biſhop of Paris, and the fright which he ſuſtained is ſaid to have deprived him of his reaſon. This occurred in 1561, and he lived many years in this deplorable condition, having died at Paris in 1577, at the age of 72.

His father, alſo John de Gorris, was a phyſician at Bourges, attained conſiderable eminence, and left two works, one on the general "practice of medicine," dated 1555; the other, a "collection of formulæ," 1560, both in Latin. Eloy Dict. Hiſt.

GORRITI, in *Geography*, a ſmall iſland in the river La Plata.

GORSA, a ſmall iſland near the S. coaſt of Cuba. N. lat. 21° 45'. W. long. 81° 25'.

GORSE. See FURZE and ULEX.

GORSIO, in *Geography*, a town of Sweden, in Helſingland; 30 miles W. of Hudwickſwall.

GORT, a poſt town of Ireland, in the county of Galway. It ſtands on an eminence, and is a dirty ſtraggling town, but can boaſt of a few good houſes. Adjoining to it are the ruins of a caſtle, and near it is Kilmacduagh, the ſee of a biſhop. Gort is 98 miles W. from Dublin.

GORTER, JOHN DE, in *Biography*, a phyſician, who, after having been a diſciple of the celebrated Boerhaave, became a diſtinguiſhed teacher of medicine at Harderwick, his native place; in conſequence of which he was elected a member of the academies of Peterſburg, Rome, and Haerlem, and obtained the title of phyſician to Elizabeth, empreſs of all the Ruſſias. He was the author of ſeveral works, which are written with excellent method, and contain many intereſting and original obſervations. He died on the 11th of September, 1762, at the age of 74.—His works, the titles of which are enumerated by Eloy, relate to phyſiological and practical ſubjects, as well as to the practice of the ancients. Eloy. Dict. Hiſt.

GORTERIA, in *Botany*, named by Linnæus after David De Gorter, profeſſor of phyſic and botany in the Dutch univerſity of Harderwick, author of ſeveral local Floras of that neighbourhood, and of Elementa Botanica. He died in 1783, aged 66. (Dryandr. Bibl. Banks. v. 5. 256.) Linn. Gen. 441. Schreb. 576. Willd. Sp. Pl. v. 3. 2265. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 3. 254. Juſſ. 182. Gærtn. t. 171. Lamarck. Illuſtr. t. 702. (Gazania; Lamarck. Illuſtr. t. 702. Perſonaria; ibid. t. 716.) Claſs and order, *Syngeneſia Polygamia-fruſtranea*. Nat. Ord. *Compoſitæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common calyx* of one leaf, imbricated with ſpinous ſcales, the innermoſt gradually longer, ſtraight, briſtle-ſhaped, rigid. *Cor.* compound, radiated. Florets of the diſk numerous, perfect, with a funnel-ſhaped five-cleft corolla: thoſe of the radius fewer, female, with a ligulate lanceolate one. *Stam.* (in the perfect florets only) Filaments five, ſhort; anthers united into a cylindrical tube. *Piſt.* (of the perfect florets) Germen hairy; ſtyle thread-ſhaped, the length of its own little corolla; ſtigma cloven. In the female florets the germen is obſolete and abortive; ſtyle none; ſtigma none. *Peric.* none, except the calyx, falling off oſt entire. *Seeds* to the perfect florets only, ſolitary, roundiſh. Down ſimple or woolly. *Receptacle* naked.

Eſſ. Ch. Receptacle naked. Down ſimple or woolly. Florets of the radius ligulate. Calyx of one leaf, clothed with imbricated ſcales.

All the plants ranged under this genus are natives of the Cape of Good Hope. In the 2d edition of Linnæus's Species Plantarum, where it firſt appears, are five; *perſonata*, Jacq. Coll. v. 4. t. 21. f. 1; *rigens*, Curt. Mag. t. 90; *ſquarroſa*, *ciliaris*, and *fruticoſa*. The latter is the ſame plant as *G. aſteroides*, Linn. Suppl. 381, but different from *Atractylis oppoſitifolia*, under which it is quoted in Syſt. Veg. ed. 14. 730. To the above are added, in the Mantiſſa, p. 287, *G. ſetoſa*; and in the Supplementum ſix more, *herbacea*, *hiſpida*, *ſpinoſa*, *cernua*, *uniflora*, and *barbata*. Of theſe the *uniflora* is there ſuſpected, we believe juſtly, to be a mere variety of *rigens*.

The genus thus underſtood undoubtedly forms a very unnatural aſſemblage, Linnæus having chiefly conſidered the ſimple-leaved calyx, as Gærtner long ago remarked. Willdenow accordingly has but ſeven *Gorteriæ*, the *perſonata*, *rigens*, and *cernua* of Linnæus, with *diffuſa*, *integrifolia*, *pectinata*, and *ciliata* of Thunberg. Others are ſent to his genera of *Muſſinia*, whoſe receptacle is villous, and ſeed-down formed of ſimple hairs; and *Berckheya*, whoſe receptacle and ſeed-down are chaffy. Among the latter are the beautiful and truly wonderful *G. ciliaris*, and the *ſpinoſa*; the latter figured in Jacq. Hort. Schonbr. t. 372. This is doubtleſs a great improvement, but it ſeems to us that the genus muſt, after all, chiefly depend on *G. perſonata*, which is an annual plant, of no beauty, with many ſpreading *ſtems*, about a foot high. *Leaves* alternate, ſpatulate, revolute, pinnatifid or undivided; very white and cottony beneath; and green and briſtly, like the ſtems, above. *Flowers* ſolitary, terminal, ſmall, yellow, with numerous prominent ſpines to the calyx. The *ſeeds* are crowned with wool, but have no proper *pappus* or ſeed-down. The leaves of *G. rigens* bear ſome analogy with this, but the large orange bloſſoms, unarmed calyx, and long ſimple ſeed-down, urge the propriety of ſeparating it. The latter is Lamarck's *Gazania*, above quoted.

GORTYNA, or Gortyn, in *Ancient Geography*, an inland city of Crete, being, according to Strabo, near 90 furlongs diſtant from the African ſea, or that part of the Mediterranean which waſhed the ſouthern part of the iſland. Its origin is obſcure, ſome aſcribing it to Gortyn, the ſon of Rhadamanthus, and others to Taurus, who carried off Europa. In proceſs of time, however, it eclipſed all the other cities of Crete, eſpecially after the iſland was reduced by the Romans. Of its ancient ſplendour and magnificence we may form ſome judgment from its ruins, which are ſtill viſible about ſix miles from mount Ida; though many of them have been carried away by the Turks. In ancient times it was famous for the temples of Apollo, Diana, and Jupiter Hecatombæus, ſo called becauſe Menelaus there ſacrificed to Jupiter 100 oxen, when he received information of Helena's flight. Its walls were waſhed by the river Lethe. Theophraſtus, Varro, and Pliny ſpeak of a plane tree near Gortyna, which never ſhed its old leaves till new ones ſprouted forth.

GORTYNIA, a town of Greece, in the northern part of Macedonia.

GORUAH, in *Geography*, a town of Hindooſtan, in Bahar; 62 miles W.S.W. of Bahar.

GORY, a town of Georgia, in the province of Carduel, on the Kur; 45 miles W. of Teflis. N. lat. 41° 55′. E. long. 44° 30′.

GORZE, a town of France, in the department of the Moſelle, and chief place of a canton, in the diſtrict of Metz; 7 miles S.W. of Metz. N. lat. 49° 3′. E. long. 6° 4′. The place contains 1535, and the canton 14,278 inhabitants, on a territory of 220 kiliometres, in 31 communes.

GORZEGNO, a town of France, in the department of the Stura, on the Bormida; 13 miles S.E. of Alba. N. lat. 44° 38′. E. long. 8° 17′.

GORZKE, a town of the principality of Magdeburg; 34 miles E. of Magdeburg.

GOSAYPOUR, a town of Hindooſtan, in Allahabad; 13 miles N.W. of Jionpour.

GOSCHGOSCHUENK, a town of America, in the Delaware, conſiſting of three villages ſituated on the banks of the Ohio. Its name ſignifies "the habitation of owls," from the number of thoſe birds that reſort hither.

GOSCHUTZ, a town of Sileſia, in the principality of Oels; 25 miles N.N.E. of Breſlaw. N. lat. 51° 23′. E. long. 17° 30′.

GOSELINI, Julian, in *Biography*, an Italian writer, was born at Rome in 1525, where he purſued his maturer ſtudies in the houſe of the cardinal de Santa Fiora. When he was ſeventeen years of age he was taken into the ſervice of Ferdinand Gonzaga, then viceroy of Sicily. He accompanied that nobleman to Milan in 1546, and became his ſecretary, and was afterwards taken to the court of Spain, where he obtained the eſteem and favour of Philip II. Under the duke of Albuquerque he was impriſoned on a charge of conſpiracy againſt the life of Giambatiſta Monti. He vindicated his own cauſe, was releaſed, and admitted to public employment. He died in 1587, leaving behind him ſeveral works, that obtained for him high reputation: of theſe the principal are, "The Life of Ferdinand Gonzaga." "Three Conſpiracies, &c." "Rime," or a collection of poems, ſeveral times reprinted. "Diſcourſes." "Letters," &c. Bayle.

GOSFIELD, in *Geography*, a townſhip of Eſſex county, in Upper Canada, ſituated upon lake Erie.

GOSHAWK, in *Ornithology*, the Engliſh name of the Falco *palumbarius*; which ſee.

GOSHEN, in *Ancient Geography*, a territory of Egypt, ſituated between the Red ſea and the Nile, upon the borders of Canaan, not far from On or Hieropolis, which Joſeph obtained of Pharaoh for the reſidence of his father Jacob and family. This was a fertile ſpot of ground, and fit for cattle: and, therefore, as Joſephus tells us, Pharaoh kept his own in that diſtrict. It was alſo ſeparate from Egypt, and therefore fitteſt for Jacob and his family, which would be out of all danger of interfering with the Egyptians.

Goshen, in *Geography*, a townſhip of America, in the county of Hampſhire, and ſtate of Maſſachuſetts, between Cummington and Conway; 14 miles N. of Northampton; incorporated in 1781, and containing 724 inhabitants.—Alſo, a townſhip in Vermont, lying partly in Addiſon county, and partly in Caledonia, adjoining to Saliſbury on the weſt.—Alſo, a townſhip in Cheſter county, Pennſylvania, containing 966 inhabitants.—Alſo, a town in Litchfield county, Connecticut, famous for the production of excellent cheeſe, containing 1493 inhabitants; 7 miles N.W. of Litchfield.—Alſo, the moſt conſiderable town in Orange county, New York; about 58 miles N. of New York city. Its ſituation is pleaſant, and it contains about 60 or 70 compact houſes, an academy, court-houſe, gaol, and Preſbyterian church. The townſhip contains 2563 inhabitants.—Alſo, a place in London county, Virginia, where is a poſt-office; 37 miles from Waſhington.—Alſo, a town in Kennebeck county, Maine, containing 270 inhabitants.

Goshen *Creek*, a river of New Jerſey, which runs into Delaware bay. N. lat. 39° 10′. W. long. 74° 54′.

GOSHGOSBINK, a Moravian ſettlement in Pennſylvania, ſituated on Alleghany river, about 15 miles above fort Franklin.

GOSIR, a town of Arabia, in Hadramaut, near the coaſt; 75 miles S.W. of Keſchim.

GOSLING, a town of Auſtria; 12 miles S.E. of Bavarian Waidhoven.

GOSLINGS, the name given to young geeſe.

GOSPEL, a hiſtory of the life, actions, death, reſurrection, aſcenſion, and doctrine of Jeſus Chriſt.

The word is Saxon, and of the ſame import with the Latin term *evangelium*, or the Greek ευαγγελιον, which ſignifies *glad tidings*, or *good news*; the hiſtory of our Saviour being the beſt hiſtory ever publiſhed to mankind. This hiſtory is contained in the writings of St. Matthew, St. Mark, St. Luke, and St. John, who from thence are called Evangeliſts. (See each of theſe articles.) The Chriſtian church never acknowledged any more than theſe four goſpels as canonical; notwithſtanding which, ſeveral apocryphal goſpels are handed down to us, and others are entirely loſt.

We ſhall here ſubjoin the titles of ſome of the principal of theſe apocryphal goſpels, as we find them in Jones's Canon, and Lardner's Works, with remarks that will ſerve to enable us to diſtinguiſh them from our four goſpels, the authenticity of which is evinced under other articles in this work. (See BIBLE, CANON, and TESTAMENT.) Several of theſe ſpurious goſpels are mentioned in the decree, aſcribed to pope Gelaſius, in the council of Rome, A. D. 494, which pronounced them to be apocryphal. The goſpel of "Andrew the Apoſtle," is only mentioned in this decree. No fragments of it are extant, nor are there any teſtimonies concerning it. The goſpel of "Apelles" is not mentioned by any writer before Jerom, who places it among the apocryphal pieces of the New Teſtament. Apelles was a diſciple of Marcion, flouriſhed about the year of Chriſt 180, and is ſuppoſed to have formed this goſpel out of the true and genuine goſpels for the uſe of his followers at the cloſe of the ſecond century. The goſpel, "according to the twelve apoſtles," is mentioned by Origen, Ambroſe, and Jerom, but they unanimouſly concur in rejecting it, and in expreſsly aſſerting that the church receives only four goſpels. Jerom ſuppoſes this to have been the ſame with the goſpel according to the Nazarenes The goſpel "according to St. Barnabas" is not noticed by any of the Chriſtian writers of the firſt four centuries; nor do there ſeem to be any fragments extant, that unqueſtionably belong to it. Mr. Jones apprehends that this was merely ſome interpolated corrupted goſpel of St. Matthew. The goſpel of "Bartholomew" is mentioned by Jerom as apocryphal, and Jones, for reaſons which he alleges, inclines to think, that it was the ſame with the goſpel of St. Matthew, uſed by the Hebrews or Nazarenes. M. Daillè is of opinion that it was forged but a very little time before Gelaſius. The goſpel of "Baſilides" is named by Origen, Ambroſe, and Jerom, among the apocryphal books of the New Teſtament; but no fragments of it remain. The goſpel of "Cerinthus" is mentioned only by Epiphanius in connection with an expoſition of the firſt words of St. Luke's goſpel, as many other Chriſtian writers notice the apocryphal books; and it ſeems probable, from the ſimilarity of the opinions adopted by Cerinthus and the Ebionites, that the goſpel of Cerinthus and his followers was no other than the Ebionite or Nazarene goſpel, *i. e.* the goſpel of St. Matthew corrupted and interpolated, in Hebrew. The goſpel "according to the Egyptians," was one of the moſt celebrated apocryphal books, and ſuppoſed even by ſeveral modern critics to have been a faithful compoſure of ſome Catholic Chriſtians in Egypt, before either of the four canonical goſpels now received. The firſt Chriſtian writer who cites it is Clemens Alexandrinus, who, however, rejects it, though ſome have ſuppoſed that a paſſage in the ſecond epiſtle of Clemens Romanus to the Corinthians is taken from this goſpel. It is mentioned by Origen, Jerom, and Epiphanius among apocryphal books. Many modern writers, as Eraſmus, Grotius, Grabe, Mills, ſuppoſe, that it is referred to in the introduction to St. Luke's goſpel, and therefore that it was prior to his; and Dupin and F. Simon think, that though it is not of the ſame authority with the four canonical goſpels, it ought not to be rejected. Mr. Jones is of opinion, that it was compoſed by ſome very early heretics to ſupport their doctrines of celibacy and abſtemiouſneſs, and very probably by thoſe of Egypt; and Dr. Lardner thinks that it was not written before the third century. The goſpel of the "Ebionites" was either altogether, or very nearly, the goſpel of the Nazarenes. The goſpel of the "Encratites" has been mentioned by Fabricius and ſome others, but there is reaſon for doubting whether any goſpel was ever called by this name. The goſpel of "Eve" has been mentioned by ſeveral modern writers, but only by Epiphanius among the ancients; it was, without doubt, a forgery of the Gnoſtics. The goſpel of the "Hebrews" was the ſame with that of the Nazarenes. The goſpels of "Heſychius" were ſome interpolated copies of our received goſpels. The goſpel of "Judas Iſcariot" is mentioned by Irenæus and Epiphanius as peculiar to one of the moſt monſtrous and inconſiſtent ſects that ever aſſumed the Chriſtian name. The falſe goſpels of "Lucianus," who was a famous critic and martyr under Diocleſian, were, like thoſe laſt-mentioned, corrupted, interpolated copies of our preſent goſpels. The goſpel of "Matthias," of which there are now no remains, is mentioned by ſeveral of the moſt celebrated writers among the ancients, *viz.* Origen, Euſebius, Ambroſe, and Jerom; but they all repreſent it as apocryphal. The goſpel of "Marcion" is taken notice of by Tertullian and Epiphanius, but it appears to have been one of our own goſpels, mutilated and altered; probably that of St. Luke, from which he took away entirely the two firſt chapters, and many other parts, inſerting many things of his own, with a view to favour the opinions he had adopted. The goſpel of the "Nazarenes" or "Hebrews" is the moſt famous of all the ancient goſpels. Some have ſuppoſed that St. Paul refers to this goſpel, Gal. i. 6. It is cited by Ignatius, as ſome have ſuppoſed, by Clemens Alexandrinus, by Origen, by Euſebius, by Epiphanius, by Jerom; and it is mentioned by Bede, Sixtus Senenſis, Baronius, Caſaubon, Grotius, F. Simon, Dupin, Grabe, Toland, Nye, Richard Mill, Fabricius, Mangey, and other modern writers. However it is alleged, that this goſpel was never received by any primitive writer as canonical, nor was it cited or appealed to, as of any authority, by any one writer of the firſt four centuries; and moreover that it was compoſed out of St. Matthew's and the other authentic goſpels, with additions of ſome other things received by oral tradition. It is allowed, that it was an early compoſure, and Mr. Jones ſays, that it was undoubtedly extant in the beginning of the ſecond century, and ſeems to have been made by ſome converted Jews, to favour their notion of blending judaiſm and chriſtianity together. "As many miſtakes," ſays Dr. Lardner, "have been entertained about the "goſpel according to the Hebrews," it may not be unſeaſonable to obſerve here, that probably it was an Hebrew tranſlation of St. Matthew's original Greek goſpel, with additions from the other goſpels; to which poſſibly might be added ſome few particulars received by tradition from the early Jewiſh believers."

believers." (See Ebionites and Nazarenes.) This excellent writer elſewhere obſerves, it is not neceſſary for us to ſuppoſe, that the ancient fathers who mention other goſpels, thought, "that all, if any of thoſe goſpels, were written before St. Luke's, or that he ſpoke of them; for Baſilides and Apelles could not write goſpels before the ſecond century: and they might ſuppoſe, that ſeveral, if not all the others, mentioned by them, were written after St. Luke's. The meaning of what theſe ancient writers ſay is, that the church receives four goſpels only. There were many others. But to them may be applied the words of St. Luke; they only took in hand, or attempted. They did not perform, as Matthew, and Mark, and Luke, and John did. And they might expreſs themſelves in that manner concerning goſpels written after St. Luke's, as well as before it."

The goſpel of "Peter" has been taken notice of by many of the ancient writers, as Serapion, Tertullian, Origen, Euſebius, and Jerom. Some have ſuppoſed, that this was the goſpel of St. Mark, who was the companion of Peter, and wrote the goſpel now extant under his name. But there is reaſon for believing that the goſpel of Peter was different from that of St. Mark. It is not very certain by whom it was forged. Dr. Grabe, and after him, Dr. Mill, ſuppoſe it to have been made by Leucius, whom they reckon to have been a heretic of the ſecond century; but Leucius did not live till the latter end of the third, or the beginning of the fourth century; whereas this goſpel appears to have been extant in the ſecond century, as we may infer from the account of it by Serapion, who was biſhop of Antioch in the 11th year of the emperor Commodus, *i. e.* A.D. 190. Mr. Jones apprehends, that this goſpel was compoſed by thoſe ancient heretics in the ſecond century, called *Docetæ* (ſee that article); and he conjectures that the goſpel of Baſilides above-mentioned, was either wholly, or in a great meaſure, the ſame with this apocryphal goſpel under the name of Peter. The goſpel of "Perfection" was one of the numerous forgeries of the Gnoſtics, who pretended to a greater perfection in knowledge and virtue than all others, and hence took their name. (See Gnostics.) The goſpel of "Philip" was another forgery of the ſame perſons. The goſpel of "Scythianus" was compoſed by him who was the ſource and author of the Manichean hereſy. The goſpel of "Tatian" was no other but a harmony of four goſpels, or a ſort of epitome of the whole hiſtory contained in our four goſpels. The goſpel of "Thaddæus" is merely mentioned in the decree of pope Gelaſius. The goſpel of "Thomas," or the goſpel of the "Infancy of our Saviour," is mentioned by Origen, Euſebius, Cyril, Ambroſe, Athanaſius, and Jerom, and is unqueſtionably apocryphal; though this is different from the goſpel of Thomas, one of the followers of Manes, the head of the Manichees, for Origen, who mentions the former, lived a conſiderable time before the Manichean hereſy was divulged. The goſpel of "Truth" was a forgery of the Valentinians in the ſecond century. This is ſuppoſed by ſome to be the ſame with the goſpel of "Valentinus," but others are of opinion that he had a goſpel of his own, different from that called the goſpel of Truth uſed by his followers. For further particulars we refer to Jones's Canon and Lardner's Works.

GOSPINI, in *Geography*, a town of the iſland of Sardinia; 24 miles S. of Oriſtagni.

GOSPORT, is a ſea-port town of Hampſhire, England. In the time of king Henry VIII., when Leland viſited this part of the iſland, Goſport was only a poor village inhabited by fiſhermen, but it has gradually become a town of conſiderable extent and importance; and of late years has been regularly fortified on the land ſide by a line of baſtions, redoubts, counterſcarps, &c. that extends from Weovil to Stoke, or more properly, Alverſtoke lake. Within the works on the Weovil ſide, are the king's brewery and cooperage, with an immenſe range of ſtorehouſes for wine, malt, hops, &c. This place communicates with the ſea by means of a large baſin and canal, with extenſive quays, where veſſels of conſiderable burthen can take in their ſtores. Many ſmall ſloops belonging to Weovil are employed in the conveyance of wine, beer, and water, to the ſhips in the harbour. On the Weovil ſide are alſo the new barracks, an extenſive range of buildings, with every convenience for a great number of ſoldiers. Goſport, conſidered as a ſea-port, is handſomely built, and the police well regulated. The town is a chapelry to the neighbouring village of Alverſtoke: the chapel is a ſpacious edifice, ſtanding in a large well-planted cemetery, to the ſouth of the town; the interior is neat, and diſpoſed into a middle and two ſide aiſles. The work-houſe for the poor is a large, airy, and commodious building. Here are alſo ſeveral charity-ſchools; and ſome alms-houſes for diſtreſſed widows. The markets are held three days weekly, and are much frequented: fiſh and vegetables are ſold in great abundance; the latter being brought, not only from a conſiderable diſtance inland, but alſo from the Iſle of Wight. Two fairs are held annually. Several breweries are eſtabliſhed; and a very extenſive iron foundery, where numerous articles are manufactured for government. Goſport is 78 miles diſtant from London: the population of the pariſh of Alverſtoke, including the inhabitants of this town, was returned, under the act of 1801, at 11,295; the number of houſes being 1906. The connection between Goſport and Portſmouth is preſerved by numerous ferry-boats that ply acroſs the harbour, which in this place is about three quarters of a mile in width.

At a ſmall diſtance ſouth of Goſport, is the Royal Hoſpital of Haſler, built between the years 1746 and 1762, for the reception of ſick and wounded ſeamen, on the earneſt recommendation of the late earl of Sandwich. It is ſituated within 400 yards of the extremity of the point of land which bounds the weſt ſide of the entrance to Portſmouth harbour; and conſiſts of an extenſive front, and two wings, each compriſing two diſtinct ranges of buildings. In this hoſpital upwards of 2000 patients can be accommodated; the regular expence of the eſtabliſhment in ſalaries, &c. is above 5000*l.* annually.

Nearly a mile ſouth-weſt from Haſler hoſpital is Fort Monkton, a modern and regular fortification, exceedingly ſtrong, and defended by thirty-two pieces of heavy ordnance; to the weſtward, ranges a ſtrong redoubt; and this, together with the fort, effectually ſecures this part of the coaſt. On the ſhore, to the eaſtward, a high and maſſive ſtone wall has been erected, to preſerve the land from the ravages of the ſea.

Near the extremity of the neck of land which terminates the entrance of the harbour on the eaſt ſide, is the Block houſe, a very ſtrong fort, defended by a formidable battery. Beauties of England and Wales, vol. vi.

Gosport, formerly called *Appledore*, a fiſhing town of America, on Star iſland, belonging to Rockingham county, New Hampſhire, containing 85 inhabitants; about 12 miles E.S.E. of Piſcataqua harbour.

GOSS, in *Rural Economy*, a term occaſionally applied to the common whin in different places, and which is ſometimes written *gorſe*. See Furze.

GOSSAINGUNGE, in *Geography*, a town of Hindooſtan, in Oude; 15 miles S.E. of Lucknow.

GOSSAMER is the name of a fine filmy ſubſtance, like cobwebs, which is ſeen to float in the air, in clear days in autumn, and is more obſervable in ſtubble-fields, and upon furze and other low buſhes. This is probably formed by the flying ſpider, which, in traverſing the air for food, ſhoots out theſe threads from its anus, which are borne down by the dew, &c.

GOSSAMPINUS, a name given by Pliny and the ancients to a tree growing in the Eaſt Indies, which produced a ſort of cotton, the threads of which were too ſhort to be ſpun or carded; ſo that it ſerved only for the ſtuffings of beds and the like, for which it was very proper, being very light and ſoft. It was in ſome eſteem in medicine alſo, to recal the heat and ſpirits into parts to which it was applied. It is called by Piſo *arbor lanigera*, the wool-tree, and had its ancient name from the words *goſſipium*, cotton, and *pinus*, the pine-tree, being ſomewhat like the pine in external appearance, yet bearing a ſort of cotton.

GOSSE-ABDIAH, in *Geography*, a town of Nubia, on the Tacazé; 90 miles S. of Jalac.

GOSSEC, M. in *Biography*, a voluminous French muſical compoſer of the old ſchool, almoſt the only lineal deſcendant of Lulli and Rameau. He had force, fire, and knowledge; but his ſtyle was not that of the preſent day, either in Italy or Germany, nor could his friend, M. Laborde, perſuade us, that "true genius is in need of no ſchool or model. In whatever nation a man of genius may be born, he will make himſelf known, and not march with leſs firmneſs, though without a guide, in the road to glory. Celebrated ſchools cannot give genius, that is the boon of nature, and nature wants no ſchool." Eſſais ſur la Mus.

Unluckily, nature alone has never made an artiſt. A good painter, poet, or muſician, can never be made without education, ſtudy, and models. Ingenious works have been produced by dint of genius, but never faultleſs. The awkwardneſs of ſelf teaching will always appear; and taſte, elegance, facility, grace, and often learning, will be wanting to render them perfect.

GOSSEINS, in *Geography*, a town of Thibet, on the Dewah. N. lat. 30° 30′. E. long. 81° 24′.

GOSSELIES, a town of France, in the department of Jemmape, and chief place of a canton, in the diſtrict of Charleroy. The place contains 2872, and the canton 12,894 inhabitants, on a territory of 100 kiliometres, in 17 communes.

GOSSIPIUM. See GOSSYPIUM.

GOSSLAR, in *Geography*, a town of the kingdom of Weſtphalia, on the Goſe, which runs near this place into the Ockar. It was a free and imperial town, having on one ſide the biſhopric of Hildeſheim, and on the other the principality of Wolfenbuttle. It was founded in the year 922, by Henry the Fowler, and part of it re-built after being deſtroyed by fire in 1728. It has four pariſh churches, two chapels, and two Lutheran convents. Its principal trade ariſes from the mines of iron and lead in the Rammel mountain near it; 30 miles S. of Brunſwick. N. lat. 51° 55′. E. long. 10° 26′.

GOSSUM, a ſwelling of the thyroid gland. See BRONCHOCELE.

GOSSWEINSTEIN, or GOSSMANSTEIN, in *Geography*, a town of the biſhopric of Bamberg, on the Putlach, 20 miles E. S. E. of Bamberg. N. lat. 49° 45′. E. long. 11° 19′.

GOSSYPIUM, in *Botany*, the Cotton plant. The name is ſuppoſed by the learned to be of Egyptian origin, and if ſo, is akin to *Cotnemſegiar*, or *Gotnemſegiar*, the evident ſource of our word Cotton, which is given as the Egyptian appellation of the plant in Alpinus, de Plantis Ægypti, 71. Pliny makes it a Latin word, though the more common name he ſays is Xylon; the Greek ξυλον.—Linn. Gen. 355. Schreb. 468. Willd. Sp. Pl. v. 3. 803. Cavan. Diſſ. faſc. 6. 309. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. v. 2. 453. Juſſ. 274. Lamarck. Illuſtr. t. 586. Gærtn. t. 134. (Xylon; Tourn. t. 27.)—Claſs and order, *Monadelphia Polyandria*. Nat. Ord. *Columniferæ*, Linn. *Malvaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth double: the outer of one leaf, three-cleft, flattiſh, largeſt: inner of one leaf, cup-ſhaped, with five blunt notches. *Cor.* Petals five, inverſely heart-ſhaped, flat, ſpreading, attached to the tube of the ſtamens by their baſe. *Stam.* Filaments numerous, connected in their lower part into a tube, ſeparate and lax above, inſerted into the corolla; anthers kidney-ſhaped. *Piſt.* Germen ſuperior, roundiſh; ſtyle columnar, as long as the ſtamens; ſtigmas three or four, oblong, thickiſh. *Peric.* Capſule roundiſh, pointed, with three or four cells and as many valves, with contrary partitions. *Seeds* numerous, oval, fringed and enveloped with long wool.

Eſſ. Ch. Calyx double; the outer three-cleft. Capſule with three or four cells. Seeds enveloped in wool.

The ſpecies of Cotton, like thoſe of all plants cultivated from the moſt remote antiquity, in various countries, for economical purpoſes, are extremely difficult to define, and obſcured by numerous varieties.

Linnæus in Sp. Pl. ed. 1, defines three ſpecies only,

1. G. *herbaceum*. Camer. Epit. 203. Cavan. t. 164. f. 2, ſuppoſed to be a native of the Levant, Eaſt Indies, and Africa, and generally cultivated in thoſe countries for its produce.—Leaves five-lobed, pointed, with one gland beneath. Stem herbaceous, nearly ſmooth.—This is annual, with a buſhy, branched, often zig-zag *ſtem*, ſmooth or only ſlightly downy. *Leaves* cut half-way down into three principal, and two ſmaller lateral, pointed rounded lobes. The mid-rib bears one gland at its back, about half an inch from the ſtalk. *Flowers* yellow, purple at the baſe. *Capſule* the ſize of a walnut, enveloped in the calyx like a filberd.

2. G. *barbadenſe*, taken up from Plukenet, t. 188. f. 1. Leaves three-lobed, entire, with three glands beneath.—Suppoſed to be a native of Barbadoes. It is at leaſt one of thoſe cultivated in the Weſt Indies. The plant is in all its parts larger than the foregoing; lobes of the *leaves* not near ſo deep.

3. G. *arboreum*. Cavan. t. 165. Pluk. t. 188. f. 3. (Cudu-pariti; Rheede Hort. Mal. v. 1. 55. t. 31.)—Leaves palmate, five-lobed; lobes lanceolate. Stem ſhrubby.—Native of the Eaſt Indies in a ſandy ſoil. The woody perennial *ſtem*, and deep-cut long-lobed *leaves*, whoſe mid-rib bears one gland, diſtinguiſh this. The *flowers* are rediſh. The cotton is uſed in manufactures. Willdenow erroneouſly quotes Alpinus here.

His *Cotnemſegiar* is in the Plant. Ægypt. t. 71, not his Exot. t. 38, and does not agree with the Eaſt Indian plant.

To theſe is added in Sp. Pl. ed. 2. 975,

4. G. *hirſutum*. Cavan. t. 167. Leaves with three or five acute lobes. Stem branched, hairy.—The ſynonym of Tournefort is wrong.—This is ſaid to come from America. It appears to us a hairy variety of the firſt, for the gland on the mid-rib, which Linnæus thought an excluſive mark of *hirſutum*, is found in both.

What Linnæus intended by G. *religioſum*, Syſt. Nat. ed. 12. v. 2. 462, is rather doubtful. He defines it—"Leaves three-lobed, acute, with one gland beneath. Branches dotted with black."—We have an Eaſt Indian plant which anſwers to this definition, but it does not exactly agree with what he has marked *religioſum* in his own herbarium, which appears to us *barbadenſe*; though it may be what he had in his garden.

With the *latifolium* of Murray, Comm. Gott. for 1776. t. 1, we are unacquainted.—Cavanilles figures and deſcribes ſeveral more ſpecies, eſpecially G *vitifolium*, t. 166, a noble plant, from Commerſon's herbarium, gathered in the Mauritius.—Willdenow, adopting theſe, reckons ten ſpecies in all, but the ſynonyms of the whole genus require reviſion.

GOSTADT, Jottstadt, or *Joſephſtadt*, in *Geography*, a town of Saxony, in the circle of Erzgeberg; 23 miles S. of Chemnitz. N. lat. 50° 26′. E. long. 13° 2′.

GOSTIN, a town of the duchy of Warſaw; 48 miles N.N.W. of Rawa.

GOSYTULLA, a town of Bengal; 22 miles E. of Kiſhenagur.

GOTARA, a town of Hindooſtan, in Bahar; 57 miles S.S.W. of Patna.

GOTERON, a valley of Switzerland, in the canton of Friburgh, on the N.W. of the town of Friburgh, near the bridge leading to Bern, takes it name from the Goteron, a ſmall rivulet; it is extremely narrow, and above two miles in length, and is bounded on each ſide by overhanging rocks of ſandſtone. Vernet, the celebrated landſcape painter, ſtudied theſe rocks with great attention, and frequently declared that, excepting thoſe of Tivoli, he never ſaw any whoſe varying tints had a more pleaſing and harmonious effect. The valley contains ſeveral mills, an iron foundery, where the ore brought from Franche Comté is forged, and a manufacture of linen and cotton, eſtabliſhed by ſome merchants of Neuchatel, under the protection and encouragement of government.

GOTH, Stephen, in *Biography*, archbiſhop of Upſal, in Sweden, in the 16th century, concurred in the meaſures adopted by king John, to reſtore and re-eſtabliſh popery in that kingdom. With this view he ſanctioned a new liturgy, which, under the pretence of bringing the Lutheran church nearer to the ſimplicity of the earlier ages of the goſpel, artfully aſſimilated the doctrines and ceremonies of worſhip to thoſe of Rome, with the omiſſion of ſome particular forms and expreſſions which would have too plainly diſcloſed the object in view. This liturgy was ordered to be uſed in all the churches. The king's brother Charles, and the clergy within his juriſdiction, were alarmed at this attempt, and they ſo effectually rouſed the jealouſy and excited the fears of the people, and of the ſtates, that after repeated efforts to carry his point, which introduced great confuſion into the kingdom, and had nearly produced a civil war, the king was obliged to relinquiſh his ſcheme, and the liturgy was ſuppreſſed. It has long ſince become an object of curioſity among collectors, and is entitled "Liturgia Sueceanæ Eccleſiæ cum præfatione et notis Laurentii Upſalienſis Epiſcopi," 1576. Univer. Hiſt.

GOTHA, in *Geography*, a principality of Germany, in the circle of Upper Saxony, bounded on the N. by the electorate of Saxony, on the E. by the duchy of Weimar, on the S. by the county of Henneberg, and on the W. by the principality of Eiſenach. The duchy contains 12 towns, and more than 200 churches: it abounds in grain and fruit, and the ſouthern diviſion contains part of the foreſt of Thuringia, and ſome mine works. The ſtate conſiſts of three claſſes, *viz.* counts, nobility, and ſome barons, convoked by the prince. The reigning duke maintains a guard of 160 men, two regiments, each of which is compoſed of 800 men, and a corps of artillery. The chief rivers are the Leine and the Neiſſe.

The capital of the principality of the ſame name is ſeated on an eminence near the Leine, which ſupplies the town with water, conveyed by ſtone-canals, and is among the beſt and handſomeſt towns in Thuringia. It has an hoſpital for the ſoldiers, two ſchools for their children, and barracks, in which the military art is taught: it has likewiſe a foundery for cannon, balls, &c. two churches, a good academy, a houſe of correction, an hoſpital for widows, and another for orphans. The inhabitants carry on a conſiderable trade in wool and woollen manufactures, and beer; and they derive benefit, not only from the agriculture of the vicinity, but from the paſſengers that traverſe through it from Leipſick to Upper Germany. The reſidence of the duke, called Friedenſtein, ſtands on a hill above the town, and contains an armoury, a valuable library, a muſeum of natural curioſities, and an excellent cabinet of medals: 13 miles S.W. of Erfurt. N. lat. 50° 57′. E. long. 10° 40′.

Gotha, a river of Sweden, which iſſues from the ſouthern extremity of the lake Wenner, near Wennerſborg, and after a courſe of 70 miles, falls into the ſea near Gotheborg. In moſt places this river flows with a gentle current and in a narrow channel, and is navigable only in ſome parts of its courſe for ſmall craft of 20 tons burden. If it could be rendered navigable through its whole courſe, the Wenner lake might be joined with the German ocean; but as numerous ſhoals and cataracts intervene, the communication has been attempted by the Carlſgraf canal, the canal of Trolhætta, and the ſluices of Akerſtræm and Edet. About 10 miles from Gotheborg the river Gotha divides into three branches: two unite again after encircling a ſmall rocky iſland, crowned with the fort of Bohus, formerly deemed impregnable; the ſtream formed by the union of the two branches is called the Northern river, and falls into the ſea after a courſe of 10 miles. The third branch retains the original name of Gotha; and the ſpace included between the Northern river and the Gotha is named the iſland of Hiſingen.

GOTHARD, St., a town of Hungary, near which the Turks were defeated by the Chriſtians, in the year 1664; 21 miles W. of St. Crot.

Gothard, *St.* a chain of mountains of Swiſſerland, in the canton of Uri, the ſummit of which riſes above the ſea 9075 feet, though ſome have eſtimated its height to be much greater. The particular parts of this chain are called by different names; of which the principal are the Salla, Proſa, and Surecha, to the eaſt; the Feudo, the Patina, and the Locendro, to the weſt; to the north, the Urſino; and to the ſouth, the ridge of naked and piked rocks of the Val-Maggia. Of theſe, the Feudo is the higheſt. There are ſix paſtures on the neighbouring heights, on which are fed 200 cows, 150 goats, and 30 horſes. The river Teſino has three principal ſources in the chain of St. Gothard: the firſt is a ſpring near the foot of the Proſa, the ſecond is the lake of La Salla, in another part of the eaſtern chain, and the third is furniſhed by the ſnows of mount Feudo. Theſe three ſources uniting with another branch, that flows from the Furca, through the valley of Bedneto, form one great torrent, which takes its courſe towards the ſouth, enters the lake of Locerno, and traverſing part of the Milaneſe, falls into the Po. The ſource of the Reuſs is the lake of Locendro, an oblong piece of water, about three miles in circumference, ſtretching between the mountains of Patina and Locendro, and almoſt entirely ſupplied by the immenſe glaciers which crown the ſummit of the Locendro. The ſtream iſſuing from this lake ruſhes down the valley of St. Gothard, and joining in the vale of Urſenen, the two branches which come from the Furca on one ſide, and from the Griſon mountains on the other, flow towards the north into the lake of Lucern, and from thence throws itſelf into the Aar. The valley of St. Gothard is exceedingly dreary. It does not contain a ſingle ſhed, nor produce a ſingle tree; and the ſides of the mountains are barely ſprinkled with ſhort herbage.

Mount St. Gothard affords one of the beſt Alpine paſſages from Germany and Swiſſerland to Italy. The Romans were acquainted only with that over the Great Bernhard and Septimer. The Gothard was called by them ſometimes Adula, ſometimes the *High* and *Lepentine Alps*. The preſent road over this mountain begins at the village Hoſpital, in the Urſern valley, and terminates on the ſouth ſide, at Airolo: its breadth is from ten to twelve feet, and it is covered with large pieces of granite.

The firſt attempt of paſſing over the Gothard in a travelling carriage, was ſucceſsfully made in the month of July, 1775, by the late Mr. Greville, the gentleman to whoſe early exertion in collecting and in employing perſons well qualified to aſſiſt him, we owe the extenſive aſſemblage of minerals lately purchaſed by government for the Britiſh muſeum.

Though, in the high Gothard valley, the temperature is ſeldom below 19° of Reaumur, yet, on the N. ſide of the mountain, the climate is ſufficiently rough to make the growth of trees ceaſe at the height of 4566 feet. Among a vaſt number of plants common to the Alps in general, we find here, as peculiar to mount Gothard, the *Viola minima*, and *Campanula patula*.

But moſt intereſting is this mountain in regard to its mineral ſubſtances, and its geognoſtic ſtructure in general: for, reſpecting the former, it may be ſaid, that there is ſcarcely any where a tract of country known, that, within the ſame extent of ſpace, affords ſo conſiderable a variety of them. This is not the place for enumerating all theſe foſſils; we ſhould, however, not omit mentioning, that the *tremolite*, which has received its name from the valley of Tremola, is, according to Ebel, not found there, but deeper down the mountain, in the Leventine valley. See TREMOLITE.

The St. Gothard conſiſts entirely of primitive rocks, which, however, diſplay great variety in their mixture. On the N. ſide veined granite, gneiſs, mica-ſlate; in the plain of the rocky valley, where the Hoſpitium ſtands, granite of large grain, traverſed by beds of veined granite and mica-ſlate; from the ſummit downwards, on the S. ſide, maſſive granite of large and ſmall grain alternately, veined granite, mica-ſlate; in the Tremola valley, on the Fieudo and Soreſeia, hornblende-ſlate commences, mixed in ſome places with fine granular quartz, in others with feldſpar, and lower down with fine reddiſh-brown, dodecahedral garnets; over which beautiful rock the road winds, through the Pioſtella foreſt, down to Airolo. On the N. ſide, in the Urſern valley, among the juſt mentioned rocks, runs pot-ſtone on the S.S.E. part of the valley, and on the N.N.W. primitive lime-ſtone and clay-ſlate; while the S. ſide in the Leventine, Canaria, and Piora vallies, exhibits primitive lime-ſtone and gypſum.

All rocks of the Gothard are diſpoſed in ſtrata, having a direction from E.N.E. to W.S.W., and from N.E. to S.W. which is beſt obſerved between Hoſpital and Airolo, where the road makes a tranſverſal ſection, almoſt through the whole of the central chain. The regularity of the ſtratification of the granite is moſt ſtriking in the neighbourhood of the Rudunt bridge: the ſtrata are from three to four inches thick, and have their direction from N.E. to S.W. Likewiſe, on the Proſa and Fieudo, and ſouthward from Hoſpital down the valley of Tremola, the primitive lime-ſtone and gypſum, which paſs on the S. ſide of the mountain through the Leventine, Canaria, and Piora valleys, and the lime-ſtone, clay-ſlate, and pot-ſtone, ſeen on its N. ſide, in the Urſern valley, are the continuations of the ſame formations that range through the whole of the Pays de Vaud.

The ridges of mountains conſtituting the Gothard are exceedingly broken, and bear the marks of cauſes the moſt deſtructive; nor is it improbable that they were infinitely higher in ancient times, and that, at the period of the Romans, they were not unaptly called the *Higheſt Alps*. The upper rocky valley, where the Hoſpitium is ſituated, is covered with numberleſs pieces of rocks, which are all precipitated from the ſurrounding peaks. The great proportion of a ſmall grained granite, among the rocks of the Gothard, are the probable cauſes of this extraordinary devaſtation. The upper, nearly circular, rocky valley, was in former times completely ſhut on all ſides: the remains of the rocks that formerly filled the chaſms are ſtill diſtinctly ſeen on the N. ſide, near the bridge over the Rudunt, where the Reuſs forms a beautiful fall; and on the S. ſide, below the Hoſpitium, the rocks approach each other ſo cloſely, that the violent action which produced the preſent chaſms is ſufficiently evident. Before that revolution happened, it is highly probable that this conſiderable valley formed a deep lake; nor is it leſs ſo, that the Urſern-valley, before the Devil's mountain was broken through, and the upper Leventine valley, before the Platifer, near Dazeo Grande, was rent aſunder, repreſented deep ſeas of conſiderable extent.

GOTHEBORG, a town of Sweden, in Weſt Gothland, diſtinguiſhed by a commodious port, and ſtanding near the ſcite of Lodeſe, a town built by Guſtavus Vaſa, which, being endowed with ſingular privileges, ſoon became the great emporium for the trade of the weſtern provinces. Charles IX., when duke of Gothland, having, in 1604, laid the foundations of a new town in the iſland of Hiſingen, not far from Lodeſe, called it Gotheborg, in honour of his duchy. On his acceſſion to the throne, he erected in his new town a trading company; drew thither many foreigners, particularly the Dutch, to whom he allowed an exemption from all duties of export and import during twenty years; eſtabliſhed a corps of Engliſh and Scots troops, and granted to the Calviniſts the free exerciſe of their religion, the firſt place in Sweden where this toleration was permitted. By theſe means Gotheborg ſoon became a flouriſhing port, and, next to Stockholm, the moſt commercial town in Sweden. In 1611 it was reduced to aſhes by the Danes, and afterwards rebuilt in the reign of Guſtavus Adolphus on the preſent ſcite, and obtained a confirmation of its ancient rights, with a grant of ſeveral new privileges.

Gotheborg is built in a ſingular ſituation. At a ſmall diſtance from the ſea is a marſhy plain, not more than half a mile in breadth, watered by the rivers Gotha and Moldal, and almoſt incloſed with high ridges of bare and rugged rocks. Gotheborg ſtands partly on the ridges, and partly in the plain, and is divided into the upper and lower town. The latter is entirely level, interſected by ſeveral canals, and the houſes are conſtructed on piles: the upper part hangs on the declivities, and rows of buildings riſe one above the other like the ſeats of an amphitheatre. The whole is regularly fortified; and the circumference is near three miles, excluſive of the ſuburbs, called "Haga," which lie towards the harbour. The ſtreets are uniformly ſtraight; ſome few of the houſes are of brick, but moſt of them are conſtructed of wood, painted red. The harbour, formed by two chains of rocks, is about a quarter of a mile in breadth; and the entrance is defended by the fort of New Elfſborg, which ſtands on a ſmall rocky iſland, and contains a garriſon of 250 men.

A royal ſociety of ſciences and literature has been lately eſtabliſhed in this town, on the plan of that of Upſal. The acts, written in the Swediſh tongue, and printed in 8vo. contain diſquiſitions on various ſubjects, in the ſeveral branches of ſcience, natural hiſtory, antiquities, hiſtory, and polite letters. The population amounts to 20,000 perſons, in conſequence of an increaſe, occaſioned by the extenſion of its commerce, particularly on account of the Eaſt India company, and the ſucceſs of the herring fiſhery. The Eaſt India company was eſtabliſhed in 1731, and on account of the ice, which cloſes the port of Stockholm, in the gulf of Bothnia, at the proper ſeaſon of the departure of ſhips for the Eaſt Indies, the company carries on its commerce from Gotheborg, whoſe harbour, lying in the German ocean, is more open. In 1740, the herrings, which had not hitherto uſually approached the weſtern ſhore of Sweden, flocking in ſhoals, the inhabitants of Gotheborg eſtabliſhed a fiſhery, which has been very lucrative. The fiſhery begins in November, and though it continues ſcarcely three weeks, it ſupplies the fiſhermen of Gotheborg with not leſs than 600,000 barrels. Of theſe, 200,000 are ſalted, and train-oil is drawn from the remainder; fifteen barrels of herrings yielding one of oil, which is principally exported to Holland and Spain. One barrel of ſalt, procured from Spain, cures three barrels of herrings: the average exportation of ſalted herrings may be eſtimated at 150,000 barrels, and the inland conſumption of Sweden at 50,000. An Engliſh conſul and factory reſide at Gotheborg; and a chapel, with a regular chaplain, is appropriated for their uſe. The fortifications of Gotheborg are ſo weak, that in the year 1788 it muſt have fallen into the hands of the Danes, if foreign powers had not interfered. N. lat. 57° 40′. E. long. 11° 44′. Coxe's Travels in Sweden.

GOTHIC, or GOTHICK, ſomething that has a relation to the Goths, an ancient people, originally inhabiting that part of Sweden called Gothland; whence they ſpread themſelves over Greece, Dalmatia, Bulgaria, Italy, Spain, &c. See GOTHS.

GOTHIC *Architecture*, a term of reproach to denote one or more kinds of architecture which prevailed during the middle ages. It ſeems to have been invented by the reſtorers of the Grecian orders in Italy, about the middle of the 16th century, to ſignify every preceding ſpecies of European architecture not conformable to them, and it was imported in the ſame ſenſe into England by Mr. Evelyn and ſir Chriſtopher Wren, though the latter appears ſometimes to confine the term to the pointed ſtyle, in which particular he is followed by the greater part of late writers. Mr. Evelyn, quoted by ſir Chriſtopher Wren, in his "Parentalia," ſays: "Gothic architecture is a congeſtion of heavy, dark, melancholy, monkiſh piles." In the ſame ſenſe, ſir Chriſtopher himſelf, ſpeaking generally of what he terms Gothic architecture, calls it "Mountains of ſtone; vaſt, gigantic buildings, but not worthy the name of architecture. This we now call the Gothic manner: ſo the Italians called what was not after the Roman ſtyle." In oppoſition to the idea which this eminent architect here gives of the architecture in queſtion, he, in another part of his Parentalia, deſcribes the inventors of it as "ſetting up ſlender and miſ-ſhapen pillars, or rather bundles of ſtaves and other incongruous props, to ſupport ponderous arched roofs without entablature." In conformity with this latter notion of ſir Chriſtopher, Mr. Rious, a profeſſional writer, ſays: "Modern Gothic is diſtinguiſhed by the lightneſs of its work, the exceſſive boldneſs of its elevations and of its ſections, by the delicacy, profuſion, and extravagant fancy of its ornaments." The ſame confuſion of language, if not of ideas, prevails amongſt the admirers of the Gothic ſtyle, ſo called, as amongſt the declared foes of it. The late poet laureat, Thomas Warton, who has written a great deal on the ſubject, and who had planned a "Hiſtory of Gothic Architecture," ſpeaking of Saliſbury cathedral, expreſsly denies that it is in the Gothic ſtyle, while two other celebrated writers in the ſame line, the Rev. James Bentham and Capt. Groſs, as poſitively affirm that this cathedral is "entirely in the Gothic ſtyle." The perplexity and uncertainty of an ordinary reader muſt neceſſarily be encreaſed by the different ſenſes in which the terms, ancient architecture, modern architecture, Saxon architecture, Norman architecture, and Engliſh architecture, are now uſed by different writers. To clear up this confuſion, and to preſent diſtinct and clear ideas on theſe much agitated ſubjects, it ſeems beſt to treat them in an hiſtorical manner.

It is demonſtrable that the regular orders of Grecian architecture were upon the decline throughout the Roman empire after the reign of the Cæſars, and ſtill more ſo after that of Conſtantine the Great. A century later the Oſtrogoths over-ran and ſubdued Italy, the Viſigoths, Spain, the Huns, Germany, the Vandals, the Roman provinces of Africa, the Franks, France, and the Saxons, Britain. Theſe ſeveral barbarians deſtroyed innumerable monuments of architecture as well as of the other arts, but they none of them introduced a ſtyle of building different from that which they found practiſed in the conquered countries. They did not inſtruct the ancient inhabitants to build in a new manner; on the contrary, they learnt of them ſo much of the art as they actually acquired. But the art itſelf being vaſtly degraded in the fifth and ſixth centuries, and thoſe warlike hordes not being very apt ſcholars, no wonder their firſt ſtructures were executed in a rude and heavy ſtyle. Still nothing is more groundleſs than to ſpeak of Gothic architecture in the manner of Mr. Evelyn and ſir Chriſtopher Wren, as of a ſtyle of building invented or introduced by the Goths. The fact is, the heavy circular manner of building which prevailed throughout Chriſtendom, from the fall of the Roman empire, in the fifth century, down to the twelfth century, was the Roman, or, what is the ſame thing, the Grecian ſtyle, incorrectly and rudely executed. Amongſt us it is called the Saxon ſtyle, becauſe it prevailed during what is called the Saxon period or dynaſty in South Britain; but the firſt teachers and the models of it were both of them ſtrictly Roman.

On the firſt introduction of Chriſtianity amongſt our Saxon anceſtors, at the concluſion of the ſixth century, they conſecrated many of the exiſting Pagan temples to the Chriſtian worſhip, according to the inſtructions which they received to this effect from pope Gregory the Great, and they ran up other temporary oratories of wood or whattles, as we learn from Bede, and other original hiſtorians. Very ſoon, however, the ſame Roman miſſionaries, who converted them, taught them to build churches of ſtone after the Roman manner; for this denomination of it, *the Roman manner*, (*more Romano*,) is always mentioned by the aforeſaid hiſtorians. The firſt archbiſhop of the Northumbrians, Paulinus, who was a Roman monk, appears to have been the chief architect amongſt the Engliſh Saxons at the beginning of the ſeventh century. He built churches of ſtone at York, Lincoln, and other places. His next ſucceſſor but one, Wilfrid, was an Engliſhman, who not only equalled but greatly ſurpaſſed his maſter in architecture. For the churches which he built at Rippon and at Hexham were long celebrated for being the fineſt buildings of their kind north of the Alps: but then it is expreſsly recorded, both of him, and his rival in architecture, Benedict Biſcop, abbot and founder of the church and monaſtery of Weremouth, that they made different journies to Rome, and ſtudied the architecture of the church of St. Peter's and other churches there, and that they even hired workmen from thence to execute their works in England. Thus it evidently appears, that the ſtyle of architecture, which is call'ed the Saxon ſtyle, was not the invention of our anceſtors, but was imported from Italy in the ſeventh century; and it is equally evident, from various monuments, that the Italians in this and the ſubſequent ages built in the ſame heavy manner, and made uſe of the ſame members and ornaments, that the Engliſh Saxons did. Still the architecture of our anceſtors, previouſly to the conqueſt, though very heavy and rude, has been too much depretiated by many Engliſh writers. The Rev. Mr. Bentham, in his "Hiſtory of the Church of Ely," or rather the poet Gray, who drew up the architectural part of that work, refutes Somner, Staveley, and other authors, who deny that the Saxon builders made uſe of ſtone for their buildings, or knew how to turn an arch; but then this very writer fails to do them the juſtice due to them, where he ſignifies that they were unacquainted with the uſe of towers, bells, and tranſepts, previouſly to the tenth century. It would have been ſtrange if they had not imported theſe amongſt other eccleſiaſtical inventions from Italy during the preceding centuries; but we have otherwiſe ſufficient proofs that they had adopted each of them long before the tenth century.

During a great part of the ninth and tenth centuries, England and France were as much haraſſed by invaſions of the Northern barbarians, as their former inhabitants, the Gauls and Britons, had been in the fifth century, by the anceſtors of the now civilized Saxons and French. Theſe turbulent invaders, who were indifferently called Danes or Normans, were guilty of much greater devaſtation upon the exiſting religious monuments, at leaſt, than the Goths and Vandals had committed; becauſe the latter were Chriſtians, though Arians, when they over-ran the civilized world; whereas the Danes and Normans, when they invaded England and France, were perſecuting Pagans. So great was the dread of their violence throughout the laſt mentioned country, that the following petition was there added to the litany: "From the fury of the Normans, O Lord deliver us." In fact, the Almighty was pleaſed to deliver firſt France and then England, from the ſcourge which had ſo long and ſo ſorely afflicted them; but in a very different manner from what the Chriſtian inhabitants expected. Inſtead of witneſſing the extermination or ſubjugation of their barbarous enemies, they ſaw them bend their necks to the yoke of Chriſt, and become models of piety and morality to themſelves and the other Chriſtian nations. Such at leaſt was the caſe with the Northern men, who ſettled in that part of France, which from them has ſince been called Normandy. A laſting peace and tranquillity being, through this happy event, reſtored to the French provinces, its princes and nobles began to rebuild their demoliſhed churches, and to erect others with incredible diligence. But no people ſhewed ſo much zeal in this undertaking as the newly converted Normans. The reader will be convinced of this, when he is given to underſtand that William the Conqueror, during the few years that he reigned in Normandy, previouſly to his invaſion of England, built two noble churches and abbeys, and his nobles, not fewer than thirty-eight, each of them vieing with the reſt, to make his building the moſt magnificent and ſplendid. Such were the Normans, the braveſt, moſt induſtrious, and moſt religious people, and the moſt addicted, in particular, to eccleſiaſtical architecture of all Chriſtian people, when William, their prince, with the flower of his nobles, his army, and his eccleſiaſtics, came to ſettle in England ſoon after the middle of the eleventh century. It is to be obſerved, that the moſt celebrated ſchools of literature and the arts, and more particularly of architecture in Europe, at this period, were the abbeys of Bec and Caen in Normandy, the former of which produced thoſe three great architects, Lanfranc and Anſelm, ſucceſſively archbiſhops of Canterbury, and Gundulph, biſhop of Rocheſter. But indeed all the Norman prelates and abbots appear to have been able architects; for there was hardly a cathedral or abbey church in England which was not rebuilt by one or other of them, in the courſe of thirty or forty years after the conqueſt. The characters which they aimed at in theſe ſtructures were evidently the ſublime and beautiful. To produce the former effect, they built their churches as long and as lofty as poſſible; to produce the latter effect, they not only built in a much more neat and perfect manner than the Saxons had done, but alſo they made uſe of certain new invented ornaments in their ſtructures. Of theſe the moſt oſtenſible and ordinary was the arcade or ſeries of arches which, in one or other of its various forms, is to be met with in all the exiſting Norman churches. From the continued efforts of theſe indefatigable and ingenious architects, to make their churches as awful and as beautiful as poſſible, before the middle of the twelfth century, a new ſtyle of building was produced, called "the Pointed Style." It certainly appeared, for the firſt time, either in England or in France; nevertheleſs, the firſt aſcertained inſtance of it which has hitherto been produced, claims the honour of the invention for this country. But before we proceed to give a more particular account of the riſe and progreſs of this ſingular ſtyle of building, it will be proper to detail the various other ſyſtems which have been publiſhed reſpecting it.

It has been ſeen above, that Mr. Evelyn and ſir Chriſtopher Wren deſcribe the architecture of the middle ages, in general, whether circular or pointed, under the opprobrious term of Gothic, as being the real invention of the Goths and other barbarians. The former of theſe writers, as quoted with applauſe by the latter, ſays, in his "Parentalia:" "The Goths and Vandals having demoliſhed the Greek and Roman architecture, *introduced*, in its ſtead, a certain fantaſtical and licentious manner of building, which we have ſince called modern Gothic, of the greateſt induſtry and expenſive carving, full of fret and lamentable imagery, ſparing neither pains nor coſt."[*] We ſee that the writer here ſpeaks of the light pointed ornamental ſtyle of our anceſtors no leſs clearly than he does in another paſſage, quoted above, of the plain heavy circular ſtyle, called the Saxon; and that he ſuppoſes the former no leſs than the latter to have been really introduced into the countries, which had formed the Roman empire, by the Goths and Vandals, who ſubdued them. How little reaſon there is for aſcribing the Saxon ſtyle to theſe barbarians has been ſhewn above; and, with reſpect to the pointed ſtyle, it is ſufficient to obſerve that this appeared in no part of Chriſtendom before the twelfth century; whereas the Goths and Vandals committed whatever depredations on the monuments of Roman art, which they did commit, in the fifth century, and that their power was every where cruſhed, and their very name extinguiſhed in the courſe of the ſixth century, except, indeed, in Spain, where the name of Gothic remained attached to the reigning family, till the beginning of the eighth century and no longer. So groundleſs and abſurd, in every reſpect, is the term Gothic, as applied to pointed architecture!

At the ſame time that ſir Chriſtopher commends the ſyſtem of his friend Mr. Evelyn, he himſelf departs from it, ſince he prefers the word *Saracenic* to denote the pointed ſtyle. "What we now vulgarly call the Gothic," he ſays, "ought properly and truly to be named Saracenic architecture, refined by the Chriſtians, which firſt of all began in the Eaſt, after the

the fall of the Greek empire. The holy war gave the Chriſtians who had been there an idea of the Saracen works, which were afterwards imitated by them in the Weſt."

This ſyſtem concerning the pointed ſtyle, namely, that it originated with the Saracens, has, out of mere reſpect to the name of its author, ſir Chriſtopher Wren, been followed by biſhop Lowth, in his life of Wykeham, by Rious, by Warton, by Groſe, and, in ſhort, by the generality of modern writers who have had occaſion to enter upon the ſubject. In refutation, however, of this ſyſtem, we have to remark that the firſt, or Grand Cruſade, in which the conqueror's ſon, Robert, and many other Normans and Engliſhmen embarked, making part of above a million of perſons, who were engaged in it, began in 1096, and terminated by the capture of Jeruſalem in 1099. Now it is certain from hiſtory that the cathedrals of Exeter, Rocheſter, and Chicheſter, with many abbey churches, were built wholly in the circular ſtyle after the laſt-mentioned year. Amongſt theſe the inſtance which is moſt to the preſent purpoſe is that of Rocheſter cathedral, which was built by that greateſt architect of his age, Gundulph, formerly a monk of Bec abbey, then biſhop of Rocheſter, as well as the caſtle of that city, the chapel in the white tower of London, &c. without the leaſt mixture of the pointed ſtyle. The reaſon of this is, becauſe Gundulph had travelled through the Eaſt on a pilgrimage to Jeruſalem, a little before the cruſade took place, when he had an opportunity of ſurveying the churches and other buildings of thoſe countries at his leiſure. Again, it has been remarked by Groſe, Bentham, and other writers on the ſubject, that in all the deſcriptions and drawings of buildings in the Holy Land and other parts of the Eaſt, given us by Pocock, Norden, Shaw, Le Bruyn, &c. there is but one church, namely, that of St. John d'Acre, in the proper pointed ſtyle (which church the writer of this article has diſcovered to have been built by William, an Engliſhman, at the time when our Richard I. made himſelf maſter of that city); and that very rarely ſuch a thing as a pointed arch is repreſented as exiſting in thoſe countries. It is true a late writer, the Rev. Mr. Whittington, in his "Survey of the Eccleſiaſtical Antiquities of France," has propoſed to diſcover from theſe and other drawings pointed architecture in every part of the Eaſt, from the Euxine ſea to Egypt; but then it appears that he calls the mis-ſhapen obeliſks and minarets of the Mahomedan moſques pointed architecture. He has another argument for his aſſertion, namely, that "it is improbable the dark ages of the Weſt ſhould have given a model of architecture to the Eaſt." If there is any force in this argument, it would follow that the muſical ſcale of bells, optical glaſſes, the mariner's compaſs, gun-powder, and printing were diſcovered in the Eaſt inſtead of the Weſt, contrary to the known fact.

Mr. Murphy, to whom the admirers of pointed architecture are indebted for his elegant views of the church of Batalha in Portugal, conjectures that this ſtyle was borrowed from the pyramids, and that of courſe Egypt was its native ſoil. But in almoſt every country and age men have built their habitations with ſloping roofs to carry off the falling rain; hence they muſt have ſeen the figure of a triangle at the gable ends of them, no leſs than the Egyptians did in their pyramids. Denon's, Meyer's, and other views of ancient buildings in Egypt, are by no means favourable to Mr. Murphy's ſyſtem. There is indeed an ancient hall in the caſtle of Cairo, called Joſeph's Hall, which is a great deal in the pointed manner, and which is ſuppoſed by the vulgar to have been built by the patriarch of that name; but Niebuhr and lord Valentia give ſufficient reaſon to believe that it was built by Saladin, the enemy of our Richard I., whoſe true name was Joſeph. In fact, it is in the ſtyle of that period. According to this ſuppoſition, we are warranted in believing that this hall was the workmanſhip of Chriſtian priſoners, or fugitives, after the third cruſade. Mr. Murphy's theory is equally deſtitute of hiſtorical grounds and moral probability.

Biſhop Warburton, in his "Notes on Pope's Epiſtles," endeavours to unite together two of the above-mentioned refuted ſyſtems, that which derives pointed architecture from the Northern Goths, and that which brings it from the Eaſtern Saracens, at the ſame time that he aſſigns the weſtern peninſula of Europe for the real place of its birth. The following is an abridgment of his account. "When the Goths had conquered Spain, and the religion of the old (Chriſtian) inhabitants had inflamed their piety, they ſtruck out a new ſpecies of architecture unknown to Greece and Rome. For this northern people having been accuſtomed, during the gloom of Paganiſm, to worſhip the Deity in groves, when their new religion required covered edifices, they ingeniouſly projected to make them reſemble groves; at once indulging their old prejudices, and providing for their preſent conveniences by a cool receptacle in a ſultry climate, with the aſſiſtance of Saracen architects, whoſe exotic ſtyle of building ſuited their purpoſe." All this is a mere revery. The Goths and Vandals entered Spain in the year 409. They did not, however, acquire there a new religion from the old inhabitants, for they were already Chriſtians, and habituated to the uſe of churches. On the other hand, the Mooriſh Saracens did not enter Spain till three hundred years afterwards, namely, till the year 712, when having cooped up the Chriſtians in the mountains of Aſturias, there continued ever afterwards the moſt relentleſs warfare between the two people. It is impoſſible to conceive more monſtrous ideas than that the Chriſtian Goths ſhould have brought with them into Spain a partiality for the Pagan worſhip which they had practiſed in the foreſts of Germany, and that they ſhould have retained it for the ſpace of three hundred years afterwards, till they had the means of employing their implacable enemies, the Mahomedan Moors, to build Chriſtian churches for their uſe; and that when this was effected, they ſhould have kept the ſecret of pointed architecture to themſelves for the ſpace of 400 years longer! Were all this poſſible, or were it a fact that this ſtyle had been imported into our country from any other, where it had been practiſed for a conſiderable time before, it would have made its appearance amongſt us all at once, with its ſeveral ſtriking characters; contrary to what we actually ſee was the fact. After all, if the aiſle of an ancient cathedral reſembles an avenue of trees in ſome reſpects, it differs from it in many others, which are obvious to the ſight.

Having followed different guides, north, eaſt, and weſt, in ſearch of the original pointed architecture, we have latterly been invited by an ingenious artiſt to accompany him to the ſouth, namely, into Italy, the cradle of modern arts, with a promiſe that he will there point out to us much earlier ſpecimens of this ſtyle than are to be met with in this northern climate. In the year 1805 Mr. Smirke jun., then returned from Italy, laid before the Society of Antiquaries a certain drawing, ſince engraved in the "Archæologia," vol. xv., of the dreſſings of a window belonging to the cathedral of Meſſina, in the richeſt ſtyle of the third pointed order, being ſuch as we have no example of in this country before the middle of the 15th century. Theſe dreſſings he would have us believe are coeval with the cathedral itſelf, which was built by the Norman chieftain Roger, earl of Sicily, in the eleventh century. He preſented another drawing, publiſhed by the ſociety as aforeſaid, which appeared to be much more for his purpoſe, becauſe of the known dates of the original. This drawing repreſents a portion of the outſide of the baptiſtery of the cathedral church at Piſa, which baptiſtery was certainly built by Dioti Salvi in 1152. The drawing exhibits what we ſhould call Roman and Saxon work, with intermixed crocketted pediments and pinnacles, ſuch as we were unacquainted with for more than a hundred years afterwards. Laſtly, this gentleman ſhewed a view of the cloiſter of Campo Santo, adjoining the laſt mentioned cathedral, built in 1278. Here we ſee the richeſt tracery mullions under ſemi-circular arches, the whole of which he conſidered as being the ſame original work. Theſe ſpecimens gained many converts to his ſyſtem, that of Italy being the parent country of pointed architecture.

But there is no error which we have ſo much to guard againſt in ſtudying architectural antiquity as the confounding of ſubſequent alterations with the original work. There are few adepts in this ſcience who would not ſtart at the firſt ſight of Mr. Smirke's drawings, and who would not pronounce the works they repreſent as an incongruous mixture of the architecture of different ages; but it was reſerved for ſir Henry Englefield's profound knowledge of the ſubject and critical acumen to detect and exhibit in detail the pointed enrichments with which later architects had decorated the plain circular works of their predeceſſors. To the juſtice of this learned antiquary's remarks the accurate hiſtory of the cathedral of Piſa, written by Martini a canon of that church, bears ample teſtimony. In a word, the very ſpecimens which Mr. Smirke has produced in favour of Italy's claim to the invention of pointed architecture, as well as all the other buildings, tombs, and altars at Rome, and in every other part of Italy, demonſtrate its great inferiority both in date and in execution, to England, France, and Germany, with reſpect to this particular ſtyle.

Allied, in one reſpect to the ſyſtem of biſhop Warburton, is that of ſir James Hall, bart., who, in "An Eſſay on Gothic Architecture," now publiſhed, endeavours to ſhew that the pointed ſtyle was borrowed from the idea of upright poſts ſurrounded with oſiers, the heads of which are to meet like thoſe of trees in an avenue. But the utmoſt that the ingenious baronet proves is that baſket-work may be made to reſemble pointed architecture, not that pointed architecture was borrowed from exiſting models of baſket-work. Lord Orford, heretofore ſir Horace Walpole, in his "Obſervations on Engliſh Architecture," ſays, that the architecture in queſtion was copied from ſhrine-work; juſt as if the making of boxes preceded the building of houſes! After all, this is only placing the tortoiſe under the elephant; for where did artiſts learn to faſhion their ſhrines in the pointed ſtyle! Laſtly, Mr. Payne Knight derives this ſtyle from all the three parts of the world, heretofore known, Europe, Aſia and Africa, where he decides, in his "Principles of Taſte," that "the ſtyle of architecture which we call cathedral or monaſtic, is manifeſtly a corruption of the ſacred architecture of the Greeks or Romans, by a mixture of the Mooriſh or Saracenic, which is formed out of a combination of the Egyptian, Perſian, and Hindoo."

But why ſhould we wander into every remote corner of the world, and even into the regions of fancy in ſearch of an invention which belongs to our own climate? And for what purpoſe ſhould we take ſo much pains to prove a plant to be an imported exotic which wo have ſeen ſprouting up, and attaining its full growth in our own garden? Let us now go back to the point from which we ſtarted in purſuit of various falſe ſyſtems. We have ſeen above that the greateſt people, without diſpute, of the eleventh and twelfth centuries, namely, the Normans, the conquerors of England, France, Italy, Sicily, and various regions in the Eaſt, were at the ſame time a moſt induſtrious and ingenious people, and poſſeſſed of the moſt ardent paſſion for eccleſiaſtical architecture of any people we read of, and that they vied with each other in the grandeur and beauty of their reſpective ſtructures. To produce the effect of grandeur, as it has been before obſerved, they gave the greateſt poſſible length and height to their churches; for that of beauty they deviſed ſeveral architectural ornaments; the moſt common of which was the arcade or ſeries of ſmall round arches, which appear on ſome part or other of all their churches built in this country ſubſequent to their conqueſt of it, and which ſometimes cover the whole of them over; as we ſee on the outſide of St. Botolph's priory, and St. Oſyth's abbey in Eſſex, and in the baſement ſtory of the inſide of Durham cathedral. Theſe arcades the architects diverſified in a great variety of ways, as may be ſeen upon the tower of St. Auguſtine's monaſtery in Canterbury, built by the Norman abbot Scoltandus in 1080. One of the varieties conſiſted in making the circular arches interſect each other. The portion thus interſected formed a new kind of arch, more graceful in its appearance, and far better calculated to give an idea of height than the round one, which, however, had hitherto been adopted by all nations, whether Egyptians, Greeks, Romans, or Saxons. In fact, every one muſt be ſenſible that a pyramid or obeliſk, from its aſpiring form, appears to be taller than a ſemicircular arch, the diameter of which is equal in height to it. Theſe plain and interſecting arcades were ſometimes irregularly intermixed, as in Carilepho's and Flambard's work on the north ſide of Durham cathedral; and ſometimes placed in alternate rows, as in that of Remigius on the façade of his church at Lincoln. The pointed arch thus formed appeared firſt in mere *baſſo relievo*, as in the above mentioned inſtances, amongſt ſeveral others; but ſoon it was likewiſe ſeen in *alto relievo* over niches and receſſes, in the walls of churches, as in the remains of archbiſhop Lanfranc's work in Canterbury cathedral, and in the abbey churches of Glaſtonbury and Rumſey. It is probable that ſome of the firſt, if not quite the firſt open arches in the pointed ſtyle now exiſting, are the twenty windows in the interſected portions of ſuch croſſing arches in the choir of St. Croſs near Wincheſter, made by that great encourager of the arts, and particularly of architecture, biſhop Henry de Blois, king Stephen's brother. The date of this work is 1132, according to Godwin, Groſe, and others, or elſe 1130, according to biſhop Lowth, who had examined the records of this foundation, and Rudborne, the monk of Wincheſter, in his "Hiſtoria Major Wintonienſis." Moſt probably the choir was begun in the former year, and finiſhed in the latter. As the prelate proceeded in his work, from the choir to the tranſept and tower of his church, he made ſeveral other pointed arches without any interſecting circles over them, notwithſtanding the greater part of his work, as ſtill appears, was the circular Saxon. In 1138, as we are aſſured by the above-mentioned monk of Wincheſter, and another monk who wrote the "Annales Wintonienſes," biſhop De Blois rebuilt his epiſcopal manſion of Farnham in Surrey, where his ſucceſſors ſtill ordinarily reſide. Now in the ancient part of this building, we ſee at the preſent day pointed arches reſting upon circular Saxon columns, juſt as we do at St. Croſs; and no architectural critic, with theſe documents before him, will heſitate a moment in pronouncing them part of the work in queſtion, executed by De Blois in 1138. As the ſame prelate reſtored the abbatial church at Rumſey, where his niece Mary was a nun, and as he himſelf had been abbot of Glaſtonbury, before he was biſhop of Wincheſter, we may ſafely attribute the pointed arches, intermixed with the circular ones in theſe two ſtructures, to his direction, ſome time in the latter end of the reign of his couſin Henry I.

After all, it would be raſh to pronounce abſolutely that biſhop De Blois of Wincheſter was the author of pointed architecture, ſince we have convincing evidence, that churches were built by other architects about this period, in the ſame mixed ſtyle of pointed and circular work. We muſt, however, incidentally obſerve, that before the concluſion of this twelfth century, the circular ſtyle was entirely laid aſide, as well with reſpect to columns as to arches. We have evidence, for example, in the annals both of St. Wurburg's abbey Cheſter, and of Peterborough abbey, quoted by Dugdale, that Bildwas abbey in Shropſhire, where the ſeven pointed arches of the nave, ſurmounted by ſmall circular arches, in the upper ſtory, are ſtill ſeen, was founded either in 1136 or 1139; probably it was begun in the former year, and finiſhed in the latter. We might argue in the ſame manner from the dates and actual ſtate of Kirkſtal abbey, Lantony abbey, and ſeveral other ancient ſtructures. If we may give implicit credit to the teſtimony and the plates of captain Groſe, the Scotch architects were not long in adopting the ſtyle of their Engliſh neighbours. It is remarkable that the eccleſiaſtical buildings erected by David king of Scotland, and his nobles, before he came into England in order to command the armies of his niece, the empreſs Maud, were purely in the Saxon ſtyle; whereas thoſe founded there, after that event, preſent the ſame mixture of circular and pointed architecture which prevailed at that period in England.

A late writer, the Rev. Mr. Whittington, whoſe profeſſed object it was to transfer the credit of the diſcovery in queſtion from the Norman Engliſh and Engliſh to the French, which credit the latter ſeem diſpoſed, from traditionary accounts, to attribute to our countrymen, has aſſerted that examples of pointed arches, of a more ancient date than any exiſting in England, are to be met with at the abbey church of St. Denis near Paris, which church was finiſhed in 1144. It appears, however, that this writer was unacquainted with the hiſtorical evidence on which the above-mentioned early inſtances of the pointed arch in England reſt, and that he was even at a loſs to determine which of the works at St. Denis really belonged to the period he has aſſigned. If we examine the pointed windows of this abbey, exhibiting different tranſactions of the firſt cruſade in Montfaucon's "Monarchie Françoiſe," which windows are ſaid by this great antiquary to have been executed by abbot Suger in 1140, we ſhall not find the appearance of a pointed arch in any one of them. It may be added, that in the famous tapeſtry of Bayeux, repreſenting the conqueſt of England, and ſaid to have been wrought by the conquerer's mother, there is no appearance either of a pointed, or ſo much as of an interſected arch, in the ſeveral churches, ſhrines, and other architectural works there diſplayed. In a word, throughout the whole of Montfaucon's plates, we every where find the French pointed architecture much inferior to that of a correſponding date in our own country.

To return to the ſubject of interſecting arches: we obſerve theſe ſometimes to conſiſt of plain ſemicircles croſſing each other, as on the outſide of the ſouth tranſept of Walkelyn's work at Wincheſter, and on the north tranſept of Warlewaſt's work at Exeter, forming in the interſections ſimple pointed arches; and ſometimes we remark that the interſections reſt upon pillars, each of them being ſurmounted with a capital, or at leaſt with an abacus, as on the north tranſept of Durham, and the weſt front of Lincoln cathedrals. In the latter caſe, we have the appearance of pointed arches with lateral points, or cuſps within the heads of them, as ſir James Hall has very aptly termed them. This addition to the pointed arch was occaſionally uſed in the firſt period or order of pointed architecture, but afterwards it became univerſal. The addition of another cuſp on each ſide of the pointed arch turned its trefoil head into a cinque foil. In like manner, four of theſe cuſps being placed at equal diſtances within that circle or "L'Œil de Bœuf," which the Roman and Saxon architects had been in the habit of placing in the tympanum of their pediments, turned it into an elegant quatrefoil or croſs. By means of additional cuſps, and circles within circles, the Catharine wheel, or Marygold window, as it is called in England, or "La Roſe du Portail," as the French term it, was eaſily produced. In all the works executed during the middle and latter part of the twelfth century, a confuſed and heterogeneous mixture of ſtyles is every where diſcernible, as might be expected where circular faſhion began to be left off, and the pointed one to be uſed inſtead of it.

In a general way, the arches were altered before the columns. Hence nothing is ſo common as to find in the ſtructures erected between 1140 and 1180, arches of the ſharpeſt points, reſting on circular Saxon pillars of the greateſt circumference. It could not, however, long eſcape the obſervation of our indefatigable architects, that ſuch heavy ſupporters ill accorded with the lightneſs of the aſpiring arch. Accordingly, towards the latter end of this twelfth century, in ſome inſtances the circular Saxon column began to be ſhaped like the Arabic numerical figure 8, ſo as to retain its former ſtrength, and to appear gracefully ſlender; and where columns were made uſe of more for decoration than for ſtrength, as for example to ſupport ornamental arcades, or the cornices of windows or doors, very thin detached columns were employed, and thoſe for the moſt part made of Purbeck or Petworth marble. We have a ſtriking and moſt intereſting example of theſe and other improvements which took place in the pointed ſtyle, towards the latter part of the twelfth century, in the eaſt end of Canterbury cathedral. Perſons who cannot ſee the original, will find it accurately repreſented in Mr. Carter's treaſury of original ſpecimens, called "The Ancient Architecture of England." This portion of our Metropolitan church was rebuilt, after an accidental fire had deſtroyed the upper part, and weakened the remainder of it, between the years 1175 and 1180. As we have the incomparable advantage of poſſeſſing a circumſtantial account of this building, and of the differences between it and the former ſtructure, raiſed a hundred years before by archbiſhop Lanfranc, which account is drawn up by the intelligent monk Gervaſe of Canterbury, who was an eye-witneſs of what he relates, we ſhall ſubjoin ſome of the moſt material parts of it; he tells us then, that the pillars of the new choir were of the ſame form and thickneſs with thoſe of the old choir, but that they were twelve feet longer; that the former capitals were plain, while the latter were delicately carved; that there were no marble columns in Lanfranc's work, but that there was an incredible number of them in the work of the two Williams; that the ſtones which formed the ancient arches were cut with an axe, but thoſe of new arches with a chiſſel; that the vaulting of the ſide aiſles of the choir was plain, whilſt that of the new choir was groined and fixed with key-ſtones; that the former choir had a flat ceiling ornamentally pointed; but that the ſucceeding choir was elegantly vaulted with hard ſtone for its ribs, and light toph ſtone for the interſtices; finally, that there was only one *triſorium*, or gallery, round the ancient choir, whilſt there were two ſuch in the modern choir. The eaſt end of this venerable cathedral, as it is ſeen at the preſent day, and as it is repreſented by Mr. Carter, exactly correſponds in theſe and in other particulars with this deſcription of it, given 600 years ago. It is all in the firſt order of the pointed ſtyle, except the main pillars, which are (to the eye) round, with a ſort of Corinthian capital, and except the arches ſpringing from theſe pillars, which are alſo circular as far as the *concha abſidis* or altar end, theſe being pointed, as likewiſe with the exception of certain blockings and mouldings, where the Saxon billet ornament is ſtill ſeen.

The improved architecture of this, the moſt dignified church in the iſland, could not fail of being adopted in our other churches, when there was occaſion for rebuilding or repairing them. Lincoln cathedral ſeems to have led the way in this particular about the year 1195, under the direction of its biſhop St. Hugh, who was not leſs renowned for his ſkill in architecture than for the ſanctity of his life. This prelate undertook to rebuild the whole of his vaſt cathedral, and he was ſo intent upon the work, that, as Matthew Paris tells us, he carried mortar and ſtones on his own ſhoulders for the uſe of the maſons. The building was ſo far advanced at the time of his death, which happened in the year 1200, that he is conſidered and called its founder, though his work was not finiſhed till about fifty years afterwards, in the epiſcopacy of Robert Groſetete. Excepting the weſt front, which is almoſt all the work of the Norman prelate Remigius, and the towers, the groining, the ſkreens, and certain other decorations added in the fourteenth century, the whole vaſt pile of St. Mary's church and Chapter-houſe at Lincoln is in the ſimple ſtyle of the firſt or lancet order of pointed architecture; but awful and beauteous beyond the conception of thoſe who have not ſeen it, and greatly ſuperior to any church of the ſame order and period to be found in France. In 1202, the rich and powerful biſhop Godfrey de Lucy, amongſt his other great works, began to rebuild the eaſtern part of his cathedral at Wincheſter, which he executed in the ſtyle of the Metropolitical choir, but without the leaſt mixture of the Saxon. His extenſive work is ſtill to be ſeen there, conſiſting of long narrow ſharp-pointed windows and other arches, detached pillars of Purbec marble, quatre-foil mouldings, and light groining of ſimple interſecting ribs. And, whereas, it became very uſual, for the ſake of gracefulneſs and alſo of uſe, where they were uſed as windows, to place two of theſe narrow arches cloſe together under another pointed [illegible] greater width, in conſequence of which a vacant ſpace occurred between their heads; a trefoil, quatrefoil, or cinquefoil was frequently introduced, with the happieſt effect, to fill up this ſpace. In 1227 archbiſhop Walter Grey began to rebuild the northern Metropolitan church in the prevailing ſtyle, and he actually finiſhed the ſouth croſs aiſle as it is now ſeen. The ſame kind of work was going on at this time at Worceſter, Saliſbury, and other cathedral and abbey churches. The laſt-mentioned church, which is an entire new foundation, begun by biſhop De Poore in 1220, and finiſhed by biſhop Bridport in 1258, exhibits, in its front and other parts, the double lancet arch, [illegible] the intermediate quatrefoil roſe, and all the other characters deſcribed above. There being occaſion, however, to place three lancet arches together in the windows of the upper ſtory, the head of the middle one was gracefully raiſed above the other two, an improvement which was ſoon adopted in many other churches. A ſtill more ſtriking improvement which took place, if not at Saliſbury for the firſt time, at leaſt about the time of its completion, was the elevation of the cornice, pediment, or canopy which had hitherto adhered, or at leaſt had been very near to the architrave of the arch. This was now raiſed, like the two ſides of a triangle, to a conſiderable height above it. The jambs of the pediment were at firſt rather ſhort, not reaching, by any means, ſo low as the ſpringing of the arch, and generally reſting on ſome ſmall flower or other ſlight ornament. The point of the canopy always terminated in a trefoil or other graceful ornament, but was not, as yet, adorned with crockets or foliage down the jambs. Biſhop De Poore, being tranſlated to Durham, began to ornament the eaſt end of his preſent cathedral in the ſtyle which he had introduced into the one he had left. Whilſt the work at Saliſbury was drawing towards a concluſion, that at Weſtminſter abbey, was beginning, namely, in the year 1245. The north tranſept, and part of the adjoining nave of the church, remain in almoſt the ſame ſtate they were left in by their founder Henry III. The windows of the laſt-mentioned portion of the abbey, together with the correſponding aiſle, are larger and better proportioned than any which had hitherto been ſeen in this iſland. Here alſo we meet with the cinquefoil roſe between the heads of the two lights; while the exterior windows of the triforium or gallery conſiſt entirely of a triple cinquefoil under a pointed arch. Theſe two models for the upper part of church windows were long followed. On the other hand, the arches and windows of the tranſept, being placed in a regular order, and very near to each other, preſented an appearance of thoſe large mullioned windows which, in the ſucceeding period of this ſtyle, came into faſhion. In this part alſo of the abbey church, namely, the inſide of the tranſept, we begin to meet with good ſtatuary.

During the reign of Henry's ſon, Edward I., which began in 1272, the architecture of this country, through the ingenuity and induſtry of its artiſts, acquired a new character, and may be ſaid to have grown into a new order of the pointed ſtyle. The firſt and diſtinguiſhing feature of this was the general adoption of the well proportioned and well turned aſpiring arch. The arches which had hitherto been conſtructed, though ſometimes accidentally perfect, were, for the moſt part, too acute. But the arches built at the latter end of the thirteenth century generally approached to the perfect proportion. This proportion, according to the beſt judges, is when an equilateral triangle can be inſcribed within the crown and impoſts of the arch. The arches alſo were gracefully turned. Beſides all this, they were now invariably ornamented in their heads with cuſps, ſo as to form trefoils, cinquefoils, or ſeptfoils. In like manner the pediments or canopies over the arches were univerſally purfled, that is to ſay, adorned with the repreſentation of foliage called crockets, from the corbel on which they reſted up to the rich flower or other elaborate finial in which they terminated. Theſe corbels or brackets now corresponded in height with the ſpringing of the arch, and moſtly exhibited buſts of the founders or other benefactors of the eſtabliſhment. Pinnacles, which hitherto had been both very ſimple and very rare, were, in this improved order, placed at the ſides of almoſt every arch, and on the top of almoſt every buttreſs, being invariably purfled and ſurmounted with rich finials. A pinnacle of a proportionable ſize being placed on a tower, inſtead of a buttreſs, became a broach or ſpire. Accordingly the uſe of ſpires became almoſt general in the fourteenth century. We even read of a new built tower being pulled down, becauſe it was unequal to bear the weight of this grand ornament, when a new one was built, which, with its ſpire, was as high as the church was long. In the ſame ſpirit of ornamental grandeur, the buttreſſes, ſupporting the upper part of the nave, inſtead of being concealed in the roofs of the ſide aiſles, were brought into view with ſuitable decorations, and made to ſtretch over the tops of thoſe aiſles, in what are called flying buttreſſes. The window no longer conſiſted of an arch divided by a ſimple mullion, and ſurmounted with a ſingle or a triple roſe, but was henceforward, in all grand churches, portioned out by mullions into three, four, five, ſix, and ſometimes into nine different bays or days, as the ſeparate lights in a window were then called; and theſe again were frequently ſubdivided by one or more tranſoms running acroſs them. Their heads alſo were varied by tracery work into a variety of architectural deſigns, and ſometimes, as at the weſt end of York, into the form of a beautiful flower. The plain niches of the thirteenth century became, in the fourteenth, gorgeous tabernacles, in which as much architectural ſkill was often diſplayed as in the whole church to which they belonged. Theſe tabernacles, as well as various other parts of the ſacred edifice, were filled with ſtatues, which frequently ſhewed equal ſpirit in the deſign and art in the execution. Finally, the ribs ſupporting the groined ceiling were no longer ſimple interſecting arches; but they branched out into tracery work, ſtill richer and more elegant than that in the grand windows of this period; and wherever the ribs met, they were tied together by an architectural knot or boſs, which generally exhibited ſome inſtructive device. It muſt not be forgotten, that during the latter part of this period, the pediments which before had been ſtraight, began to humour the ſweep of the arch, by which means they became leſs high and more graceful.

We have inſtances of theſe improvements, or rather of this new order of the pointed ſtyle, in the three remaining architectural croſſes, erected by Edward I. thoſe of Northampton, Geddington, and Waltham, to the memory of his queen Eleanor, who died in 1290; likewiſe in the magnificent tomb of his brother Edmund Crouchback in Weſtminſter abbey, who departed this life in 1296. But the moſt complete ſpecimen of the whole detail of theſe improvements is York Minſter, the nave of which, as it ſtands, was built between the years 1290 and 1330, and the choir ſome thirty years after the latter period. If any ſimilar ſtructure in the ſame ſtyle, but upon a ſmaller ſcale, could, in its time, have vied with this in beauty and grandeur, it was St. Stephen's chapel, Weſtminſter, now the houſe of commons, which Edward III. began to erect in 1348. Of the inimitable beauties of the latter erection, only a few ſcattered veſtiges remain, to ſhew the architectural antiquary what it was in its glory. There are few, if any, of our cathedrals and remaining abbey churches which were not rebuilt or reſtored in ſome conſiderable part or other of them, according to this improved order. Before 1321, biſhop Langton had added the Lady chapel to his cathedral of Litchfield, had groined the nave and choir, and had erected the magnificent weſtern façade. About the ſame time the greater part of the nave of Weſtminſter abbey church was rebuilt. Between the years 1327 and 1340, Exeter cathedral was groined, and its heavy Norman arches and pillars were changed into light and graceful pointed arches and cluſter-columns, by its munificent prelate Grandiſon. During the pontificate of archbiſhop Courtney, which began in 1381, and that of his ſucceſſor Arundel, the nave of Canterbury cathedral was rebuilt. During the ſame period that eminent prelate and architect, William of Wykeham, was employed in performing the ſame difficult tranſmutation of the nave of Wincheſter cathedral, which had been performed in that of Exeter. The circular columns and arches were not taken down, as has been generally ſuppoſed, but the former were caſed and the latter reduced to a point. This may be aſcertained by an attentive examination of the work within the roofs of thoſe ſtructures; and without this trouble, by ſimply looking at the nave of Glouceſter, St. Albans, or Rumſey great church, where the operation here deſcribed will appear to have been performed, on two or three of the circular pillars and arches at the weſt end, and to have been left off with reſpect to the other pillars and arches. The taſte for theſe improvements deſcended even to country pariſh churches, few of which did not ſooner or later exchange their ancient windows, at leaſt, for thoſe of the pointed ſtyle.

But human arts, like the human body, when they have attained to the perfection of their ſtate, tend towards their decline. This was the caſe with that ſingular invention, pointed architecture. Its riſe, progreſs, and decline, occupy little more in the chronology of the world than four centuries. As its characteriſtical perfection conſiſted in the due elevation of the arch, ſo its decline commenced by an undue depreſſion of it. This new ſtyle, or third order of pointed architecture, took place in the latter part of the fifteenth century, and is to be ſeen in the royal chapels of St. George, Windſor, of King's college, Cambridge, and of Henry VII., Weſtminſter. It cannot be denied, that the builders of theſe ſplendid and juſtly admired ſtructures diſplayed more art and more profeſſional ſcience than even their predeceſſors had done; but then they diſplayed this at the expence of the ſtyle itſelf, which they cultivated, and of the awful and devout impreſſions which this ſtyle was invented to excite. The ſpectator was now amazed to ſee huge maſſes of ſtone, called pendent capitals, each one of more than a ton weight, hanging in the air, which, inſtead of ſupporting the vaſt groins they were fixed in, were ſupported by them; the conſequence of this, however, was to bring the flat arches of the ceiling ſtill nearer to the eye, ſo that their curvature was henceforward diſcernible at their ſpringing rather than at their point. Finally, ingenuity was at this period much more affected than awfulneſs: hence thoſe royal chapels, and ſeveral mortuary ones built in Wincheſter, Peterborough, and our other grand churches, during the time of the two laſt Henries, are ſeen covered over with tracery, and loaded in their groins and friezes with buſts, armorial bearings, and rebuſes, beyond all due proportion, ſo that, however elegant the deſign, and exquiſite the execution of them generally is, a judicious ſpectator, after admiring them, fails not to prefer to them the chaſte grandeur of York Minſter, or even the unadorned majeſty of Saliſbury cathedral. The church-windows of this period were ſo multiplied and enlarged, as to become what a late writer, Mr. Whittington, profeſſes to admire "all window," but which they certainly could not become without great detriment to the character of awfulneſs in the church itſelf. The ſame depreſſion of the pointed arch took place on the outſide as in the inſide of the buildings of this period. Inſtead of the tapering pinnacles and lofty ſpires which had hitherto adorned the towers of churches, theſe ſtructures were now generally covered with round cupolas, and the portals, inſtead of being ſurmounted with crocketed pediments and graceful pinnacles, were generally encloſed within ſquare architraves, the chief ornaments of which were ſeen in the ſpandrels. All this, however, is to be underſtood with ſome exceptions. For example, biſhop Oliver King erected his church at Bath, about the year 1500, in a very ſimple faſhion of pointed artitecture, and biſhop Fox repaired the preſbytery and chancel of Wincheſter cathedral with a chaſte and taſteful elegance.

But the downfal of pointed architecture in this kingdom became inevitable from various cauſes, chiefly, however, from the loſs of its characters of majeſty and awfulneſs, the neceſſary conſequence of the depreſſion of its ſublime and graceful arch. The deſtruction of it was complete at the beginning of the reign of Edward VI., from which period, till the introduction of the pure Grecian ſtyle in the reign of Charles I., a real Gothic, or at leaſt a truly barbaric ſtyle took place, conſiſting of a confuſed medley of all the known ſtyles and orders of ſtyles, intermixed with globes, triangles, pyramids, obeliſks, frets, and other whimſical and ugly devices, as may ſtill be ſeen in the ſepulchral and other monuments of the period in queſtion.

From what has been ſaid, it appears that the term *Gothic* architecture is an improper one, as applied to any ſpecies of architecture whatſoever; that the mode of building which prevailed amongſt our anceſtors before the conqueſt, called the Saxon ſtyle, conſiſting of round pillars with rude capitals and baſes, and of circular arches, was ſtrictly Roman, being copied, even to its minute ornaments, from coeval originals at Rome, and having been firſt taught and practiſed in this iſland by Roman maſters; that this ſtyle was ſucceeded, before the middle of the twelfth century, by a ſtyle of architecture perfectly new, the eſſential character of which is the pointed arch, from which, by a natural proceſs, the ſlender cluſter column, the aſpiring cornice or pediment, the crocketed pinnacle and lofty ſpire, with the other ornaments mentioned above, actually grew; that this ſtyle was not borrowed from Northern Goths, nor Eaſtern Saracens, nor Weſtern Moors, nor Southern Italians (for in this ſtyle the Italians themſelves were but novices, and not very apt ones), but that it was diſcovered in this climate, moſt probably by the Engliſh Normans, the greateſt people of the 12th age, and the fondeſt of eccleſiaſtical architecture that ever exiſted; that the ſtyle was improved by the joint efforts of the Normans, Engliſh, and French, at a time when our kings were maſters of the faireſt provinces of France, and brought to its perfection, chiefly by the ingenuity and induſtry of the Engliſh, during a period in which England was in proſperity by her conqueſts, and France in deſolation from her defeats; that there are three diſtinct orders in this ſtyle, the members and proportions of which can be diſtinctly pointed out by profeſſional men, (ſuch as the author of the "Ancient Architecture of England") with almoſt as much accuracy as thoſe of the five Grecian orders; on which ſubject it may be obſerved, that theſe Grecian orders were practiſed long before their members and proportions were accurately laid down, that the characteriſtic of the firſt order is the acute arch, and that the period of its duration may, in a general way, be ſaid to have laſted from the middle of the twelfth to the end of the thirteenth century: of this order, Lincoln, Beverley, and Saliſbury churches are examples; that the chief characteriſtic of the ſecond order, is the perfect or equilateral arch, the reign of which was from the end of the thirteenth, till after the middle of the fifteenth century, to which order York Minſter, and the naves of Wincheſter and Canterbury cathedrals belong; and that finally, the characteriſtic of the third order is the obtuſe arch, which grew into faſhion about the laſt-mentioned period, and laſted to the downfal of pointed architecture itſelf in the middle of the ſixteenth century. The fineſt ſpecimens of this, doubtleſs, are the above-mentioned royal chapels. With reſpect to the proper denomination of this ſtyle, ſome of the learned, as well as the vulgar in general, ſtill call it the Gothic, others the Saracenic, a third claſs, the Norman, a fourth, the Engliſh, and a fifth, the pointed. From the whole of what has been ſaid above, it will be readily concluded, that the preſent writer conceives the laſt of theſe terms to be the beſt adapted to the ſtyle, as being the moſt ſtrictly deſcriptive of its characteriſtical quality.

This article is the abridgment of a much longer treatiſe on pointed architecture, which is ſhortly expected to appear from the preſs of Mr. Taylor's Architectural Library; in which treatiſe many hiſtorical documents in ſupport of the preſent ſyſtem, and certain plates to illuſtrate it, will be ſeen. M.

Gothic *Bible*. See Bible, and Argenteus *Codex*.

Gothic *Character*, or *Writing*, is a character or manner of writing, which, in the main, is the ſame with the Roman, only that it is very full of angles, turns, and bendings, eſpecially at the beginning and ending of each letter.

The manuſcripts in Gothic characters are not very ancient. Ulphilas, biſhop of the Goths, was the firſt inventor of the Gothic characters, or the firſt who compoſed the Gothic alphabet, in imitation of the Greek, and the firſt that tranſlated the bible into the Gothic tongue.

The letters uſed in the Gothic goſpels are twenty-five in number, and formed, with ſlight variations, from the capitals of the Greek and Latin alphabet.

As theſe characters, in which the *Codex* Argenteus, or Gothic verſion of the bible, was written by Ulphilas, their inventor, were derived partly from the Greek and partly from the Latin, Michaelis (Introd. to the N. T.) thinks it natural to aſcribe the ſaid verſion not to the Franks or Germans, but to the Goths, who lived on the borders of the Danube; or in Wallachia, where they at that time reſided, the Latin was ſpoken, and their neareſt neighbours were the Greeks. A mixed alphabet, ſuch as that which is found in the Codex Argenteus, is ſuch as might reaſonably be expected. Some of the words in this verſion are ſtill uſed in the Leſſer Tartary, the ancient ſeat of the Goths; *e. g. ſwiltan*, "to die," from *ſwalt*, "death," a word that is quoted by Buſbeck, from the language of the Crim Tartars. In this verſion, many words are adopted immediately from the Greek; *viz.* αττα, *atta*, father; *ams*, ωμος, the ſhoulder, where even the *s* is retained from the Greek termination, &c. Hence it is inferred, that the dialect, in which ſuch words occur, was that of a nation that lived in the neighbourhood of the Greeks. This verſion has alſo Sclavonian words, ſuch as *ſan*, a maſter, which prove it to have been written in the dialect of a nation that bordered on Sarmatia. The ſame may be ſaid of many Latin words: ſuch as *anacumbjan*, accumbere, to ſit at table, *militondans*, militantes, ſoldiers, *agha*, water, &c. This argument is the more deciſive, when we conſider, that the Goths, in the time of Ulphilas (ſee his biographical article,) lived in Wallachia, a country in which Roman colonies had been planted, and where a corrupt Latin is ſpoken at this very day. Ulphilas himſelf lived in Wallachia, and had it in his power at leaſt to make uſe of Latin letters, as well as thoſe of the Greeks, with whom he had continual intercourſe. See Gothic *Language*.

The Runic characters are alſo frequently called Gothic characters. See Mabillon, De Re Diplomat. lib. i. cap. 2.

But they who take the Gothic characters to be the ſame with the Runic, are miſtaken ; as is ſhewn by Ol. Wormius, Junius in his preface to the Goſpels written in Gothic letters, and Dr. Hicks on the Runic Tongue.

Gothic *Column* is any round pillar in a Gothic building, either too thick or too ſmall for its height.

There are ſome found even twenty diameters high, without either diminution or ſwelling.

Gothic *Language*, the language of the Goths. This language, as the acknowledged parent of the Engliſh, is of conſiderable importance ; while its remote antiquity, the ſcantineſs of its records, and the circumſtance of its having been ſtudied only by few among the learned, have rendered it a matter of great uncertainty as to its character and origin. The queſtions reſpecting its antiquity and genius are reſolvable into thoſe in regard to the people who uſed it. Monſ. Mallet, in his "Northern Antiquities," ſuppoſes that the ancient Gauls and Germans, the Britons and the Saxons, were all originally one and the ſame people : and thus he makes the Gothic the ſame with the Celtic tongue. This opinion, which was firſt taken up by Cluverius in his "German Antiquities," has been ſince adopted by Keyſler in his "Northern and Celtic Antiquities," and Pelloutier in his "Hiſtory of the Celts," and maintained by them with uncommon erudition. According to theſe writers, the ancient and original inhabitants of Europe conſiſted only of two diſtinct races of men, *viz.* the Celts and Sarmatians ; and from one or other of theſe, but chiefly from the former, all the ancient nations of Europe are deſcended. The Sarmatians, or Sauromatæ, were the anceſtors of all the Sclavonian tribes, *viz.* the Poles, Ruſſians, Bohemians, Wallachians, &c. who continue to this day a diſtinct and ſeparate people, extremely different in their character, manners, laws, and language from the other race, which was that of the Celts ; from whom, as they ſuppoſe, were deſcended the old inhabitants of Gaul, Germany, Scandinavia, Britain, and Spain, who were all included by the ancients under the general name of Hyperboreans, Scythians, and Celts, being all originally of one race and nation, and having all the ſame common language, religion, laws, cuſtoms, and manners.

This opinion, though ſupported with an uncommon diſplay of deep erudition and a great variety of ſpecious arguments, is controverted by the late learned and ingenious Dr. Percy, in a preface to Monſ. Mallet's Northern Antiquities, which he has tranſlated and enriched with notes. This profound antiquarian, in oppoſition to the French writers, ſtates that ancient Germany, Scandinavia, Gaul, and Britain, were not inhabited by the deſcendants of one ſingle race ; but, on the contrary, divided between two very different people ; the one of whom he calls with moſt of the Roman authors Celtic, who were the anceſtors of the Gauls, Britons, and Iriſh ; the other Gothic or Teutonic, from whom the Germans, Belgians, Saxons, and Scandinavians derived their origin ; and that theſe were *ab origine* two diſtinct people, very unlike in their manners, cuſtoms, religion, and laws.

The Gothic, then, is radically different from the Celtic according to Dr. Percy, who, on the authority of Hicks, as ſtated in the preface to his "Inſtitutiones Grammaticæ Angloſaxonicæ," gives the following genealogy of the two languages. Gothic is the parent of 1. Old Saxon, or Anglo-Saxon ; 2. Francic or Franco-Theotiſc ; 3. Cimbric, or Old Icelandic. From the firſt, *viz.* the Anglo-Saxon, are again derived Engliſh, Broad Scotch, Belgic, or Low Dutch, and Friſic. From the Francic, are derived German, or High Dutch, German of Swabia, and Swiſs ; while the Cimbric, in its turn, gave birth to the Icelandic, Norwegian or Norſe, Daniſh, and Swediſh. On the other hand, the Celtic is repreſented by the ſame writer as the parent of the ancient Gauliſh, the ancient Britiſh, (ramified into the Corniſh, Armorican, or Bas-Bretagne, and Welſh,) and the ancient Iriſh, which was ſubdivided into Manks, or language of the Iſle of Man, into Erſe, or Highland Scotch, and Iriſh. To the old original mother tongue of all the Gothic dialects, it has been uſual to give the name of Teutonic, not ſo much as Dr. Percy aſſerts from its being the language of Tuiſto, the great father and deity of the German tribes, as from the Teutones, the people who uſed it : the ſame probably with the Cimbri, or as the Greeks called them *Κιμμεριοι*, who inhabited the northern regions, and more particularly the Daniſh iſlands. Now, in oppoſition to this writer, we are free to affirm, there is no ground for believing that this mother tongue, whether called Gothic or Teutonic, was in its primæval form different from the Celtic. And this propoſition we ſhall endeavour to make manifeſt from the very ſpecimens by which Dr. Percy has attempted to ſhew their eſſential difference. But before we enter on this queſtion, it is neceſſary to remark, that learned men, in their enquiries concerning the origin of nations, have not ſufficiently attended to the conſideration which we learn from the Moſaic hiſtory, that all nations originated in a common family, and at firſt ſpoke a common language. Let us ſuppoſe that ſome members or deſcendants of this family, (as we read of Gomer,) emigrated from Aſia to Europe. If they ſettled in Greece, they introduced with them the primæval cuſtoms, and language, though ſomewhat corrupted no doubt from its original purity. Others, actuated by the ſame ſpirit of emigration, would ſoon follow ; and, if more powerful, would diſlodge their predeceſſors, who had no other reſource but to ſeek new habitations in remoter regions.

As theſe wanderers multiplied, they advanced, till, in the courſe of years, all the countries on the north and weſt, as well as on the eaſt of Europe, were completely peopled. But this population of courſe could not take place before they had been divided into independent tribes, and diſtinguiſhed by correſpondent difference in dialects and manners. But ſtill a very great reſemblance muſt have as yet been viſible among them in both theſe reſpects, however ſeparated from each other : for in the earlier periods of ſociety, language, though widely uſed, muſt long have continued the ſame, with little variations, it being corrupted and diverſified into diſtinct tongues only by the progreſs of civilization, by the refinements of literature, by improvements in art and in government, and by thoſe political convulſions which the love of conqueſt, inſpired by conſcious ſuperiority in thoſe arts, produces. All the nations of Europe, therefore, in the ruder and more early ages, may be conſidered as uſing only the ſame great primordial ſpeech, grown indeed into diſtinct branches, and aſſuming in one country the appearance of being independent of, and unconnected with thoſe uſed in other countries. Now, if we ſuppoſe that the Celtæ were the firſt emigrants from Aſia, who, pervading Europe, ſettled in Gaul, Old Spain, Britain and Ireland ; while their brethren, under the names of Getæ (Goths), Scythæ, Cimbri, &c. directing their courſe to the North, occupied Thrace, Scandinavia, and other northern territories ; it would follow, that theſe tribes, however remote, uſed at firſt either the ſame language, or languages which had a cloſe affinity from their relation to the common primæval tongue. Nor would there be material difference in this concluſion, though we ſhould ſuppoſe, with many learned men, that the inhabitants of the North of Europe came, not from the Eaſt but from the

the North of Aſia, as they muſt ſtill have been deſcendants of the ſame primitive family, which, according to Moſes, peopled the world. Thus the Celtic and the Gothic or Teutonic muſt have been, in their origin, the ſame or ſiſter tongues.

But further, while the ancient Celts and Goths continued in the darkneſs for which they became proverbial, the inhabitants of Greece rapidly improved in laws and the arts of life. In this improved ſtate, Greece became, in regard to the leſs favoured inhabitants of the North and Weſt, what Aſia had hitherto been in reſpect to Greece, a freſh ſource of civilization and letters. Its language, growing more copious and refined with the people, diffuſed itſelf with the bleſſings of knowledge and ſociety, which their example or inſtruction imparted to the Northern and Weſtern inhabitants of Europe. Thus Greek, with the arts of Greece imported into Italy, gave birth to the Latin tongue; and this at a later period neceſſarily affected the Celtic language, in conſequence of the victories which the Roman arms atchieved in Gaul and in Britain. This revolution greatly widened the line of diſtinction which for ages had been extending between the Celtic and the Gothic tongues; the former being aſſimilated to the Latin, the latter to the Greek, by a copious influx of new terms. It were indeed matter of great curioſity if ſome records of the Celtic and Gothic tongues had been preſerved before they were yet modified by the aſcendant languages of Greece and Rome; but no ſuch records unfortunately have ſurvived the wrecks of time. And we can judge of the ancient Celtic only from the Welſh, its acknowledged daughter; while we are left to form our judgment of the primæval Gothic from the remnants of a verſion of the New Teſtament, effected by Ulphilas, into the dialect uſed by the Goths in Mœſia, and hence called Mœſo-Gothic.

Having made this preface to ſhew that the Celtic and Gothic had one common baſis, *viz.* the primordial tongue imported from Aſia, we proceed to prove, as far as we are able from their reſpective offspring, that they had in common many Aſiatic words, and were modified by a great portion of Latin and Greek terms: and that from theſe two cauſes they eſſentially reſembled each other. The Lord's prayer is thus rendered in the ancient Gothic of Ulphilas.

	Literal tranſlation :
1 Atta unſar thu in himinam	1 Father our thou in heaven
2 Veihnai namo thein	2 Be ſanctified thy name
3 Quimai thiudinaſſus theins	3 Come thy kingdom
4 Vairthai Vilga theins ſue in himina, gah ana airthai	4 Be done thy will ſo in heaven, alſo on earth
5 Hlaif unſerana thana ſeintinan gif uns himmidaga	5 Give us this day the bread eternal
6 Gah aflet uns thatei ſculans ſigaima, ſua ſue gah veis afletam tham ſculam unſeram	6 And forgive us that we are debtors, as alſo we forgive thoſe our debtors
7 Gah ni bringais uns in fraiſtubngai	7 And bring us not into temptation
8 Ak lauſei uns afthamma ubilin, Amen.	8 But deliver us from evil, Amen.

The following is a ſpecimen of the Celtic, as exiſting in the Welſh tongue:

1 Ein Taad, yr hwn wyt yn y Nefoeth	1 Our father, the one who art in heaven
2 Santeiddier dy enw	2 Be hallowed thy name
3 Deved dy deyrnas	3 Come thy kingdom
4 Bydded dy Ewyllys ar y ddaiar megis y mae yn y nevoeth	4 Be thy will on the earth as it is in the heaven
5 Dyro i ni heddyw ein bara beynyddiol	5 Give to us this day our daily bread
6 A madde i ni ein Dyledion fel y maddeuwn ni ein dyledwyr	6 And remit to us our debts as that we remit to our debtors
7 Ag nac arwain ni i brofedigaeth	7 And lead us not into trial
8 Eithr gwared ni rhag drwg, Amen.	8 But deliver us from evil, Amen.

We propoſe next to lay before our readers a brief analyſis of theſe two ſpecimens, which it is preſumed will ſhew that the two languages in queſtion have much nearer reſemblance to each other, than Dr. Percy, or any perſon who has not a thorough knowledge of both, could poſſibly imagine. The Hebrew דד, *dd*, pronounced with an initial and cloſing vowel, is *adda*, and ſignifies *beloved*, and this is the ſource of the Gothic *atta*, and the Greek αττα, with the utmoſt propriety applied to a parent as the deareſt object of love. The ſame word in Hebrew is written דוד, *dood*, and is no other than the Celtic *taad*, under a difference of character. In the Corniſh it is *taz*, in the Friſic *haita*, in the Lapland *atki*, and the old Cantabrian or Biſcayan *aita*, *father*. *Unſar* is the Greek ἡμετερος, thus ſtrangely corrupted, ἡμετες, *untar*, *unſar*; and hence the Engliſh *our*. In the ſame manner, ὑμεις has degenerated into *ums*, *uns*, *us*. The Celtic *ni* is the Hebrew and Arabic pronoun אני, *ani*, which, ſounded with only the cloſing vowel, is *ni*, *us*, and with only the initial *ein*, *our*. The Gothic *in* and the Welſh *yn* have originated in the Greek εν, or the Latin *in*; but it is obſervable that both theſe languages uſe this prepoſition as it is uſed in Latin, when followed by an accuſative noun in the ſenſe of *into*, *unto*, or *to*: thus *in fraiſtubngai*, into temptation; *inni*, or *i ni*, *to us*. The Welſh language is remarkable for the attention paid to harmony in the arrangement of its terms. To produce this effect the termination of a preceding word, in order to coaleſce with the ſucceeding one, is ſomewhat changed, and thus made to unite both into one. Thus *rhwn* is *yr hwn*, *the one*, where *r* or *rh* (aſpirated after the manner of the Greek ῥ) is prefixed to *wn*, the Latin *unus*, or the Anglo-Saxon *an*. *Wyt*, moreover, is a coalition of *wy ty*, *art thou*, or *thou art*; *wy* being the ſubſtantive Greek verb εω or ειμι, whence the Goths derived their *im*, and the Engliſh our *am*. The Greek χειμων, *tempeſt* or *clouds*, by ſoftening the guttural into an aſpirate, of which we ſhall preſently give ſome more examples, has in the Gothic degenerated into *himin*, the place where the tempeſts or clouds reſide, namely, the *ſky* or *heaven*. In the Franco-Theotiſc the ſame word is *himil*, and in the Cimbric *himal*. It exiſts alſo in the Celtic; but there it has retained its original ſound and ſenſe, under the form of *cwmwl*, *a cloud*. It is ſingular that the ſame aſſociation of ideas, founded on the nature of things, has transferred the Greek νεφος, or the Latin *nubes*, to ſignify in Welſh *heaven*, under the ſhape of *neof* or *nefoedd*.

2. *Veihnai* is the verb of *veiha* or *veihs*, *holy*, which is but the Greek ἁγιος, with the labial *v* ſubſtituted for the aſpirate, as the old Latins have done in numerous inſtances, ſome of which we ſhall preſently produce. On the other hand, *ſantiddier* is *ſanctus*, converted by the Welſh into a verb; while

dy is the ſame with the Gothic *thu*, and no other than the Latin *tu*, or the Æolic τυ, or the Engliſh *thou.* The Gothic *thein*, it is obvious, has given birth to the Engliſh form of *thine.* *Namo*, whence our *name*, retains the Perſian character of *naam*, though perhaps it is more immediately derived from *nomen*, and is a kindred noun with the Welch *enw*, which probably degenerated from ονομα, by dropping the laſt ſyllable.

3. The Arabic קואים, *quaem*, *legs*, has given birth to the Gothic *quiman*, *to uſe the legs*, *i. e.* to come, and to the Anglo-Saxon *cyman*, and our *come.* The ſame word has been imported into the Celtic in the ſhape of *cammu*, ſignifying to *hop* or *ſtep*. The ſame word exiſts in the Shanſcrit, *gumun*, *to go.* The correſponding Welſh *deved* or *dywad*, is the Greek ταω, ταζω, or τεινω, *to ſtretch to an object*, which laſt deſcended from the Arabic אתי, *ata*, by dropping the initial vowel. The ſame verb exiſts in Welſh, under the different figure of *thowy* or *thowys*, and is no other than the Engliſh *tow*, *to conduct.* The Gothic *thiudinaſſus*, *a kingdom*, ſeems originally to have meant *the emperor of a ſubdued nation*, from the Greek θητευς and αναξ, or ανασσω, as the offspring of the former exiſts in this tongue *thiuda*, *gens*, *populus.* On the other hand, the Welſh *deyrnas* is the Greek θρονος, corrupted, by the tranſpoſition of *r*, into *thornos* or *dyrnas*. Our Engliſh *throne* conforms to the original in ſound and ſenſe. In the Anglo-Saxon the correſponding word is *ryc*, which ſtill exiſts in ſuch Engliſh compoſitions, as *biſhopric*, *i. e.* the dominion of a biſhop. In the Great Indian language abovementioned, this term ſubſiſts under the character of *reyh*, meaning *wealth*, and which is nearly the ſame in ſound and ſenſe with the Anglo-Saxon *ryc*, or our *rich*, and the Latin *res*, *property*.

4. As *light* or *air* is the chief medium of exiſtence, the Hebrew term אור, *awar*, gave birth to the Latin *eram*, *ero*, and the Gothic *wair* or *wairthan*, *to be*, *to become.* The Welſh *bydded*, which exiſts alſo in the form of *byw*, and which is the ſame with the Greek βιοω, and the Latin *vivo*, deſcended from the Perſian *bodan*, *to be.* *Wilga* is βουλω, or *volo*, with *ga* annexed, by an analogy common in the Gothic tongue. The Welch *wollys*, or with *e* prefixed, *ewyllys*, has flowed from the ſame ſource; and under the former of theſe forms is nearly allied to the Engliſh *will.* *Sue* is our *ſo*, or the Greek ὡς reverſed, a fate very common with monoſyllables in the ancient languages. *Gah* came from και, and *ana* from ανα, which, in compoſition, means *up*, and has given birth to the Gothic ſenſe of *upon.* *Airthai* is the Arabic *ardd*, from the Hebrew ארץ, *arets;* while the Welſh *daiar*, or as it is otherwiſe written, *tyr*, originated in *terra.* The Hebrew עבר, *aber*, the parent of ὑπερ in Greek, of *uber* in German, *ufer* in Gothic, and *over* in Engliſh, has contracted in Celtic into *ar*, in the ſenſe of *upon.*

5. The Arabic עלף, *âleph*, *food*, is the origin of the Gothic *hlaif*, and the Engliſh *loaf.* *Thana*, or *than*, is the accuſative article τον. *Sintinein* is formed from the noun *ſinth*, *viciſſitude*, *change*, which is no other than the Hebrew שנה or שנת, *ſinth*, that change or period of time called a year: hence *ſintinein* came to ſignify *continual*, or *perpetual.* Our Lord, we believe, by the clauſe τον αρτον τον επιουσιον, meant not, as it is generally rendered, *daily bread;* but the bread belonging to us, and eſſential to us as immortal beings, namely, the bread of the ſoul. (See " Mr. Jones's Illuſtrations of the four Goſpels," p. 123.) In this ſenſe the clauſe was underſtood by the early commentators, and by the Gothic tranſlator, who has rendered it *hlaif thana ſintinein*, the eternal bread. In Hebrew, Arabic, and Perſian, כף, *kaph*, denotes the palm of the hand; hence it came to ſignify the action of the hand, which conſiſts either in imparting or receiving. In the former ſenſe it gave birth to the Gothic *gif*, and in the latter to the Latin *capio.* *Himmidaga* means *this day;* *himma*, or as we write it, *him*, being the perſonal pronoun uſed definitively, and *diga*, or *daeg*, according to the Anglo-Saxon, being the Latin *dies;* *him day* for *this day*, which is more common in the plural form among the vulgar *them days.*

The Welch *dyro*, in the ſame verſe, is the Greek δωρον, *a gift*, converted into a verb. *Heddyw* is a diſguiſed form of *hodie*, which laſt is only a contraction of *hoc die*, this day. *Bara* is a word which exiſts in all languages. Its origin is the Hebrew פרה, *pharah*, *fruit:* and hence πυρος in Greek, *far*, and *pario* in Latin, *brodh* in Cimbric, *brot* in Francic, *broodt* in German, *branta* in Norſe, *bread* in Engliſh, *brod* in Daniſh, and *brae* in Friſic. *Brynhyddiol*, rendered *daily*, appears to be compoſed of *bryn*, *a top* or *ſummit*, and *yddiol*, the Latin *dies* adjectived, and means a top of each day, or a head of each day, *i. e.* daily. The word is alſo uſed *beynyddial*, *beyn* being a corruption of *pen*, a head. The Welſh are fond of this expreſſion, and have a phraſe, *poeb dyth ar y pen*, each day on his head, meaning every day in ſucceſſion.

6. *Aflet uns*, i. e. *of-let*, or *let off*, *diſmiſs to us.* *Thatei* is a corruption of the Greek τουτο, *this* or *that thing*, and is thus the parent of the Engliſh *that:* hence the reaſonableneſs of the explanation which the celebrated Mr. Tooke has given of ſuch phraſes—remit to us *that thing*, *viz.* *ſculans ſigaima*, we are debtors. *Sculans* were perſons under command, under obligation or debt, from the Greek σκυλλειν, *to labour:* hence appears to have been derived our *ſcullion*, a mean domeſtic ſervant. In ancient times labourers uſually paid their rents in kind from the products of their fields: hence, in Greek, the tenant was called χειρωφειλετης. On the ſame principle, in Gothic, the word ſignifying *to labour*, came to ſignify *to owe*, or *to be in debt.* *Sigaima* is only the Latin *ſimus* corrupted by the inſertion of *ga*, a particle of frequent uſe in Gothic. The Welſh *a mathe*, or as it may be written, *ammaddeu*, is a compoſite of *ag madde*, *and remit*, the firſt being the Latin conjunction *ac*, the ſecond the Greek μεθιεω, the ſame with μεθιημι, *to diſmiſs* or *remit.* *Dyledion*, the plural of *dyled*, is the Latin *deleta*, things to be *eraſed*, or to be cancelled by being paid, *i. e.* debts. The noun *wr*, or the plural *wyr*, which in this tongue is ſo often added to the name of a thing, is but the Latin *vir*—*dyledwyr*, *debtmen* or *debtors.*

7. The Goths and Anglo-Saxons corrupted φερειν into *beoran* and *bringan*, and hence our *to bear*, and *to bring*—*ni bringai*, do not bring us. The Latin *nē* in Gothic is *ni*, in Anglo-Saxon and Engliſh *no*, in Welſh *na* or *nag.* *Fraiſtubngai* is the correſponding noun of *fraiſan*, to tempt, and appears to have been borrowed from the Latin *preſſus*, and therefore primarily meant *preſſure*, *ſtraightneſs.* The Welſh *arwain* is the French *rene* with the vowel *a* prefixed, and is the ſame with our *rein:* its proper ſenſe is to lead a horſe with a bridle. The French, in deriving words from the Latin, generally reject the guttural in the middle or at the end; and on this principle the root of *rene* is *regno*, *to rule*, *direct.* *Profedigaeth* ſtrictly denotes *experience*, and its origin is the Latin *probo*, which laſt is itſelf taken from the Greek φορβη, *paſture*, or the correſponding verb φερβω, *to taſte* or *chew.*

8. The Gothic *ak* is the Latin *ac*, though uſed by the latter in a conjunctive, by the former in a disjunctive ſenſe—*but.* The root is αεξω, or the thence derived *augeo*, whence the Gothic *augan:* and *ak*, conformably to the form of this

laſt verb, is alſo written *auk* in the ſenſe of *nam*, *enim*. The correſponding Welſh word is *eithr*, derived from ἑτερος, *another*. The explanation of it is this—lead us not into trial; another thing, *i. e.* do another thing, namely, deliver us from evil: on this principle the conjunction αλλα, *but*, originated in αλλος. *Lauſei*, which has given birth to various words in Anglo-Saxon and in Engliſh, and among the number to *looſe*, *loſe*, *leaſe*, *releaſe*, *let*, is apparently the offspring of the Hebrew לוז, *luz*, *decedo*, *recedo:* to *deliver* from evil is but to cauſe to recede from evil, and thus *lauſen* correſponds in ſenſe as well as in ſound to the original. A looſe character is a character freed or looſened from the rules of ſobriety and juſtice, and this deviation from rectitude is implied in the original לוז; while the compound *releaſe* comes cloſe to the Gothic ſignification of *lauſan*, to deliver. The Welſh which anſwers to this is *gwared*, and is no other than the Latin *gero*, (properly pronounced *guero,) to manage*, *to carry*. The Arabic פרע, *pharâ*, is the origin of our word *free*, its primary ſenſe. Being thence applied to men, it came to ſignify thoſe who were the *heads* of families, or who went before them: hence it was uſed to convey the more general and abſtract ideas of precedence or *beginning*; in this ſenſe it is the origin of πρωι in Greek, *præ* in Latin, *fra* or *fram* in Gothic, *ifra* in Cimbric. In the Anglo-Saxon *m* is annexed, and hence our word *from*, though the Scotch uſe it in the original purity of *frae*. The correſponding Welſh *rhag*, which means *far*, *diſtance*, has retained with great exactneſs the ſound and ſenſe of רחק, *rhak*, its Hebrew original. The Gothic *ubil*, German *ubel*, Anglo-Saxon *iſle*, and Engliſh *evil*, is the Perſian and Arabic בלי, *bala*, with a vowel prefixed. The Perſian *tarīk*, is the parent of the Engliſh *dark:* and as darkneſs was the ſymbol of *evil*, or of the ſuppoſed dæmon which created it, the Celts received it to expreſs *evil* under the form of *drwg:* and it is remarkable that the ſame word with *alpha privativum* is uſed by the Greeks to denote a contrary ſenſe—ατρεκης, *not dark*, *ingenuous*, *ſincere*, *true*. In the ſame language τρωκτης means an *impoſtor*, which the lexicographers, miſled by mere ſimilarity of ſound, have erroneouſly referred to τρωγω, *to eat*.

From this analyſis, which we hope is worthy the attention of the learned, we ſhall draw a few concluſions reſpecting the Gothic tongue. Firſt, it appears to reſemble the Celtic, in having a common Aſiatic baſis, and in containing a copious influx of Greek and Latin words. As the two languages were not eſſentially different, there is no foundation for ſuppoſing, with Dr. Percy, that the Celts and the Goths were originally diſtinct races of men. And here we cannot help ſpecifying a feature in theſe tongues, which, in a remarkable manner, beſpeaks their original identity, or their immediate deſcent from a common parent.

The Gothic, with its offspring the Anglo-Saxon and the German, uſes the particle *ga* or *ge* prefixed to words, and eſpecially to verbs. The Gothic ſometimes inſerts *g* in the middle of words, and frequently before the infinitive termination of verbs: αυξειν, or *augere*, is *wahſgan*, and χλευειν, *to deride*, *hlahgan*, *to laugh*. In conſequence of this analogy, words borrowed from Greek and Latin are remarkably diſguiſed, and they muſt be ſtripped of this peculiarity before they can be traced to their true origin. The Celtic, if we may judge from the Welſh, was diſtinguiſhed by the ſame characteriſtic feature: thus, the Latin *vir* is *gwr; vinum*, *gwyn; vagus*, *gwaeg*, &c. On this principle ὁμως, *like*, *as*, in Welch is *megis*, which bears the ſenſe of the original. The identity or ſimilitude of the two languages will account for the Goths and Celts being called by the common name of Cimmerians or Cimbri, which the true Britons, the undoubted deſcendants of the Celts, ſtill inherit under the name of Cymri.

Sir W. Jones, in his ſixth diſcourſe delivered to the ſociety at Calcutta on the antiquities of Aſia, has the following paſſage well worthy of our attention, as tending to confirm, in a remarkable manner, the reſult of the preceding inquiry. The paſſage is this: "It has been proved by clear evidence and plain reaſoning, that a powerful monarchy was eſtabliſhed in Iran long before the Aſſyrian government; that it was in truth a Hindoo monarchy, though, if any chuſe to call it Cuſean, Caſdean, or Scythian, we ſhall not enter into a debate on mere names; that it ſubſiſted many centuries, and that its hiſtory has been ingrafted on that of the Hindoos, who founded the monarchies of Ayodhya and Indraprеſtha; that the language of the firſt Perſian empire was the mother of the Sanſcrit, and, conſequently, of the Zend and Parſi, as well as of Greek, Latin, and Gothic; that the language of the Aſſyrians was the parent of Chaldaic and Pahlavi, and that the primary Tartarian language alſo had been current in the ſame empire; although, as the Tartars had no books, or even letters, we cannot, with certainty, trace their unpoliſhed and variable idioms. We diſcover, therefore, in Perſia, at the earlieſt dawn of hiſtory, the three diſtinct races of men, whom we deſcribed on former occaſions as poſſeſſors of India, Arabia, and Tartary; and whether they were collected in Iran from diſtant regions, or diverged from it, as from a common centre, we ſhall eaſily determine from the following conſiderations. Let us obſerve, in the firſt place, the central poſition of Iran, which is bounded by Arabia, by Tartary, and by India; whilſt Arabia lies contiguous to Iran only, but is remote from Tartary, and divided even from the ſkirts of India by a conſiderable gulf. No country, therefore, but Perſia ſeems likely to have ſent forth its colonies to all the kingdoms of Aſia: the Brahmans could never have migrated from India to Iran, becauſe they are expreſsly forbidden by their oldeſt exiſting laws to leave the region, which they inhabit at this day; the Arabs have not even a tradition of an emigration into Perſia before Mohammed; nor had they, indeed, any inducement to quit their beautiful and extenſive domains: and as to the Tartars, we have no trace in hiſtory of their departure from their plains and foreſts till the invaſion of the Medes, who, according to etymologiſts, were the ſons of Madai, and even they were conducted by princes of an Aſſyrian family. The three races, therefore, whom we have already mentioned, (and more than three we have not yet found,) migrated from Iran, as from their common country: and thus the Saxon Chronicle, I preſume on good authority, brings the firſt inhabitants of Britain from Armenia; while a late very learned writer concludes, after all his laborious reſearches, that the Goths or Scythians came from Perſia; and another contends, with great force, that both the Iriſh and Old Britons proceeded ſeverally from the borders of the Caſpian; a coincidence of concluſions from different media, by perſons wholly unconnected, which could ſcarce have happened, if they were not grounded on ſolid principles. We may, therefore, hold this propoſition firmly eſtabliſhed, that Iran or Perſia, in its largeſt ſenſe, was the centre of population, of knowledge, of languages, and of arts; which, inſtead of travelling weſtward only, as it has been fancifully ſuppoſed, or eaſtward, as with equal reaſon might have been aſſerted, expanded in all directions to all the regions of the world." Here we ſee it ſtated, as the reſult of ſir William Jones's inquiry, that the Goths, the Iriſh, and the Old Britons, or the Celtæ, were originally the ſame people, and of Aſiatic origin; that they uſed the ſame language derived from the primæval language of Aſia: and this he gives not merely as the conſequence of his own inveſtigation, but as a coincidence of concluſions, through different media, by perſons wholly unconnected." We know not whether this great man was aware of the great ſimilitude ſubſiſting between the Gothic and the Celtic tongues. From his ſilence we may conclude that he was not: and if he had ſeen ſpecimens of them, analyſed ſimilar to that above, he would have deemed the reſemblance a ſurpriſing confirmation of his theory.

We conclude, in the ſecond place, from the above analyſis, that the Gothic had a cloſe affinity to the Greek and Latin. And ſir William Jones gives it as his opinion, that the Greek, Latin, and Gothic originated in one and the ſame language; namely, the ancient language of Perſia. Theſe three languages, therefore, originally reſembled each other, not merely becauſe they borrowed ſome words one from the other, but becauſe they had the ſame words, phraſes, and even conſtruction, in conſequence of having derived them from a common tongue. And here we cannot help mentioning one feature in which the ancient Gothic bore a very ſingular reſemblance to the Greek in the time of Homer, or that dialect of the Greek (namely, the Æolic), from which the Latin was principally derived: we mean the much diſputed Æolic *digamma.* In the Oriental languages gutturals abounded: theſe, by degrees, ſoftened into a mere aſpirate; and for this aſpirate was, in very numerous inſtances, ſubſtituted a *labial* letter *w* or *v*, or *f*, or ϝ. Thus *khaan, a king*, degenerated into *hân;* and being introduced into Greek in the form of αναξ, or ανασσω, was pronounced ϝαναξ, ϝανασσω. While the oral Greek was thus corrupted, the written retained the aſpirate; and as the works of Homer became the ſubject of univerſal ſtudy, the true orthography triumphed over the caprice of oral ſounds. But the Latins had no ſuch monument of genius as the Iliad to ſtudy: the corruptions of pronunciation, therefore, prevailed, and the digamma was univerſally ſubſtituted for the aſpirate. Thus ἑστια, *veſta*, ἑσπερα, *veſpera.* The digamma was alſo prefixed to a broader open vowel, and always inſerted between a diphthong, as οις, pronounced *owis, ovis;* οινος, *woinos, vinum;* οικος, *woikos, vicus.* Now, this ſame digamma runs through the Gothic language, which ſhews that a great part of it, through ſome channel or other, was derived from the Greek, about the early age in which the Latin ſeparated into a diſtinct dialect. We ſhall give a few examples of this fact. The Greek αναξ, in Gothic, is written conformably to the corrupt pronounciation of ϝαναξ, *fân;* αειν, *ſpirare*, is *waian;* αεξειν, (which is equivalent to αυξανειν) is *wahſgan, creſcere;* εργαζειν, *waurkgan;* hence the Engliſh, *to work.*

But though the Greek may have the ſame form and baſis with the Gothic; and though by ſome communications, now unknown, it may have enriched the Gothic with its own early improvements, yet the dialect dignified with this name is only the remains of the Gothic tongue, debaſed by a ſtrong mixture of Greek and Latin terms, a century or two after the commencement of the Chriſtian era. The Goths who uſed it lived in Wallachia, a country in which Roman colonies had been planted, and which was contiguous to the provinces of Greece. As the verſion of Ulphilas, contained in the "Codex Argenteus," is the only repoſitory of this dialect, it is worth while to hear what Michaelis ſays of it in his "Remarks on the Ancient Verſions," Marſh's tranſlation, vol. ii. p. 142. "In the "Codex Argenteus," many words are adopted immediately from the Greek. Here I underſtand, not ſuch as have been common to the German and the Greek from the earlieſt ages of antiquity, and ſhew either an original relation, or original connection between the two nations, but ſuch Greek words as are found in no other German dialect than that of the "Codex Argenteus," and have been transferred from the Greek, after the complete formation of both languages: for inſtance, αττα, *father, ams, the ſhoulder*, ωμος, where even the *s* is retained from the Greek termination. *Spyreïdans, baſkets*, σπυριδες; *rhatizo, eaſier*, ῥαδιος; *maizo, greater*, μειζων; *aſtaſſais*, (αποστασιου,) *bokos, bill of divorce.* This betrays not a dialect that was uſed in Germany, or in the North, but that of a nation that lived in the neighbourhood of the Greeks. Even the mode of expreſſing the ſound of *ng*, in the "Codex Argenteus," is purely Greek, and never uſed in Germany, where the Latin orthography has been received; for *finger* is written in that manuſcript *figgr*, as the Greeks would have expreſſed it by a double gamma." Ulphilas is ſaid to have invented the characters of this dialect; which are evidently a mixture of the Greek and Latin alphabet. The uſe of ſuch characters was natural, if the dialect which they expreſſed contained a great mixture of the languages to which they properly belonged.

This repreſentation muſt greatly diminiſh our veneration for the Gothic, as far as it can be known by us; yet, in this light, it demands our attention and reſpect as the undoubted parent of the Engliſh tongue. Nevertheleſs, we are hence compelled to regard the Gothic and the Anglo-Saxon as but corrupt channels by which the terms of Greece and Rome have been imported into our own language. There are, indeed, thoſe who conſider them in this humble and degraded ſtate, as claiming the dignity of original, ancient, and independent languages. And Mr. Horne Tooke, in particular, in his celebrated work on grammar, has attempted to induce the public to receive corruptions from Greek and Latin in the dark ages, as the original words of a Northern language; whence Greek and Latin have, according to him, themſelves been derived. The merits of this queſtion will more properly be diſcuſſed under the articles GRAMMAR and GREEK. But if the account we have given of the Gothic be juſt, we ſhall want no other evidence to convince us that the theory of Mr. Tooke, as far as this queſtion is concerned, (and it forms a very leading feature of his ſyſtem,) is not only erroneous, but ridiculous and abſurd.

GOTHIC *Medals.* See MEDAL.

GOTHIC *Muſic.* When ſig. Eximeno calls fugues and canons Gothic compoſitions, he does not diſgrace their ſtructure any more than he would our cathedrals, by calling them Gothic buildings. Let fugues be baniſhed from the theatre and private concerts, if he pleaſes, but let them remain in the church as a diſtinct ſpecies of compoſition, where they were firſt generated, and where they can never become vulgar or obſolete. The ſtyle is naturally grave, requires muſical learning, and will, by the ſolemnity of the words and place of performance, continue to be reverenced and reſpected. It is allowed that variety is more wanted in muſic than in any other art, and by totally excommunicating canons and fugues from the church, the art would loſe one capital ſource of variety, as well as ingenuity; and intelligent hearers be bereaved of a ſolemn ſtyle of muſic, to be heard no where elſe.

GOTHINI, or GOTHUNI, in *Ancient Geography*, a name given to the Goths. They were called Getones by Tacitus and Juſtin, and Guttones by Pliny. Claudian calls them Gothuni.

GOTHLAND, a country of Sweden, bounded on the N. by Sweden Proper, on the E. and S. by the Baltic, and on the W. by the Sound, the German ocean, and Norway. This country is inhabited by a people, who derived their origin from the Getæ, or Tartars of the Crimea. The Goths had kings of their own, till the year 1132, when they were united to Sweden. The country is pleaſant and fertile, conſiſting of paſture and arable land; and abounding in lakes and rivers plentifully ſtored with fiſh, and alſo with foreſts and mines. It contains 48 towns, and is divided into Eaſt, Weſt, and South Gothland.

Eaſt Gothland is bounded on the N. by the provinces of Nericia or Nerike, and Sudermanland, on the E. by the Baltic, on the S. by Smoland or Smaland, and on the W. by the Wetter lake, which ſeparates it from Weſt Gothland. It is about 80 miles long, and 70 broad. It produces wheat, rye, barley, oats, peaſe, &c. in ſuch abundance as to ſupply the neighbouring provinces. It has likewiſe many fine orchards, with meadows, paſtures, lakes, and rivers abounding with fiſh, extenſive foreſts, iron-mines and founderies, and quarries of ſtone and marble. The inhabitants are occupied in huſbandry, hunting, and fiſhing, and alſo in ſome places in the mines. The chief towns of this province are Nordkioping, Soderkioping, Linkioping, and Wadſtena; which ſee reſpectively.

South Gothland is divided into three provinces, *viz.* Schonen or Skone, Halland, and Blekingen, which have at ſundry times changed their maſters, till at length Charles Guſtavus annexed them for perpetuity to the Swediſh dominions, by the treaty of Roſchild, in the year 1658.

Weſt Gothland is bounded on the N. by Warmeland, on the E. by Nericia, the Wetter lake, and Smaland, on the S. by Smaland and Halland, and on the W. by the Scaggerac. It is about 115 miles long, and 15 broad; like Eaſt Gothland it was under the adminiſtration of its own kings and laws. The ſoil produces corn, vegetables, and fruit; and affords excellent paſtures, which enable the occupiers to ſupply other provinces with butter and cheeſe. The rivers, lakes, and ſea-coaſt abound with fiſh; and in ſeveral places are erected iron-forges, alum-works, paper mills. The inhabitants are chiefly employed in agriculture and fiſhing. The chief towns are Gotheborg, Wenneſborg, Lidkioping, and Falkioping; which ſee reſpectively.

GOTHLAND, or *Gottland*, an iſland belonging to Sweden, ſituated in the Baltic, between N. lat. 56° 54′, and 57° 56′, and E. long. 18° 6′, and 19° 6′; about 70 miles long and 25 in its greateſt breadth. It was formerly an independent kingdom, but is now ſubject to the ſupreme court of juſtice at Stockholm. Its ſituation has gained for it the appropriate denomination of the "Eye of the Baltic." The ſoil is fertile, and affords fine woods of oak and pine, and good paſtures; and its breed of ſheep is accounted excellent. It has large quarries of ſtone, which is exported to Stockholm and other places, and ſome curious ſpecies of ſtone corals, carnelians, agates, and beautiful petrifactions. It furniſhes likewiſe good lime-ſtones, tar, and deal-boards. Although it is not infeſted with bears or wolves, it abounds with foxes, deer, and hares. The inhabitants gain their ſubſiſtence by tilling the ground, grazing, fiſhing, working in the quarries, burning lime, and other ſorts of mechanic trades, and navigation. The peaſants are in a ſtate of abſolute dependence on the burghers, who ſupply them with neceſſaries, and with money for paying their taxes, and to whom they ſurrender the whole produce of their induſtry, without ſtipulating any price. This iſland was at firſt ſubject to the crown of Sweden, and afterwards to the Danes for near two centuries, till the year 1645, when by the treaty of Bromſebro, it was reſtored to Sweden. The capital of the iſland is Wiſby, on the weſtern coaſt.

GOTHS, a people, who came originally, according to Jornandes (Rer. Get.) who abridges the Gothic hiſtory of the learned Caſſiodorus, compriſed in 12 books, from the vaſt iſland, or rather peninſula, called Scandinavia, and including the preſent Sweden, Norway, Lapland, and Finmark. The learned Grotius, and after him Sheringham, and moſt of the northern writers, maintain by arguments, which, as many conceive, have not been refuted, but which are not convincing to others, that the Cimbrians (ſee CIMBRI), Getes (ſee GETÆ), and Goths, were the ſame nation; that Scandinavia was firſt peopled by them; and that from thence they detached colonies into the iſlands in the Baltic, the Cherſoneſus, and the adjacent places, yet deſtitute of inhabitants. Many veſtiges, which cannot be aſcribed to the arts of popular vanity, atteſt the ancient reſidence of the Goths in the countries beyond the Baltic. From the time of the geographer Ptolemy, the ſouthern part of Sweden ſeems to have continued in the poſſeſſion of the leſs enterpriſing remnant of the nation, and a large territory is even at preſent divided into Eaſt and Weſt Gothland. (See GOTHLAND.) The time when the Goths firſt ſettled in Scandinavia, and the period at which they firſt peopled with their colonies the iſlands, the Cherſoneſus, and the neighbouring places, have not been aſcertained. Some have ſaid, that their firſt ſettlement was conducted by Eric, contemporary with Sarach, grandfather of Abraham. However this be, the peopling of the iſlands in the Baltic ſea, of the Cherſoneſus, and of the adjacent places on the continent, is called by the Northern writers, the *firſt* emigration of the Goths or Getes. The attempt to croſs the Baltic was natural and eaſy. The inhabitants of Sweden (as we learn from Tacitus) were maſters of a ſufficient number of large veſſels with oars; and the diſtance is little more than 100 miles from Carlſcroon to the neareſt ports of Pomerania and Pruſſia. At leaſt as early as the Chriſtian era, and as late as the age of the Antonines, the Goths were eſtabliſhed towards the mouth of the Viſtula, and in that fertile province, where the commercial cities of Thorn, Elbing, Koningſberg, and Dantzick were long afterwards founded. Weſtward of the Goths, the numerous tribes of the Vandals were ſpread along the banks of the Oder, and the ſea-coaſt of Pomerania and Mecklenburg. A ſtriking reſemblance of manners, complexion, religion, and language, ſeemed to indicate that the Vandals and Goths were originally one great people. (See VANDALS.) In the age of the Antonines the Goths were ſtill ſeated in Pruſſia. About the reign of Alexander Severus, they made frequent and deſtructive inroads into the Roman province of Dacia. In this interval, therefore, of about ſeventy years, we muſt place the *ſecond* emigration of the Goths, from the Baltic to the Euxine. To what cauſe this was owing is matter of mere conjecture. Perhaps a peſtilence or a famine, a victory or a defeat, an oracle of the gods, or the eloquence of a daring leader, were ſufficient to impel the Gothic arms on the milder climates of the ſouth. Beſides the influence of a martial religion, the number and ſpirit of the Goths were equal to the moſt hazardous adventures. The uſe of round bucklers and ſhort ſwords rendered them formidable in a cloſe engagement; the manly obedience which they yielded to hereditary kings gave uncommon union and ſtability to their councils; and the renowned Amala, the hero of that age, and the tenth anceſtor of Theodoric, king of Italy, enforced, by the aſcendant of perſonal merit, the prerogative of his birth, which he derived from the *anſes*, or demigods of the Gothic nation.

Whatever was the motive of their migration, they took their route eaſtward, entered Scythia, advanced to the Cimmerian Boſphorus, and, driving out the Cimmerians, ſettled in the neighbourhood of the Mæotic lake. Thence, in proceſs of time, they ſent out numerous colonies into Thrace, Dacia, Mœſia, or Italy, and laſtly into the countries bordering on the Euxine ſea, forcing every where the ancient inhabitants to abandon their native abodes. Such is the account given by Jornandes, and Ablavius, a celebrated writer among the Goths, who lived long before him. In the vicinity of the Mæotic lake, they had, it is ſaid, Filimir for their king, who was a warlike prince; in Thrace, Mœſia, and Dacia, Xamolxis, a great philoſopher; and in the countries on the Euxine ſea, princes of the illuſtrious families of the Balthi and the Amali, the Viſigoths being ſubject to the former, and the Oſtrogoths to the latter. In all theſe countries they were the ſame people, though ſubject to different princes, and known by various appellations. As for the denominations of Weſtrogoths, ſoftened by the Latins into that of Viſigoths, and Oſtrogoths, they were diſtinguiſhed by thoſe names before they left Scandinavia, being called Weſtrogoths and Oſtrogoths, or weſtern and eaſtern Goths, from their ſituation to the weſt and eaſt, the former inhabiting that part of Scandinavia which borders on Denmark, and the latter the more eaſtern parts, near the Baltic. The information we derive from Jornandes concerning the various migrations and ſettlements of the Goths is conformable to the accounts that are given by the ancient Greek and Latin authors with reſpect to the different colonies and ſettlements of the Getes. That the Goths and Getes were the ſame people, is ſuppoſed by all the writers who flouriſhed in or near the times in which both empires were overrun by them. Thoſe authors, without doubt well acquainted with their origin, call them ſometimes Goths, ſometimes Getes, and ſometimes Scythians; and ſeveral authors tell us, that the Getes and Goths had been long known to the Romans, and alſo to the Greeks by the former names, but not by the latter, till their incurſions into the empire.

When the Goths greatly increaſed in Scythia, they reſolved to ſeek new ſettlements; and accordingly, purſuing their route eaſtward, and travelling through ſeveral countries, they returned at length into Germany. Their leader in this migration was the celebrated Woden or Odin, of whom many ſtrange things are related. It is ſaid by the northern writers, that he was king of the Aſgardians, ſuppoſed to be the ſame people with the Aſpurgians mentioned by Ptolemy and Strabo. Aſgardia and Aſpurgia are ſaid to be a common name of their city, ſituated, according to Strabo, near Boſphorus Cimmerius; and Aſpurgia was the metropolis of a country which Strabo calls Aſia; hence Woden and his followers are ſtyled by the ancient Gothic writers Aſæ, Aſiani, and Aſiatæ. The kings of Aſpurgia are repreſented as being maſters of all that part of Scythia that lay weſt of mount Imaus, and which the Latins called "Scythia intra Imaum," or Scythia within mount Imaus. Of this Aſgardia or Aſpurgia, Woden is ſaid to have been king; and hence he emigrated with a great multitude of his followers in queſt of new ſettlements; or, as ſome ſay, with the great deſign of forming in Sweden, conſidered as the inacceſſible retreat of freedom, a religion and a people, which, in ſome remote age, might be ſubſervient to his purpoſes; when his invincible Goths, armed with martial fanaticiſm, ſhould iſſue in numerous ſwarms from the vicinity of the Polar circle to chaſtiſe the oppreſſors of mankind. Having paſſed through different countries, and performed a variety of exploits, he at length arrived in Sweden, where he was allowed to ſettle, and where he reigned till his death. His name became ſo famous that the northern nations ranked him among the gods, and worſhipped him with divine honours. He is ſuppoſed to have brought with him out of Aſia the Runic characters (ſee Runic), and to have taught the northern nations the art of poetry; whence he is ſtyled the father of the Scaldi or Scaldri. See Scalds.

That the Goths, under the conduct of Woden, came from Scythia into the northern parts of Germany, is a received opinion among the northern writers, and, as they allege, confirmed by an immemorial tradition, by the ancient chronicles of thoſe countries, and by many monuments and inſcriptions in Runic characters, ſome of which are ſtill to be ſeen in Sweden, Denmark, and the neighbouring iſlands. That there were ſuch migrations can hardly be queſtioned, ſince we find the ſame names common to the inhabitants of Scandia and Aſiatic Scythia, and likewiſe the ſame language, as Grotius, and after him Sheringham, have ſhewn. The ancient language of the Goths is now ſpoken by the Tartars of Precop, whence, and from other collateral circumſtances, it has been concluded that the Scandian Goths and Aſiatic Scythians had one and the ſame original. As to the time of this migration of Scythians under Woden into the northern parts of Germany, thoſe who maintain it have not been able to determine. Some refer it to a period about 24 years B. C.; for at that time, they ſay, Pompey laid waſte Syria, and great part of Aſia, and menaced the north with ſervitude. After all, this wonderful expedition of Woden or Odin is admitted with great heſitation, or indeed ſcarcely admitted at all by many, into authentic hiſtory. According to the obvious ſenſe of the Edda (ſee Edda), and the interpretation of the moſt ſkilful critics, Aſ-gard, inſtead of denoting a real city of the Aſiatic Sarmatia, is the fictitious appellation of the myſtic abode of the gods, the Olympus of Scandinavia; from whence the prophet was ſuppoſed to deſcend, when he announced his new religion to the Gothic nations, who were already ſeated in the ſouthern parts of Sweden.

Before we proceed with our brief abſtract of the hiſtory of the Goths, we ſhall give ſome account of their character, cuſtoms, laws, and religion, before they embraced Chriſtianity. With regard to their general diſpoſition and character, they were celebrated for their hoſpitality and kindneſs to ſtrangers; and it is ſaid that they derived their name from their being eminently good; the name of Goth being derived, according to Grotius and other writers, from the German word *goten*, ſignifying *good*. They encouraged, ſays Dio, the ſtudy of philoſophy more than any other barbarous or foreign nation, and often ſelected their kings from among their philoſophers. Polygamy was not only allowed, but encouraged, and every one was reſpected according to the number of his wives, and of courſe his children. Adultery with them was a capital crime, and invariably puniſhed with death. This ſeverity, and likewiſe polygamy, prevailed among them, when they were known to the Greeks and Romans only by the name of Getes, as appears from the poet Menander, who was himſelf a Gete, and from Horace (l. iii. od. 24.) who beſtows great encomiums on the virtue and chaſtity of their women. Of their laws we ſhall have occaſion to ſpeak in the ſequel of this article. Their government was monarchical. Their religion ſeems to have been the ſame with that of the ancient inhabitants of Scandinavia and Saxony; which ſee reſpectively. Till the end of the eleventh century, a celebrated temple ſubſiſted at Upſal, the moſt conſiderable town of the Swedes and Goths. This temple was enriched with the gold which the Scandinavians had acquired in their piratical adventures, and ſanctified by the uncouth repreſentations of the three principal deities, the god of war, the goddeſs of generation, and the god of thunder. In the general feſtival that was ſolemnized every ninth year, nine animals of every ſpecies (without excepting the human) were ſacrificed, and their bleeding bodies ſuſpended in the ſacred grove adjacent to the temple. The only traces that now ſubſiſt of this barbaric ſuperſtition are contained in the *Edda;* which ſee. See alſo Odin.

Caracalla was the firſt Roman emperor who quarrelled with the Goths, and marched againſt them into that part of Dacia, north of the Danube, of which they had taken poſſeſſion; but the advantages which he ſeems to have gained over them in a few ſkirmiſhes were very inconſiderable. It appears, that the Romans were alarmed at an early period by the progreſs of this warlike nation; for in the reign of Alexander, which began in 222, conſiderable ſums of money were ſent to them from Rome, in order to prevent their diſturbing the peace of the empire. Notwithſtanding theſe bribes, as ſoon as they heard of the aſſaſſination of the emperor Maximin, who was of Gothic extraction, they reſolved to revenge it, and accordingly entering Mœſia, they totally laid waſte that province. Not long after they made themſelves maſters of Thrace, from which they were driven by Gordian. Under Philip, his ſucceſſor, they committed dreadful ravages both in Thrace and Mœſia. Soon after their retreat from the ſiege of Marcianopolis, the capital of the ſecond Mœſia, and after having compelled the inhabitants to ranſom their lives and property, they paſſed the Danube a ſecond time, under the command of their king, Cniva, with a more conſiderable force; and having obliged Darius the ſon of the Roman emperor, to ſave himſelf by flight, they were oppoſed by the emperor himſelf. Darius, having compelled them to raiſe the ſiege of Nicopolis, they retired towards Philoppolis, took it by ſtorm, and maſſacred, as is ſaid, 100,000 perſons in the ſack of that city. The time, however, which was conſumed in this tedious ſiege, enabled Darius to revive the courage, reſtore the diſcipline, and recruit the number of his troops, after the defeat they had ſuſtained in their purſuit of the Goths. Thus recruited, the emperor exerted his utmoſt vigilance to oppoſe either the progreſs or the retreat of the barbarians. The Goths were now, on every ſide, ſurrounded and purſued by the Roman arms; and exhauſted by the long ſiege of Philoppolis, they would gladly have purchaſed, by the ſurrender of all their booty and priſoners, the permiſſion of an undiſturbed retreat. The emperor, confident of victory, refuſed to liſten to any terms of accommodation; and the high-ſpirited barbarians preferred death to ſlavery. The two armies, therefore, prepared for an engagement. The conflict was ſevere; two lines of the Gothic army were thrown into diſorder; and the third only remained entire, prepared to diſpute the paſſage of a moraſs, which was imprudently attempted by the Roman troops. Here the fortune of the day aſſumed a new aſpect. In this moraſs the Roman army, borne down by the weight of their armour, after an ineffectual ſtruggle, was irrecoverably loſt; nor could the body of the emperor ever be found. Upon the election of Gallus A. D. 251, the firſt object of his attention was to deliver the Illyrian provinces from the intolerable weight of the victorious Goths. He offered them every inducement in his power to withdraw their forces; and he even promiſed to pay them annually a large ſum of gold, on condition they ſhould never afterwards infeſt the Roman territories by their incurſions. This tribute, however, though granted at the expence of the honour of the Romans, was inſufficient to ſecure their permanent repoſe. New ſwarms of barbarians, encouraged by the ſucceſs, and conceiving themſelves not bound by the obligation of their brethren, ſpread devaſtation through the Illyrian provinces, and terror as far as the gates of Rome. In this period of alarm and diſtreſs, Æmilianus, governor of Pannonia and Mœſia, rallied the ſcattered forces of the empire; and the barbarians were unexpectedly attacked, routed, chaſed, and purſued beyond the Danube. Under the reigns of Valerian and Gallienus, the frontier of the laſt-mentioned river was perpetually infeſted by the inroads of the Germans and Sarmatians; but it was defended by the Romans with more than uſual firmneſs and ſucceſs. Nevertheleſs, the great ſtream of the Gothic hoſtilities was diverted into a very different channel. The Goths, in their new ſettlement of the Ukraine, ſoon became maſters of the northern coaſt of the Euxine: to the ſouth of that inland ſea were ſituated the wealthy provinces of Aſia Minor, which poſſeſſed all that could attract, and nothing that could reſiſt, a barbarian conqueror. The little kingdom of Boſphorus, whoſe capital was ſituated on the ſtraits, through which the Mæotis communicates itſelf to the Euxine, was compoſed of degenerate Greeks, and half-civilized barbarians. In this ſmall kingdom, domeſtic factions, and the fears, or intereſt, of obſcure uſurpers, who ſeized on the vacant throne, admitted the Goths into the heart of Boſphorus.

Here they acquired a naval force ſufficient to tranſport their troops to the coaſt of Aſia. For this purpoſe, they conſtructed a ſort of flat-bottomed boats, called "Camaræ," framed of timber only, without any iron, and occaſionally covered with a ſhelving roof, on the appearance of a tempeſt. With this kind of fleet, they firſt appeared before Pityus, at the utmoſt limit of the Roman provinces, with a convenient port, and fortified with a ſtrong wall. Their firſt attack was repulſed; but, renewing their attempts, they deſtroyed this city. Then circling round the eaſtern extremity of the Euxine ſea, their navigation from Pityus to Trebiſond was a courſe of about 300 miles. This city was large and populous, defended by a double incloſure of walls, and had its uſual garriſon ſtrengthened by a reinforcement of 10,000 men. But this numerous garriſon was diſſolved in riot and luxury, and thus rendered careleſs in guarding their impregnable fortifications. The Goths, availing themſelves of the ſupine negligence of the beſieged, erected a lofty pile of faſcines, aſcended the walls in the ſilence of the night, entered the defenceleſs city, ſword in hand, maſſacred the inhabitants, deſtroyed the temples and ſplendid edifices, and gained an immenſe booty. With the rich ſpoils of the city they filled a great fleet of ſhips, which they found in the port, and, ſatisfied with the ſucceſs of their firſt naval expedition, returned in triumph to their new eſtabliſhments in the kingdom of the Boſphorus. In their ſecond naval expedition, poſſeſſed of greater powers both of men and ſhips, they took a new courſe, followed the weſtern coaſt of the Euxine, paſſed before the wide mouths of the Boryſthenes, the Nieſter, and the Danube; and increaſing their fleet by a great number of fiſhing barks, they approached the narrow outlet through which the Euxine ſea pours its waters into the Mediterranean. In this expedition they plundered the cities of Bithynia, Chalcedon, Nice, Pruſa, Apamea, Cius, and Nicomedia. From the recent attack of Pruſa, the Goths advanced within 18 miles of Cyzicus; but their progreſs was ſtopped by the ſmall river Rhyndacus, which iſſues from the lake Apollionates, and which was then ſwelled into a broad and rapid ſtream. Their retreat to the maritime city of Heraclea, where their fleet was probably ſtationed, was attended by a long train of waggons, laden with the ſpoils of Bithynia, and was marked by the flames of Nice and Nicomedia, which they wantonly burnt. The third naval expedition of the Goths conſiſted of 500 ſail of tranſports, containing about 15,000 warriors. They now ſteered their deſtructive courſe from the Cimmerian to the Thracian Boſphorus; and were carried to the lake of the Propontis. Their landing on the little iſland of Cyzicus was followed by the ruin of that ancient and noble city. They thence iſſued through the narrow paſſage of the Helleſpont, and purſued their winding navigation amidſt the numerous iſlands ſcattered over the Archipelago, or Ægean ſea. At length the Gothic fleet anchored in the port of Piræus, five miles from Athens, ravaged Greece, and cauſed the rage of war, both by land and ſea, to ſpread from the eaſtern point of Sunium, to the weſtern coaſt of Epirus, advancing within ſight of Italy. The indolent Gallienus was rouſed; the emperor appeared in arms; and his preſence contributed to check the ardour of the enemy. Some of the numerous Gothic hoſt broke into Mœſia, for the purpoſe of forcing their way over the Danube to their ſettlements in the Ukraine. Others returned on board their veſſels, and re-tracing their courſe through the Helleſpont and the Boſphorus, and finding themſelves ſecure within the baſon of the Euxine, landed at Anchialus, in Thrace, near the foot of mount Hæmus, and refreſhed themſelves by the uſe of thoſe pleaſant and ſalutary hot-baths. Amidſt their devaſtations, we may ſelect the deſtruction of the famous temple of Diana at Epheſus, which they burnt in their third naval invaſion. It is alſo ſaid, that they threatened to deſtroy all the libraries of Athens, but were prevented from executing their menace by the profound obſervation of one of their chiefs, that as long as the Greeks were addicted to the ſtudy of books, they would never apply themſelves to the exerciſe of arms. Under the reign of Claudius, A. D. 269, the Goths collected an armament more formidable than any that had yet iſſued from the Euxine. On the banks of the Nieſter they conſtructed a fleet of 2000, or even of 6000 veſſels, which, in their paſſage through the Boſphorus, encountered various diſaſters. However, they made ſeveral deſcents on the coaſts, both of Europe and Aſia. But diſcontent and diviſion aroſe in the fleet, and ſome of their chiefs deſerted them, and ſailed away towards Crete and Cyprus: the main body, nevertheleſs, purſued their courſe, anchored at the foot of mount Athos, and aſſaulted the city of Theſſalonica. Their attacks were ſoon interrupted by the rapid approach of Claudius. The Goths, eager for a general engagement, relinquiſhed the ſiege of Theſſalonica; and with this view, leaving their navy at the foot of mount Athos, traverſed the hills of Macedonia. Claudius was diſtreſſed, but at the ſame time firm and determined. The event exceeded even his own expectations, as well as thoſe of the world; and having gained ſignal victories, and delivered the empire from this hoſt of barbarians, he was diſtinguiſhed by poſterity under the glorious appellation of the Gothic Claudius. The deciſive battle was fought near Naiſſus, a city of Dardania. The war was afterwards diffuſed over the provinces of Mœſia, Thrace, and Macedonia, and the ſuperior talents of the emperor generally enſured the ſucceſs of his arms. The Goths ſuffered to ſuch a degree, that a ſelect body of their youth was received among the Imperial troops, the remainder was ſold into ſervitude, and the female captives were ſo numerous, that every ſoldier appropriated to himſelf two or three women. To complete the diſaſters of the Goths, their fleet was either taken or ſunk, ſo that their retreat was thus intercepted. Aurelian, the ſucceſſor of Claudius, diſtinguiſhed himſelf during the Gothic war, and, at laſt, put an end to it by a laſting and beneficial treaty. The Gothic nation engaged to ſupply the armies of Rome with a body of 2000 auxiliaries, conſiſting entirely of cavalry, and, in return, ſtipulated an undiſturbed retreat, with a regular market as far as the Danube, provided by the emperor's care, but at their own expence. But the moſt important condition of peace was underſtood rather than expreſſed in the treaty. Aurelian withdrew the Roman forces from Dacia, and tacitly relinquiſhed that great province to the Goths and Vandals. This proved, in the event, a wiſe meaſure; for, after Dacia became an independent ſtate, it ſeemed as the firmeſt barrier of the empire againſt the invaſions of the ſavages of the North.

About the year 277, the ſecond of the reign of Probus, the Goths entered Thrace, and advanced as far as Illyricum, laying waſte the country with fire and ſword; but as ſoon as they heard that the emperor was marching againſt them, they retreated and left their booty behind them. In Illyricum, Probus was met by deputies from the Gothic nations, ſuing for peace, and ſubmitting to his power. No further mention is made of the Goths till the year 289, at which time Diocleſian is ſaid to have gained a complete victory over them. From this victory Diocleſian aſſumed the name of "Sarmaticus," as appears from ſeveral ancient coins and inſcriptions. From this year to the 15th of Conſtantine, the Goths gave no diſturbance to the empire, being engaged in wars with the neighbouring nations. As ſoon as the Goths were diſengaged from other wars, they invaded the Roman empire; but they were overcome by Conſtantine in ſeveral battles, fought at Campana, in Pannonia, and at Margus and Bononia, in Upper Mœſia. The emperor determined to chaſtiſe as well as to repulſe the inſolent barbarians who had dared to attack the territories of Rome, paſſed the Danube, and penetrated into the inmoſt receſſes of Dacia; and when he had inflicted a ſevere revenge, condeſcended to give peace to the ſuppliant Goths, on condition that as often as they were required, they ſhould ſupply his army with a body of 40,000 ſoldiers. In the year 331, a war broke out between the Goths and Sarmatians; on which occaſion the latter had recourſe to Conſtantine, who was glad to embrace an opportunity of humbling that ferocious nation. In the firſt action the barbarians gained the advantage; but the event of a ſecond and more ſucceſsful action, in April 332, retrieved the honour of the Roman name. Near 100,000 of the enemy were either put to the ſword, or periſhed after the battle with hunger and cold; and this defeat was ſo ſignal, as to oblige Alaric, king of the Goths, to ſue for peace, and to deliver hoſtages to the emperor, one of whom was his own ſon. The Goths not only continued quiet, but ſerved the Romans with great fidelity, during the remaining part of Conſtantine's reign; and in the reigns of Conſtans, Julian, Trajan, and Valentinian I. But in the firſt of Valens, they made inroads into Thrace, and laid waſte that province. The emperor purchaſed their retreat for a ſum of money. In the following year news was brought him to Bithynia, that the Goths were again ready to break into Thrace. When Procopius revolted, and aſſumed the title of emperor, the Goths eſpouſed his cauſe, and ſent a body of troops to his aſſiſtance; but before their arrival, he was defeated and put to death. They, however, continued in the territories of the empire, committing great ravages in Thrace and Mœſia. Valens ſent a ſtrong detachment againſt them, and their retreat being cut off, they were obliged to lay down their arms, and yield themſelves priſoners. After hoſtilities which laſted three years from 366 to 369, the barbarians ſubmitted, and thus appeaſed the reſentment of Valens. After the ratification of the treaty, Valens returned in triumph to Conſtantinople,

ſtantinople, and the Goths remained in a ſtate of tranquillity about ſix years; till they were violently impelled againſt the Roman empire by an innumerable hoſt of Scythians, who appeared to iſſue from the frozen regions of the North. In the year 375 the Huns invaded the territories of the Goths, and ſpread among them ſuch a general conſternation, that they fled for refuge to the Roman dominions. Valens liſtened to their ſupplications, and granted them protection. The liberality of the emperor, however, was accompanied with too harſh and rigorous conditions. Before they paſſed the Danube, they were required to deliver their arms; and it was inſiſted that their children ſhould be taken from them, and diſperſed through the provinces of Aſia; where they might be civilized by the arts of education, and ſerve as hoſtages to ſecure the fidelity of their parents. A probable teſtimony has fixed the number of the Gothic warriors at 200,000 men; and if we can venture to add the juſt proportion of women, of children, and of ſlaves, the whole maſs of people which compoſed this formidable emigration muſt have amounted to near a million of perſons, of both ſexes and of all ages. The Goths, juſtly provoked at the cruel treatment they met with from the Roman officers, who were to ſupply them with proviſions, had ſcarcely entered Thrace, under the conditions impoſed upon them, when they began to mutiny and plunder the country. This occaſioned a long and bloody war between them and the Romans. They were joined by the Huns, Alani, Taifalæ, and other ſwarms of their countrymen. In the battle of Hadrianople, A. D. 378, the Roman cavalry fled; and the infantry was abandoned, ſurrounded, and cut in pieces; and though the Goths were obliged to raiſe the ſiege of Hadrianople, the tide of the Gothic inundation rolled from the walls of this city to the ſuburbs of Conſtantinople; and the Roman provinces were ravaged by the barbarians. At this time a ſuſpicion prevailed, that the Goths of Aſia had formed a ſecret and dangerous conſpiracy againſt the public ſafety. An order was promulgated that, on a ſtated day, the Gothic youth ſhould aſſemble in the capital cities of their reſpective provinces; and as a report was induſtriouſly circulated, that they were ſummoned to receive a liberal gift of land and money, the pleaſing hope allayed the fury of their reſentment, and perhaps ſuſpended the motions of the conſpiracy. On the appointed day, the unarmed crowd of the Gothic youth aſſembled in the ſquare, or forum; the ſtreets and avenues were occupied by the Roman troops; and the roofs of the houſes were covered with archers and ſlingers. At the ſame time in all the cities of the Eaſt, the ſignal was given of indiſcriminate ſlaughter; and the provinces of Aſia were delivered by the cruel prudence of Julius, who was maſter-general of the troops, from a domeſtic enemy, who, in a few months, might have carried fire and ſword from the Helleſpont to the Euphrates. At length the Goths ſubmitted to Theodoſius I., and were allowed by him to ſettle in Thrace and Mœſia, which two provinces had been almoſt depopulated by the frequent incurſions of the neighbouring barbarians, and the late deſtructive war. A numerous colony of the Viſigoths was ſettled in Thrace; the remains of the Oſtrogoths were planted in Phrygia and Lydia; their immediate wants were ſupplied by a diſtribution of corn and cattle; and their future induſtry was encouraged by an exemption from tribute for a certain number of years. Hopes were entertained that the manners of the barbarians would in time be poliſhed, and that their poſterity would be inſenſibly blended with the body of the Roman people. Notwithſtanding theſe flattering expectations, it was apparent to every diſcerning eye, that the Goths would long remain the enemies, and might ſoon become the conquerors of the Roman empire. As the impatient Goths could only be reſtrained by the firm and temperate character of Theodoſius, the public ſafety ſeemed to depend on the life and abilities of a ſingle man. He died in the month of January A.D. 395, and before the end of the winter of the ſame year, the Gothic nation was in arms. The interruption, or at leaſt the diminution, of the ſubſidy which the Goths had received from the prudent liberality of Theodoſius, was the ſpecious pretence of their revolt. Inſtead of being impelled by the blind and headſtrong paſſions of their chiefs, they were now directed by the bold and artful genius of Alaric. In the year 396 Alaric marches into Greece; and he haſtened to occupy the city of Athens, and the important harbour of the Piræus. Corinth, Argos, and Sparta yielded without reſiſtance to the arms of the Goths. From Thermopylæ to Sparta, the leader of the Goths purſued his victorious march, without encountering any mortal antagoniſts; and the Chriſtian faith, which he had devoutly embraced, taught him to deſpiſe the imaginary deities of Rome and Athens. In 397 Stilicho, the general of the Weſt, advanced to chaſtiſe the invaders of Greece. The ſkill and perſeverance of the Roman at length prevailed: and the Goths, after ſuſtaining a conſiderable loſs by diſeaſe and deſertion, gradually retreated to the lofty mountains of Pholoe, near the ſources of the Peneus, and on the frontiers of Elis; a ſacred country, which had formerly been exempted from the calamities of war. Their camp was immediately beſieged; and reduced to great diſtreſs by thirſt and hunger. A ſtrong line of circumvallation was formed to prevent their eſcape. Alaric was ſecret, prudent, and rapid in his operations: he immediately negotiated a treaty with the miniſters of Conſtantinople; and Stilicho was compelled to retire from the dominions of Arcadius; and he reſpected, in the enemy of Rome, the honourable character of the ally and ſervant of the emperor of the Eaſt. Alaric is declared maſter-general of the Eaſtern Illyricum: and the uſe to which he applied his new command diſtinguiſhes the firm and judicious character of his policy. He iſſues his orders to the four magazines of offenſive and defenſive arms, Margus, Ratiaria, Naiſſus, and Theſſalonica, to provide his troops with an extraordinary ſupply of ſhields, helmets, ſwords, and ſpears. With the unanimous conſent of the barbarian chieftains, the maſter-general of Illyricum was elevated, according to ancient cuſtom, on a ſhield, and ſolemnly proclaimed king of the Viſigoths. Thus armed with double power, and ſeated on the verge of the two empires, he amuſed the two emperors Arcadius and Honorius, till he declared and executed his reſolution of invading the dominions of the Weſt. He was tempted by the fame, the beauty, and the wealth of Italy, which he had twice viſited; and he ſecretly aſpired to plant the Gothic ſtandard on the walls of Rome, and to enrich his army with the accumulated ſpoils of three hundred triumphs. Alaric loſes no time in executing his purpoſe of invading Italy, and advances, againſt much oppoſition, towards the capital of the empire. It was in the year 400 that he firſt entered Italy, making dreadful ravages in his progreſs. His march, probably from Theſſalonica, through the warlike and hoſtile country of Pannonia, as far as the foot of the Julian Alps; his paſſage of thoſe mountains, which were ſtrongly guarded by troops and entrenchments; the ſiege of Aquileia, and the conqueſt of the provinces of Iſtria and Venetia, appear to have employed a conſiderable time. In the year 403, Alaric approached Milan, and the emperor Honorius, dreading his arrival, fled to Ravenna. Stilicho, however, prepared to march againſt the enemy, whom he found encamped at Pollentia, on the Tanaro, in Piedmont. While the

Chriſtian Goths were devoutly celebrating Eaſter, they were attacked by Stilicho, and after a very ſevere engagement, they retreated from the field of battle, after the total defeat of the infantry, with their cavalry entire, under the command of Alaric, who poſſeſſed a mind, that was invincible and ſuperior to misfortune, and that derived new reſources from adverſity. The Gothic ſovereign, wiſhing to diſtinguiſh his retreat by ſome illuſtrious exploit, attacked Verona, but in the battle that enſued he ſuffered a defeat no leſs diſaſtrous than that at Pollentia. In the year 408 Alaric marched again towards Rome; with bold and rapid marches he paſſed the Alps and the Po; haſtily pillaged the cities of Aquileia, Altinum, Concordia, and Cremona; increaſed his forces by the acceſſion of 30,000 auxiliaries; and, without meeting a ſingle enemy in the field, advanced as far as the edge of the moraſs, which protected the impregnable reſidence of the emperor of the Weſt. He ſoon after pitched his camp under the walls of Rome. A ranſom having being offered and accepted, he raiſes the ſiege A.D. 409. Alaric's next attack was directed againſt the port of Oſtia, one of the boldeſt and moſt ſtupendous works of Roman magnificence; and as ſoon as he was in poſſeſſion of this important place, he ſummoned the city to ſurrender at diſcretion; but he contented himſelf with ſuperſeding Honorius, and beſtowing the purple on Attalus, prefect of the city. Attalus was ſoon after degraded, and his degradation was followed by the third ſiege and ſack of Rome, Aug. 24, A. D. 410. At the hour of midnight the Salarian gate was ſilently opened, and the inhabitants were awakened by the tremendous ſound of the Gothic trumpet. Eleven hundred and ſixty-three years after the foundation of Rome, the Imperial city, which had ſubdued and civilized ſo conſiderable a part of mankind, was delivered to the licentious fury of the tribes of Germany and Scythia. After ſix days' pillage and devaſtation, the victorious Goths evacuated Rome, and their intrepid leader advanced into Campania, and having ravaged that and the neighbouring provinces of Lucania, Samnium, Apulia, and Calabria, he approached the ſtraits of Sicily, with a deſign to paſs over into that iſland, and thence into Africa; but he was ſeized in the neighbourhood of Rhegium with a fit of illneſs, of which he died in a few days. (See ALARIC.) He was ſucceeded in the Gothic throne by his brother-in-law Ataulphus, or Adolphus, who concluded a peace with the empire, and marched into Gaul A. D. 412. Being driven out of Gaul A. D. 415, he retired to Spain, where he was ſoon after aſſaſſinated. Jingeric, his ſucceſſor on the Gothic throne, ſhared the ſame fate. After his death the free choice of the nation beſtowed the Gothic ſceptre on Vallia or Wallia, who concluded a peace with the Romans, and commenced a ſanguinary, but ſucceſsful war with the barbarians, who had ſettled in Spain. His victorious Goths, A. D. 419, forty-three years after they had paſſed the Danube, were eſtabliſhed, according to the faith of treaties, in the poſſeſſion of the ſecoud Aquitain, a maritime province between the Garonne and the Loire, under the civil and eccleſiaſtical juriſdiction of Bourdeaux. The Gothic limits were afterwards enlarged by the additional grant of ſome neighbouring dioceſes; and the ſucceſſors of Alaric fixed their royal reſidence at Thoulouſe. Thus, about the ſame time, in the laſt year of the reign of Honorius, the Goths, the Burgundians, and the Franks, obtained a permanent ſeat and dominion in the provinces of Gaul. Vallia was ſucceeded by Theodoric, who firſt made war with the Romans, and gained ſeveral places in Gaul belonging to them, and afterwards concluded a peace with them. The Goths continued quiet in the countries that had been allotted them in Gaul for the ſpace of ten years, or till the year 436, when, the Romans being engaged in a war with the Burgundians, Theodoric availed himſelf of that opportunity to enlarge his dominions. At length the Gothic king made peace with the Romans; and in the year 453 engaged by an alliance with them to aſſiſt them againſt the Huns, who had entered Gaul. Thoriſmund, his ſon and ſucceſſor, breaks with the Romans; but his brother Theodoric, who next occupied the Gothic throne, and who was eminently diſtinguiſhed by his talents and attainments, cultivated the friendſhip of the Romans, and contributed by his martial exploits to the ſupport of the Roman empire. Theodoric entered Spain with a large army of Goths and Burgundians: and having almoſt reduced the Suevians in Galicia, A. D. 457, he paſſed from thence into Luſitania, and reduced ſeveral places. Upon his return to Gaul, he took ſeveral cities belonging to the Romans, but was at length checked in his career and defeated by Ægidius, commander in chief of the Roman forces in that country. In Spain the Goths were more ſucceſsful than they were in Gaul, and became maſters of the greater part of the country. Under Euric, who aſcended the throne A. D. 466, the Goths drove the Romans out of Spain; and all the provinces, except Galicia, and part of Luſitania, which were ſubject to the Suevians, acknowledged him for their king, who reſiding at Thoulouſe, governed them by his lieutenants. Euric, having alſo made himſelf maſter of the beſt part of Gaul, compriſing the whole tract between the Rhone and the Loire, and of the greateſt part of Spain, was ſtill deſirous of reducing the remaining parts of both countries, when his death at Arles, A. D. 484, put a ſtop to his great deſigns. Euric is ſaid to have been the firſt who gave written laws to the Goths, for till his reign they had been governed by cuſtoms only; and for this purpoſe he employed Leo, his prime miniſter, one of the moſt learned men, and beſt civilians of that period. Theſe laws were called the "Theodorician" laws; and were obtruded by Euric upon the people of Gaul and Spain, who had been long accuſtomed to the Roman laws; but Alaric, his ſon and ſucceſſor, reſtored the Roman laws to their former authority, and cauſed them to be obſerved throughout his dominions. About this period the kingdom of the Viſigoths in Gaul terminated; and they, being driven from thence, fixed their royal ſeat at Toledo, in Spain. (See VISIGOTHS.) For the hiſtory of the Oſtrogoths; ſee OSTROGOTHS. Under Theodoric, who, A. D. 493, cauſed himſelf to be proclaimed by his Goths king of Italy, and was acknowledged as ſuch by the emperor Anaſtaſius, the ſucceſſor of Zeno, Theodoric ſecured his new kingdom by alliances with neighbouring powers: he quartered all his Goths in the caſtles and ſtrong holds, with their officers who were to command them in time of war, and govern them in time of peace; he retained the Roman laws, the ſame form of government, the ſame diſtribution of provinces, the ſame magiſtrates and dignities; and, beſides, according to the cuſtom of the Goths, he appointed for each city inferior judges, diſtinguiſhed by the title of counts, who were to adminiſter juſtice, and decide all diſputes; and in this reſpect the polity of the Goths, as Grotius obſerves, far excelled that of the Romans. Thus Italy, from the dominion of the Romans, fell under that of the Goths, almoſt without any perceptible change. See THEODORIC.

At ſubſequent periods attempts were made to recover the country from ſubjection to their government; particularly in the reign of Juſtinian. Under the weak reign of Theodatus, the Gothic king of Italy, Beliſarius invaded Italy, entered Rome A. D. 536, and reduced Naples A. D. 537. He defended Rome againſt the whole army of the

Goths, who beſieged it A. D. 537, and continued it above a year till their final departure. During this ſiege, which was raiſed in March, A. D. 538, one-third of their enormous hoſt was deſtroyed in frequent and bloody combats under the walls of the city, and the evils of famine and peſtilence were aggravated by their own licentiouſneſs, and the unfriendly diſpoſition of the country. Vitiger, their king, retired for ſhelter within the walls and moraſſes of Ravenna. At length Beliſarius beſieged the city, and took it in the latter end of the year 539. The ſubmiſſion of the capital was imitated in the towns and villages of Italy; and the independent Goths who remained in arms at Pavia and Verona, were ambitious only to become the ſubjects of Beliſarius. But his inflexible loyalty rejected, except as the ſubſtitute of Juſtinian, their oaths of allegiance. In the year 540, the Goths revolted, and Totila, the nephew of their late king, undertook the reſtoration of the kingdom of Italy. His firſt movements were rapid and ſucceſsful; and after reducing by force, or treaty, the towns of inferior note in the midland provinces of Italy, Totila proceeded, A. D. 546, to encompaſs Rome, and to ſtarve its inhabitants. Famine had relaxed the ſtrength and diſcipline of the garriſon, and Rome was taken by the Goths in December, A. D. 546. After the departure of Totila, it was recovered by Beliſarius in February, A. D. 547. (See BELISARIUS.) When Totila returned to avenge the injury and diſgrace, the Goths were thrice repulſed; they loſt the flower of their troops; the royal ſtandard had almoſt fallen into the hands of the enemy, and the fame of Totila ſunk, as it had riſen, with the fortune of his arms. Rome was again taken by the Goths, A. D. 549. Juſtinian made great preparations for the Gothic war, the conduct of which was committed to Narſes, who defeated Totila in a bloody engagement, July, A. D. 552, and Totila himſelf was ſtruck through the body with a lance. Narſes then proceeded to the conqueſt of Rome; and Juſtinian once more received the keys of the imperial city, which, under his reign, had been *five* times taken and recovered. The laſt king of the Goths was Teias, who was unanimouſly choſen to ſucceed and revenge their departed hero, March, A. D. 553. Sixty days were conſumed in diſtant and fruitleſs combats, between the Gothic and Roman armies, but at length, after an engagement of many hours, Teias fell, and his head, exalted on a ſpear, proclaimed to the nations, that the Gothic kingdom was no more. After a reign of 60 years, the throne of the Gothic kings was filled by the exarchs of Ravenna (ſee EXARCH); and the remains of the Gothic nation evacuated the country or mingled with the people. (Anc. Un. Hiſt. vol. xvii. Gibbon's Hiſt. vol. vii. paſſim.)

The Goths ſpread themſelves very widely in their various migrations, and formed part of the population of the ſeveral nations of Europe. In England the Celtic population was ſucceeded by the Gothic, and about two-thirds of England were poſſeſſed by the Belgic Goths. (See BELGÆ and ENGLAND.) About the time that the Belgæ ſeized on the ſouth of England, it appears that a hundred Gothic tribes paſſed to the ſouth of Ireland. (See IRELAND.) In France, or Gaul, the Goths, or warlike German tribes, under the denomination of Belgæ, ſeized on a third part of the country into which they introduced the Gothic language and manners. (See BELGÆ and GAUL.) The original population of the Netherlands was Celtic; but it was afterwards ſupplanted by the Belgæ. (See BELGÆ and NETHERLANDS.) In Germany, the Scythians or Goths, proceeding either from Scandinavia, or, as others ſay, from their original ſeats on the Euxine, expelled the Cimbri and Fins, and theſe, intermixed with the German nations, deſtroyed the Roman empire in the weſt. (See GERMANY, and the preceding part of this article.) Pruſſia appears to have been peopled by the Peucini and Æſtii, Gothic tribes bordering on the Venedi, who were Slavonians. (See PRUSSIA.) The Vandals, who conquered Spain in the fifth century, were ſubdued by the Viſigoths under Euric, who founded the modern kingdom of Spain. (See SPAIN.) The original population of Turkey in Europe chiefly ſprung from the ancient Scythians on the Euxine, the progenitors of the Dacians, Thracians, &c. and even of the Greeks. The regions of Turkey in Aſia were peopled by Scythic nations, intermixed with a few Aſſyrians from the ſouth. (See TURKEY.) The Batavi of Holland were the moſt northern people of Belgic Gaul, and without doubt a German or Gothic progeny. (See BATAVI, GAUL and HOLLAND.) The Cimbri or northern Celts, who originally peopled Denmark, were expelled by the Goths, if they were not, as ſome conceive, tribes of the ſame nation; and the Fins or Laps of Norway, which, with Sweden, conſtitutes the ancient Scandinavia, were driven to the northern extremities by the Gothic invaſion. (See DENMARK, NORWAY, SCANDINAVIA, and SWEDEN.) The Helvetians, or original Swiſs, are ſuppoſed by ſome writers to have been Celts; but others, with greater probability, conſider them as a Gothic race, or very ancient colony of Germans.

It has been a general opinion, ſtrenuouſly maintained by Cluverius and Pelloutier, and adopted by Mallet in his "Northern Antiquities," that the Gothic and Celtic nations were the ſame; but the ingenious Engliſh tranſlator of Mr. Mallet's "Northern Antiquities" has produced a variety of teſtimonies from ancient authors, to prove that the Celtic and Teutonic or Gothic nations were, *ab origine*, diſtinct, and that they differed conſiderably in perſon, manners, laws, religion, and language. The former were the anceſtors of the Gauls, Britons, and Iriſh; and the Germans, Saxons, and Scandinavians derived their origin from the latter. The Celtic tribes were probably the firſt that travelled weſtward; and the Goths, or Getæ of the ancients, who emigrated at different times from the eaſtern countries after them, might borrow ſome of their opinions and practices, which will account for the reſemblance that has been obſerved between them, without admitting that they were deſcended from them, or that they ſhould be conſidered as the ſame people. In the ſame way we may account for thoſe relics both of Celtic and Gothic ſuperſtitions, which are diſcernible in Gaul and Britain, and many other countries, the inhabitants of which derive their deſcent equally from the Celts and Goths, who were at different times maſters of theſe kingdoms, and whoſe deſcendants are now blended together; thus, the firſt inhabitants of Gaul and Britain being of Celtic race, followed the Druidical ſuperſtition. The ancient Germans, Scandinavians, &c. being of Gothic race, profeſſed that ſyſtem of polytheiſm which was afterwards delivered in the Edda; and the Franks and Saxons, who afterwards ſettled in Gaul and Britain, being of Gothic race, introduced the polytheiſm of their own nation, which was in general the ſame that prevailed among all the other Gothic or Teutonic people. See, however, the article GOTHIC *language*, where the original identity of the Celts and Goths is maintained partly by general reaſoning, and partly by etymological inveſtigation.

GOTLUNDA, in *Geography*, a town of Sweden, in Nericia; nine miles N. N. E. of Orebro.

GOTOMB, a town of Poland, in the palatinate of Lublin; 28 miles N. W. of Lublin.

GO-TON, a town of China, in the province of Se-tchuen; 48 miles N. W. of Ou-mong.

GOTSEELA, a town of Bengal; 48 miles W. of Midnapour.

GOTTA, or Gotto *Iſlands*, a cluſter of ſmall Japaneſe iſlands. N. lat. 30° 40′. E. long. 131° 40′.

GOTTAUL, a town of Bengal; 33 miles S. of Burdwar. N. lat. 22° 42′. E. long. 88° 5′.

GOTTESBERG, a town of Sileſia, in the principality of Schweidnitz, near which are two mines, one of gold, not now worked, and another of coals. The manufacture of this town conſiſts of knit worſted ſtockings. It contains two churches; 12 miles S. W. of Schweidnitz. N. lat. 50° 35′. E. long. 15° 54′.

GOTTESGAB, a town of Bohemia, in the circle of Saatz. N. lat. 30° 22′. E. long. 12° 54′.

GOTTI, Vincent-Lewis, in *Biography*, was born at Bologna in the year 1664. At ſixteen years of age he embraced the eccleſiaſtical life among the Dominican monks, and when he had completed his courſe of philoſophy at Bologna, he was ſent to ſtudy theology for four years at Salamanca in Spain. Upon his return to Italy in 1688, he was appointed profeſſor of philoſophy in the univerſity of Bologna; and ſoon recommended himſelf by his talents and virtues to the poſts of prior and provincial of his order. In 1728, pope Benedict XIII. raiſed him to the dignity of the purple; and three years afterwards appointed him member of the congregation for examining biſhops. So highly was he eſteemed, that in the laſt conclave, which was held during his time, he had the ſuffrages of a great number of the college for his being raiſed to the papal throne. He died at Rome in 1742, in his 79th year. His works, which are much valued by the Catholics, particularly by thoſe in Italy, diſplay conſiderable erudition and abilities. Of theſe the principal are "De vera Chriſti Eccleſia," in three volumes; "Theologia Scholaſtico-dogmatica, juxta Mentem divi Thomæ Aquinatis, &c." in ſix volumes 4to.; "Colloquia Theologica-polemica, in tres claſſes diſtributa, &c." 4to.; "De Eligenda inter Diſſidentes Chriſtianos Sententia," written in anſwer to a piece with the ſame title, by the celebrated John le Clerc; and an elaborate work in defence of the truth of the Chriſtian religion againſt Atheiſts, Idolaters, Mahometans, Jews, &c. in 12 volumes. He was employed at the time of his death in writing "A Commentary on the book of Geneſis." Moreri.

GOTTIGNIES, Giles-Francis, was born at Bruſſels in the year 1630, and entered into the order of the Jeſuits at Mechlin in 1653, whence he was ſent to Rome, to purſue his theological ſtudies; here he ſpent the reſt of his life employed in teaching the mathematics, and writing different works in that ſcience. He died in 1689, when he was about ſixty years of age. He was a conſiderable mathematician: a great lover of pure geometry, and had a diſtaſte to the algebraic method of reſolving problems; his works are very numerous, and have been highly commended for perſpicuity and preciſion. They relate to arithmetic and geometry; to the various parts of aſtronomy, and other branches of ſpeculative and practical mathematics. Moreri.

GOTTINGEN, or Goettingen, in *Geography*, a town of the kingdom of Weſtphalia, and principal place of a diſtrict, named from it, is ſituated in a ſpacious, pleaſant, fertile valley, on a canal, branching from the river Leine, and dividing the town into the New town and Marſch. The number of houſes is about 1000, containing about 8000 perſons; the ſtreets are large and paved; it has five pariſh churches, and one for Calviniſts; the Roman Catholics perform their religious ſervice in a private houſe. The town is governed by a provoſt, named by the ſovereign, burgo-maſters, and a ſynod choſen by the regency, aſſiſted by a council. The univerſity of Gottingen claims peculiar notice; it was founded in 1734 by George II, king of England, and conſecrated on the 17th of September 1737, and by the attention of its firſt curator, baron Munchauſen, it has riſen to diſtinguiſhed reputation. It has a ſplendid church, with its own paſtor; and it is accommodated with a ſtately edifice of ſtone, the ground-floor of which ſerves as a hall for public lectures, and the upper apartments are appropriated to the library, council-chamber, and other neceſſary purpoſes. Its library is very large and valuable, and it is called the "Bulowean," from a collection of about 10,000 volumes, with which it originated, bequeathed by baron Bulow for public uſe, and granted by his heirs to the univerſity. A royal ſociety of ſciences, founded in 1751, and a royal German ſociety, form part of the univerſity. It has likewiſe a fine obſervatory, erected on a tower on the ramparts, with a phyſic garden, anatomical theatre, &c. The territory belonging to the town is very conſiderable; 22 miles N. E. of Caſſel. N. lat. 51° 31′. E. long. 9° 52′.

GOTTO, a country of Africa, ſituated to the ſouth of Jinbali and Tombuctoo, and the river Niger or Joliba, about 15° N. lat., and from 0° to 2° E. long. It was formerly divided into ſeveral petty ſtates, under their own chiefs, but it is now under the government of a king. Its chief town is called Mooſſeeddoo, from the name of their firſt monarch.

GOTTOLENGO, a town of Italy, in the department of the Mela; 15 miles S. of Breſcia.

GOTTORP. See Sleswic.

GOTTSCHEE, a town of Middle Carniola; 20 miles S.S.E. of Laybach. N. lat. 45° 53′. E. long. 14° 48′.

GOTZEL, a town of Bavaria; 36 miles E. of Ratiſbon.

GOVAN, a town of Scotland, in Lanarkſhire; the population of which, in 1801, was 6701, of which 1314 were employed in trade and manufactures; four miles W. of Glaſgow.

GOVANDORE, a bay on the coaſt of Chili.

GOUANIA, in *Botany*, was named by Jacquin in honour of Anthony Gouan, a phyſician and celebrated botaniſt of Montpellier, where he has long filled the botanical chair, and, as far as we know, is ſtill living, though at a very advanced age. He was the friend and correſpondent of Linnæus, and is the author of a *Flora Monſpeliaca*, arranged according to what he himſelf calls a hybrid ſyſtem, the outlines being on the principles of Tournefort, the ſubordinate ſections taken from the Linnæan ſexual ſyſtem. This work appeared in 1765. He had previouſly, in 1762, publiſhed a *Hortus Monſpelienſis* according to the laſt-mentioned ſyſtem. Each work forms an octavo volume. They are chiefly remarkable for the ſecondary generic characters, taken from the habit, ſubjoined to the eſſential ones which are founded on the fructification. Profeſſor Gouan publiſhed alſo a folio volume of Obſervationes Botanicæ, with plates, illuſtrative of the plants of his neighbourhood; as well as a quarto in Latin and French on the methodical arrangement, and generic characters at length, of fiſhes.—Jacq. Amer. 263. Linn. Gen. 547. Schreb. 133. Mart. Mill. Dict. v. 2. Juſſ. 381. Lamarck. Illuſtr. t. 845.—Claſs and order, *Polygamia Monoecia*, or rather *Pentandria Monogynia*, Nat. Ord. *Dumoſæ*, Linn. *Rhamni*, Juſſ.

Gen. Ch. *Cal.* Perianth of one leaf, ſuperior, funnel-ſhaped, five-cleft; tube permanent; ſegments of the limb ovate, acute, ſpreading, deciduous. *Cor.* Petals five, oppoſite to the ſtamens, hood-ſhaped, elaſtic. *Stam.* Filaments five, awl-ſhaped, the length of the ſegments of the calyx, and alternate with them, inſerted into the tube; anthers roundiſh, incumbent, ſheltered by the petals. *Piſt.* Germen inferior, roundiſh; ſtyle awl-ſhaped, divided half-way down into three ſegments; ſtigmas obtuſe. *Peric.* Capſule with three angles, ſeparable into three parts, of one cell each, not burſting. *Seeds* ſolitary, ovate, compreſſed, poliſhed.—There are ſome male flowers, furniſhed with a ſtyle, but deſtitute of germen and ſtigma.

Eſſ. Ch. Calyx five-cleft. Petals five, hooded, covering the anthers. Style three-cleft. Capſule inferior, ſeparating into three ſingle-ſeeded parts.—Some flowers male.

Jacquin originally deſcribed two ſpecies, of which Linnæus adopted but one. Lamarck has added three more, all in our poſſeſſion, to which we are enabled to furniſh three non-deſcript ſpecies, making eight in all.

1. G. *domingenſis.* Linn. Sp. Pl. 1663. Lamarck Dict. v. 3, 4. (G. glabra; Jacq. Amer. 264. t. 179. f. 40. Lupulus ſylveſtris americana, &c. Pluk. t. 201. f. 4.)—Leaves ovate, pointed, ſerrated, nearly ſmooth. Wings of the fruit dilated, kidney-ſhaped.—Native of woods in Hiſpaniola and the Bahama iſlands. A climbing much branched *ſhrub,* the young branches downy, ending in long ſimple ſpiral tendrils. *Leaves* alternate, on ſhort hairy ſtalks, ovate, a little unequal, an inch and half long, bluntly ſerrated, furniſhed with a blunt entire point, and with ſeveral ſtraight parallel veins directed forward. The young leaves are rather downy, old ones nearly ſmooth. *Stipulas* ſmall, half arrow-ſhaped. *Flowers* in long terminal cluſters, ſmall, greeniſh and unornamental. *Capſules* of a light ſpongy texture, their central part as big as a ſmall pea, the wings thrice as long, ſpreading, pale brown, ſmooth and ſomewhat poliſhed. *Seeds* hard, of a ſhining brown.

2. G. *tomentoſa.* Jacq. Amer. 263. Linn. MSS. in Sp. Pl. (G. crenata; Lamarck Dict. v. 3. 5?)—"Leaves ovate, crenate, downy."—Native of woods in Hiſpaniola, climbing to the tops of lofty trees. *Jacquin.* Of this we have ſeen no ſpecimen. Jacquin ſays the *leaves* are four inches long. *Seeds* black and ſhining. Lamarck ſuppoſes his plant to be the ſame on account of the great ſize of its leaves, and he ſays it is diſtinguiſhed from all others by their crenatures. Jacquin deſcribes his as ſlightly crenate.

3. G. *cyclocarpa.*—Leaves elliptic-oblong, pointed, obſoletely ſerrated, roughiſh, naked on both ſides. Wings of the fruit narrow, orbicular.—Native, we believe, of the Weſt Indies. The very young *ſhoots* and *leaves* only are ſilky and ferruginous. The full-grown *leaves* are near three inches long and one broad, ſomewhat ovate, either almoſt entire, or furniſhed with ſhallow diſtant ſerratures, and a ſhort entire blunt point; they are green and quite naked on both ſides, but harſh to the touch on the upper ſurface. Veins diſtant. *Footſtalks, flowerſtalks,* and *ſtipulas* hairy. *Flowers* ſomewhat ſilky. *Fruit* orbicular at each ſide, each wing forming a hemiſphere, and not being much dilated.

4. G. *denticulata.*—Leaves ovate, pale and downy beneath, entire, with a finely-toothed point.—Gathered by the late Mr. Chriſtopher Smith in the iſland of Honimoa, Eaſt Indies.—The *leaves* are about an inch and half long, with ſtraight veins, connected by numerous minute reticulations, and are remarkable for the numerous little ſharp teeth which border their upper part and terminal point, while the reſt of their margin is entire. Their upper ſide is roughiſh to the touch, but green and naked; while the lower is hoary with very denſe ſhort down, the veins only being naked. *Stipulas* ſmall and deciduous. A ſimple curled *tendril* terminates each lateral branch, as in all the foregoing. *Flowers* in axillary downy cluſters, with lanceolate deciduous bracteas. The *fruit* we have not ſeen.

5. G. *mauritiana.* Lamarck Dict. v. 35.—Leaves ovate, pointed, variouſly ſerrated, downy on both ſides.—Native of the heights called the *Gol,* in the deſert, of the iſle de Bourbon, where it was gathered by Commerſon, and ſent to the botanic garden at Paris. The *leaves* are the ſize of the laſt, but green and clothed with ſilky down on both ſides. Their figure is ovate, rarely ſomewhat cordate, often unequal, ſharp-pointed, their margin ſingularly variable, being ſometimes nearly entire, having only ſcattered ſhallow ſerratures, ſometimes very deeply and doubly ſerrated, not unlike the Roman nettle, *Urtica pilulifera.* *Stipulas* ovate, acute, clothed with ſhining reddiſh ſilky hairs, as well as the young twigs and tendrils. The *fructification* is wanting in our ſpecimens. Lamarck ſays the *capſules* have rounded thin and membranous wings.

6. G. *tiliæfolia.* Lamarck Dict. v. 3. 5. (G. Stadtmanni; Willem. Herb. Maurit. 58?)—Leaves heart-ſhaped, bluntly pointed, ſmooth on both ſides, bluntly and ſlightly ſerrated. Native of the iſle de Bourbon, near *la Villebague.* Commerſon. The *ſtem* is much branched and divaricated, ſmooth, except the very young ſhoots. *Leaves* an inch or inch and half long, and nearly as broad, heart-ſhaped, with ſhallow ſerratures and a ſhort blunt point. They are light green and naked on both ſides, ſmooth above; minutely chagrined beneath. *Stipulas* glandular. *Flower-ſtalks* ruſty and downy. The *tendrils* become very thick and ſtrong by age.

7. G. *integrifolia.* Lamarck Dict. v. 3. 5.—Leaves ovate, bluntiſh, entire, ſmooth on both ſides. Stipulas awl-ſhaped. Long cultivated in the Paris garden, but its native country is not remembered. We have a ſpecimen from thence, deſtitute of *flowers* and *fruit,* yet we readily agree with Lamarck that there can be no doubt reſpecting its genus. The habit, ſtem, tendrils, folded young leaves, and their pale parallel veins, all indicate a *Gouania,* for no genus can be more natural than this. The *leaves* are uſually about an inch long, exactly ovate, (not oval) without any elongated point, though tipped with a gland; their margin quite entire, their midrib ſometimes ſlightly hairy at the back. *Stipulas* awl-ſhaped, deciduous. *Footſtalks* hairy only while young.

8. G. *ſmilacina.*—Leaves heart-ſhaped, minutely ſerrated, acute, ſomewhat hairy. Stipulas awl-ſhaped. Flower-ſtalks umbellated, ſcarcely ſo long as the leaves. Brought by the late ſir G. L. Staunton, Bart. we believe from the Braſils. The zig-zag *branches,* with ſmall heart-ſhaped *leaves,* and numerous axillary umbels of *flowers,* give it the aſpect of a *Smilax.* The *tendrils* grow from the firſt joint of each branch, and are elegantly ſpiral; ruſty and hairy, like the *flower-ſtalks* and *calyx.* The principal *leaves* are uſually about an inch long, green on both ſides, their ribs and veins always very hairy, their ſurface more or leſs ſo. *Stipulas* awl-ſhaped, hairy. S.

GOUAREC, in *Geography,* a town of France, in the department of the North Coaſts, and chief place of a canton, in the diſtrict of Loudeac; 24 miles S.W. of St. Brieuc. The place contains 678, and the canton 6,093 inhabitants, on a territory of 207½ kiliometres, in 5 communes.

GOUD, or GAUD. See WELD.

GOUDA, or TERGOUW, in *Geography,* a city of Holland, ſeated on a branch of the Rhine, called Iſſel, where it receives the Gouw, from which it derives its name. The great church of this town is one of the largeſt and handſomeſt in the country, and is particularly famous for its painted glaſs windows, which were executed principally by Theodore and Walter Crabeth of this town, and which are carefully preſerved. The town is advantageouſly ſituated, on account of the ſluices and canals, which are running ſtreams, and its convenient port on the Iſſel. It has five gates, and is ſo circumſtanced by reaſon of the ſluices, which may inundate the adjacent country, the breadth and depth of its ditches, and the ſtrong fortifications on the banks of the Iſſel, that it cannot eaſily be beſieged. Its chief trade conſiſts in cordage, cheeſe, and tobacco-pipes; and it has a regular communication by boats with Amſterdam, the Hague, Rotterdam, Utrecht, &c.; 22 miles S. of Amſterdam. N. lat. 52° 1′. E. long. 4° 36′.

GOUDHURST, a poſt-town of England, in the county of Kent, containing 1782 inhabitants; 11 miles S. of Maidſtone, and 44 S.E. of London.

GOUDOZ, a town of Aſiatic Turkey, in Natolia; 72 miles E.N.E. of Kiutaja.

GOUDIMEL, Claude, in *Biography*, one of the early and moſt celebrated compoſers of muſic to the metrical French tranſlations of the pſalms for the uſe of the Calviniſts. He was a native of Franche-Comté, who ſeems to have loſt his life at Lyons, on the day of the maſſacre of Paris, for having ſet to muſic the pſalms of Clement Marot. Goudimel has been much celebrated by the Calviniſts in France for this muſic, which was never uſed in the church of Geneva, and by the Catholics in Italy for inſtructing Paleſtrina in the art of compoſition, though it is doubtful whether this great harmoniſt and Goudimel had ever the leaſt acquaintance or intercourſe together. He ſet the "Chanſons Spirituelles" of the celebrated Marc-Ant. De Muret, in four parts, which were printed at Paris, 1555. We may ſuppoſe Goudimel, at this time, to have been a Catholic, as the learned Muret is never ranked among heretics by French biographers. Ten years after, when he ſet the pſalms of Clement Marot, this verſion was ſtill regarded with leſs horror by the Catholics than in later times; for the muſic which Goudimel had ſet to it was printed at Paris by Adrian Le Roy, and Robert Ballard, with a privilege, 1565. It was reprinted in Holland, in 1607, for the uſe of the Calviniſts, but ſeems to have been too difficult; for we are told by the editor of the pſalms of Claude le Jeune, which were printed at Leyden, 1633, and dedicated to the States-General, that, "in publiſhing the pſalms in parts, he had preferred the muſic of Claude Le Jeune to that of Goudimel; for as the counterpoint was ſimply note for note, the moſt ignorant in muſic, if poſſeſſed of a voice, and acquainted with the pſalm-tune, might join in the performance of any one of them; which is impracticable in the compoſitions of Goudimel, many of whoſe pſalms being compoſed in fugue, can only be performed by perſons well ſkilled in muſic.

The works of Goudimel, who was certainly the greateſt muſician in France, during the reign of Charles IX., are become ſo ſcarce, that his name and reputation are preſerved by Proteſtant hiſtorians, more in pity of his misfortunes, than by any knowledge of their excellence. With reſpect to his having been the maſter of Paleſtrina, that point will be diſcuſſed elſewhere.

The earlieſt mention of Goudimel, as a compoſer, that we have been able to diſcover, is in a work entitled "Liber quartus Eccleſiaſticarum Cantionum quatuor vocum vulgo Motetæ vocant," printed at Antwerp, by Suſato, 1554, eighteen years before his death. On ſcoring ſeveral of theſe motetæ, we found the harmony pure and correct, but conſtructed entirely on the principles of the eccleſiaſtical tones: probably before he became a diſciple of Calvin. The title of all his compoſitions may be ſeen in Draudius, Bibl. Claſſic. and Bibl. Exot. (See Franc, Claude le Jeune, and Paleſtrina.) The motets of Goudimel, in four parts, reſemble in gravity of ſtyle, ſimplicity in the ſubjects of fugue, and purity of harmony, the eccleſiaſtical compoſitions of our venerable countryman Bird.

GOODSWAARTE, in *Geography*, a ſmall iſland at the mouth of the Meuſe, S. of the iſland of Putten.

GOUEGA, a town of Africa, in Whidah; 10 miles W.S.W. of Sabi.

GOVENDING, a town of Bengal; 32 miles E. of Calcutta.

GOVERDAN, a town of Hindooſtan, in Mewat; 10 miles E.S.E. of Dig.—Alſo, a town in Oude, near the Dewah; 20 miles N. of Azimgur.

GOVERDUNPOUR, a town of Hindooſtan; 44 miles N. of Allahabad.

GOVERNDUNGURRY, a town of Hindooſtan, in Canara; 14 miles S.E. of Onore.

GOVERNMENT, a quality or office which gives a man power or right to command or rule over a place, a city, a province, a kingdom, or the like, either ſupremely or by deputation.

Government is either *general* and ſupreme, as that of a whole kingdom, empire, ſovereign ſtate, &c. or *particular* and ſubordinate; which, again, is ſubdivided into *civil*, *military*, and *eccleſiaſtical*.

Our cities, corporations, and boroughs, are uſually governed by mayors, with aldermen and common-councilmen.

Government is alſo uſed for the country, city, or place to which the power of governing or commanding is extended.

Government, again, is uſed for the manner or form of governing, *i. e.* for the police of a country, ſtate, &c.

In this ſenſe the various forms of government have generally received their denominations from the number of perſons to whom the ſupreme power has been entruſted. If it be in one perſon, it is called a *monarchy*, eſpecially if the chief magiſtrate lies under conſiderable reſtrictions, or governs by fixed and eſtabliſhed laws; whereas, if this ſingle perſon lie under fewer reſtraints, or directs every thing by his own will and caprice, the government is called *deſpotic*. If the ſupreme power be lodged in a limited number of perſons, the government is called an *oligarchy*, or *ariſtocracy*; and if all the citizens have an equal vote in making laws, and appointing magiſtrates, or the ſupreme power is lodged in the whole body of the people, it is called a *democracy* or *republic*. See theſe ſeveral articles.

Civil government and ſociety originate in the wants and fears of individuals, who, being naturally free, equal, and independent, aſſociate together, either by expreſs or tacit conſent, for the mutual preſervation of their lives, liberties, and eſtates, on this fundamental principle, that the whole ſhould protect all its parts, and that every part ſhould pay obedience to the will of the whole. However the ſeveral forms of government, that now ſubſiſt, actually begun, there is and muſt be in all of them a ſupreme, irreſiſtible, abſolute, uncontrouled authority, in which the *jura ſummi imperii*, or the rights of ſovereignty, reſide; and this authority is placed in thoſe hands, wherein, according to the opinion of the founders of ſuch reſpective ſtates, either expreſsly given, or collected from their tacit approbation, the qualities requiſite for ſupremacy, *viz.* wiſdom, goodneſs, and power, are the moſt likely to be found.

Individuals unite for mutual protection and benefit; and, therefore, the legiſlative and executive authority of government, originally derived from themſelves, ſhould be invariably directed to no other end but their ſafety and welfare; and that form of government is moſt eligible, which is beſt adapted to theſe purpoſes. Cicero declares himſelf of opinion, in his fragments De Rep. lib. ii. "eſſe optimam conſtitutam rempublicam, quæ ex tribus generibus illis, regali, optimo et populari, ſit modice confuſa." Of this kind is the Britiſh conſtitution, which lodges the executive power of the laws in a ſingle perſon, and the legiſlative in three diſtinct powers, entirely independent of each other; *viz.* the king; the lords ſpiritual and temporal, forming an ariſtocratical aſſembly; and the houſe of commons, freely choſen by the people, which renders it a kind of democracy; and each branch of this aggregate body, actuated by different views, and attentive to different intereſts, is armed with a negative power, ſufficient to repel any innovation which it ſhall think inexpedient or dangerous. Nothing can endanger or hurt the conſtitutional government of Britain, but deſtroying the equilibrium of power between one branch of the legiſlature and the reſt: for if ever it ſhould happen that the independence of any one of the three ſhould be loſt, or that it ſhould become ſubſervient to the views of the other two, there would ſoon be an end of our conſtitution: the legiſlature would be changed from that which was originally ſet up by the general conſent and fundamental act of the ſociety; and ſuch a change, however effected, is, according to Mr. Locke, at once an entire diſſolution of the bands of government, and the people are thereby reduced to a ſtate of anarchy, with liberty to conſtitute to themſelves a new legiſlative power. Locke on Government, book ii. chap. 19. Blackſt. Com. vol. i. Introd.

Another excellent writer gives a different account of the origin of civil government from that which has been above ſtated. Accordingly, he obſerves, that government, at firſt, was either patriarchal or military; *that* of a parent over his family, or of a commander over his fellow-warriors. Paternal authority, and the order of domeſtic life, ſays Dr. Paley, (Moral Philoſophy, vol. ii.) ſupplied the foundation of civil government. The condition of human infancy prepares men for ſociety, by combining individuals into ſmall communities, and by placing them from the beginning under direction and controul. A family contains the rudiments of an empire. The authority of one over many, and the diſpoſition to govern and to be governed, are in this way incidental to the very nature, and coeval, no doubt, with the exiſtence, of the human ſpecies. Beſides, a parent would retain a conſiderable part of his authority after his children were grown up, and had formed families of their own. This is the ſecond ſtage in the progreſs of dominion. The firſt was that of a parent over his young children; this that of an anceſtor preſiding over his adult deſcendants. The aſſociation, thus formed, would naturally be continued after the death of the original progenitor; and the members of it, accuſtomed to the benefits reſulting from it, might be induced to ſupply his place by a formal choice of a ſucceſſor, or they might voluntarily, and almoſt imperceptibly, transfer their obedience to one of the family, which had claimed their reſpect and confidence, or, again, they might receive with due deference a ſucceſſor, appointed by the firſt anceſtor. Thus we have a tribe or clan, incorporated under one chief, and fulfilling the purpoſes of civil union, without any other or more regular convention, conſtitution, or form of government than what has now been deſcribed. Two or three of theſe clans would frequently, by marriage, conqueſt, mutual defence, common diſtreſs, or ſome other accidental circumſtances, be united into a ſociety of larger extent. Another ſource of perſonal authority, which might extend, or ſuperſede, the patriarchal, is that which reſults from military arrangement. A popular and ſucceſsful leader, in every action of aggreſſion or defence, would gain a powerful and permanent influence among his followers. This advantage, added to the authority of the patriarchal chief, or favoured by any previous diſtinction of anceſtry, would enable the perſon who poſſeſſed it to acquire the almoſt abſolute direction of the affairs of the community; more eſpecially if he took care to aſſociate to himſelf proper auxiliaries, and to gratify or remove thoſe who oppoſed his pretenſions.

The cauſes which have contributed to introduce hereditary dominion, are principally the influence of aſſociation, which communicates to the ſon a portion of the reſpect that was paid to the virtues or ſtation of the father, the mutual jealouſy of other competitors, the greater envy with which all behold the exaltation of an equal, than the continuance of an acknowledged ſuperiority, and the number of adherents left by a reigning prince, who preſerve their own importance, merely by ſupporting the ſucceſſion of his children, and the apprehenſion of calamities that are incidental to conteſted elections. The ancient ſtate of ſociety in moſt countries, ſays our author, and the modern condition of ſome uncivilized parts of the world, exhibit that appearance, which this account of the original of civil government would lead us to expect. The earlieſt hiſtories of Paleſtine, Greece, Italy, Gaul, and Britain, inform us that theſe countries were occupied by many ſmall independent nations, reſembling thoſe which are now found among the ſavage inhabitants of North America, and upon the coaſt of Africa. This theory, it is added, affords a preſumption, that the earlieſt governments were monarchies, becauſe the government of families, and of armies, from which, according to the preceding ſtatement, civil government derived its inſtitution, and probably its form, is univerſally monarchical.

Our readers will obſerve that this theory is very different from ſir Robert Filmer's patriarchal ſcheme, now, indeed, almoſt forgotten and ſcarcely deſerving to be recorded; the refutation of which conſtitutes the firſt part of the admirable Locke's Treatiſe on Government. According to this ſcheme, all government is abſolute monarchy, which the author founds on this previous principle, that no man is born free. The abſolute ſovereignty of Adam was the reſult of a divine appointment and donation, and this ſovereignty has been regularly conveyed by a divine hereditary right to all ſucceeding monarchs. The notion, that kings reign by a *divine right*, independently of the deſignation of the people, and not accountable to them for the exerciſe of their power, abſurd as it will now very generally be thought, was, however, for a long time not only admitted, but prevalent even in this country. It is ſtrongly inculcated in the Homilies of our eſtabliſhed church, and was ſtrenuouſly maintained by ſeveral of its reſpectable divines. Dr. Tillotſon, enlightened and excellent as he was in other reſpects, could not, in the middle part of his life, emancipate himſelf from the idea, that it was ſinful to reſiſt government, as is evident from his letter to lord Ruſſel. That power originates with the people was condemned as an abominable tenet by the famous Oxford decree of 1683; but this is a topic on which it is needleſs to enlarge.

In the moſt popular forms of government, ſays Dr. Paley, the phyſical ſtrength reſides in the governed; and it therefore becomes an inquiry of conſiderable importance, among politicians, what motives induce the many to ſubmit to the few. In the diſcuſſion of this queſtion our author diſtributes the ſubjects of a ſtate into three different claſſes, *viz.* 1. Thoſe who obey from prejudice, or who are determined by an opinion of *right* in their governors, which opinion is founded upon *preſcription*: this preſcriptive title, in hereditary monarchies, is corroborated, and its influence conſiderably augmented, by an acceſſion of religious ſentiments, and by that ſacredneſs which men are apt to aſcribe to the perſons of princes. 2. Thoſe who obey from reaſon, by a conſideration of the neceſſity of ſome government or other, and of the certain miſchief of civil commotions. 3. Thoſe who obey from ſelf-intereſt, and who are kept in order by a variety of conſiderations that immediately affect themſelves.

Concerning the moral obligation of ſubmiſſion to civil government, thoſe who adopt the principles of Mr. Locke, and many other political writers, allege a compact between the citizen and the ſtate, as the ground of the relation between them; and this compact binding the parties, like private contracts, reſolves the duty of ſubmiſſion into the univerſal obligation of fidelity in the performance of promiſes. This compact is either, 1. *Expreſs,* on the part of the primitive founders of the ſtate, who are ſuppoſed to have met together for the declared purpoſe of ſettling the terms of their political union, and a future conſtitution of government. The whole body is ſuppoſed to have unanimouſly conſented to be bound by the reſolutions of the majority; and that majority is ſuppoſed to have fixed certain fundamental regulations, and thus to have conſtituted, either in one perſon, or in an aſſembly, a *ſtanding legiſlature,* to which, under theſe pre-eſtabliſhed reſtrictions, the government of the ſtate was thenceforward committed, and whoſe laws the ſeveral members of the convention were, by their firſt undertaking, thus perſonally engaged to obey.—This tranſaction is ſometimes called the "Social compact," and theſe ſuppoſed original regulations compoſe what are meant by the "conſtitution," the "fundamental laws of the conſtitution;" and form, on one ſide, the "inherent indefeaſible prerogative of the crown," and, on the other, the unalienable "birthright" of the ſubject; *i. e.* a *tacit* or *implied* compact by all ſucceeding members of the ſtate, who, by accepting its protection, conſent to be bound by its laws. "This account of the ſubject," ſays Dr. Paley, "although ſpecious, and patronized by names the moſt reſpectable, appears to labour under the following objections; that it is founded upon a ſuppoſition falſe in fact; and leading to dangerous conſequences." No ſuch ſocial compact was ever really made, nor any ſuch original convention of the people ever actually held, or could be held in any country, antecedent to the exiſtence of civil government in that country. It is to ſuppoſe it poſſible to call ſavages out of caves and deſarts, to deliberate and vote upon topics, which the experience, and ſtudies, and refinements of civil life, alone ſuggeſt: therefore no government in the univerſe *began* from this original. At a *Revolution* ſome imitation of a ſocial compact may have taken place. The eſtabliſhment of the United States of North America bears the neareſt reſemblance of it. Should it be ſaid, that the original compact is not propoſed as a fact, but as a fiction, for the commodious explication of the mutual rights and duties of ſovereigns and ſubjects; to this repreſentation it may be replied, that the original compact, if it be not a fact, is nothing; it can confer no actual authority upon laws or magiſtrates, nor afford any foundation to rights, which are ſuppoſed to be real and exiſting. But in the books, and alſo in the apprehenſion of thoſe who deduce our civil rights and obligations *à pactis,* the original convention is appealed to, and treated of, as a reality.

Moreover, it is alleged, that the theory of government, which affirms the exiſtence and the obligation of a ſocial compact, leads to concluſions unfavourable to the improvement, and to the peace, of human ſociety. Upon this theory it may be preſumed that many points, called "fundamentals" of the conſtitution, were ſettled by a convention of the people, anterior to the eſtabliſhment of the ſubſiſting legiſlature, and which the legiſlature has no right to alter, or interfere with. This circumſtance affords a dangerous pretence for diſputing the authority of the laws. Hence aroſe the doubt, which ſo much agitated the minds of men in the reign of Charles II., whether an act of parliament could of right alter or limit the ſucceſſion of the crown. Beſides, if it be by virtue of a compact that the ſubject owes obedience to civil government, he ought to abide by the power of government which he finds eſtabliſhed, however abſurd or inconvenient it may be. Moreover, every violation of the compact on the part of the governor releaſes the ſubject from his allegiance, and diſſolves the government.

Dr. Paley, rejecting the intervention of a compact, as unfounded in its principle, and dangerous in the application, aſſigns for the only ground of the ſubject's obligation, "the will of God as collected from expediency." Accordingly the author reaſons in the following manner. It is the will of God that the happineſs of human life be promoted; civil ſociety conduces to that end; civil ſocieties cannot be upheld, unleſs in each, the intereſt of the whole ſociety be binding upon every part and member of it; and this ſtep of the argument conducts us to the concluſion, namely, that ſo long as the intereſt of the whole ſociety requires it, that is, ſo long as the eſtabliſhed government cannot be reſiſted or changed without public inconveniency, it is the will of God (which *will* univerſally determines our duty) that the eſtabliſhed government be obeyed; and no longer. This principle being admitted, the juſtice of every particular caſe of reſiſtance is reduced to a computation of the quantity of the danger and grievance on the one ſide, and of the probability and expence of redreſſing it on the other. If it be aſked, who ſhall judge of this? the anſwer is, "Every man for himſelf." In contentions between the ſovereign and the ſubject, the parties acknowledge no common arbitrator; and it would be abſurd to refer the deciſion to *thoſe* whoſe conduct has provoked the queſtion, and whoſe own intereſt, authority, and fate, are immediately concerned in it. From the ſubſtitution of "public expediency" into the place of all implied compacts, promiſes, or conventions whatſoever, our author infers, 1. That it may be as much a duty at one time to reſiſt government as to obey it, *viz.* when more advantage will in our opinion accrue to the community from reſiſtance, than miſchief. 2. That the lawfulneſs of reſiſtance, or the lawfulneſs of a revolt, does not depend alone upon the grievance which is ſuſtained or found, but alſo upon the probable expence and event of the conteſt. Hence thoſe who concerted the revolution in England were juſtifiable in their counſels. 3. That irregularity in the firſt foundation of a ſtate, or ſubſequent violence, fraud, or injuſtice in getting poſſeſſion of the ſupreme power, are not ſufficient reaſons for reſiſtance, after the government is once peaceably ſettled. 4. That reſiſtance is not juſtified by every invaſion of the ſubject's rights, or liberty, or of the conſtitution; by every breach of promiſe, or of oath; by every ſtretch of prerogative, abuſe of power, or neglect of duty on the part of the chief magiſtrate; unleſs theſe crimes draw after them public conſequences of ſufficient magnitude to outweigh the evils of civil diſturbance. 5. That no uſage, law, or authority whatever, is ſo binding, that it need or ought to be continued, when it may be changed with advantage to the community. 6. As all civil obligation is reſolved into expediency, what, it may be aſked, is the difference between the obligation of an Engliſhman and a Frenchman, or why is a Frenchman bound in conſcience to bear any thing from his king, which an Engliſhman would not be bound to bear, ſince the obligation of both is founded in the ſame reaſon? Although their conditions may differ, their *rights* ſhould ſeem to be equal; and yet we are accuſtomed to ſpeak of the rights as well as the happineſs of a free people, compared with what belong to the ſubjects of abſolute monarchies; and how, it may be reaſonably inquired, can this compariſon be explained, unleſs we refer to a difference in the compacts by which they are reſpectively bound? In order to obviate this difficulty, it is allowed that a Frenchman is in conſcience bound to endure many things from his prince, to which an Engliſhman would not be bound to ſubmit for the following reaſons; *viz.* becauſe the ſame act of the prince is not the ſame grievance where it is agreeable to the conſtitution, and where it infringes it; and becauſe redreſs in the two caſes is not equally attainable. The duty of obedience is defined by different boundaries, and the point of juſtifiable reſiſtance is placed at different parts of the *ſcale* of ſuffering—all which is ſufficiently intelligible without a ſocial compact. 7. The intereſt of the whole ſociety is binding upon every part of it. If we appeal to the Chriſtian ſcriptures with regard to the duty of civil obedience or the *extent* of our civil rights and obligations, Chriſtianity hath left us where ſhe found us; ſhe has neither altered, nor aſcertained it. The two paſſages to which writers have generally referred in their inveſtigation of this ſubject are Romans xiii. 1—7, and 1 Peter ii. 13—18. In order to comprehend the proper import of the inſtructions contained in theſe paſſages, there are two queſtions relating to the ſubject of civil obedience, which ſhould be conſidered, *viz.* whether to obey government be a moral duty and obligation upon the conſcience at all, and how far, and to what caſes, that obedience ought to extend? Theſe paſſages, it may be obſerved, inculcate the *duty*; but they do not deſcribe the *extent* of it. The due conſideration of this diſtinction is ſufficient to vindicate theſe paſſages of ſcripture from any explanation of them that ſhall favour an unlimited paſſive obedience. But admitting what many commentators have ſtated, that an opinion was privately cheriſhed by the firſt Chriſtians, which led them to conceive, that their converſion to Chriſtianity entitled them to new immunities, to an exemption as of *right* (however they might give way to neceſſity) from the authority of the Roman ſovereign; we are furniſhed with a ſtill more apt and ſatisfactory interpretation of the Apoſtle's words. The two paſſages apply with great propriety to the refutation of this error. Little need be added in explanation of particular clauſes. St. Paul has ſaid, "whoſoever reſiſteth the power, reſiſteth the ordinance of God." This phraſe, "the ordinance of God," is by many ſo interpreted as to authorize the moſt exalted and ſuperſtitious ideas of the regal character. But ſurely ſuch interpreters have ſacrificed truth to adulation. For, in the firſt place, the expreſſion, as uſed by St. Paul, is juſt as applicable to one kind of government, and to one kind of ſucceſſion, as to another,—to the elective magiſtrates of a pure republic, as to an abſolute hereditary monarch. In the next place, it is not affirmed of the ſupreme magiſtrate excluſively, that *he* is the ordinance of God; the title, whatever it imports, belongs to every inferior officer of the ſtate as much as to the higheſt. The divine right of *kings* is, like the divine right of *conſtables*, in the law of the land, or even actual and quiet poſſeſſion of their office; a right ratified, we humbly preſume, by the divine approbation, ſo long as obedience to their authority appears to be neceſſary or conducive to the common welfare. Princes are ordained of God by virtue only of that general decree, by which he aſſents, and adds the ſanction of his will, to every law of ſociety, which promotes his own purpoſe, the communication of human happineſs: according to which idea of their origin and conſtitution, and without any repugnancy to the words of St. Paul, they are by St. Peter denominated the "*ordinance of man.*" Paley, *ubi ſupra.* See KING, LAW, LIBERTY, MONARCHY, PARLIAMENT, PASSIVE *obedience*, &c.

GOVERNMENT, in *Grammar,* is underſtood of that conſtruction of nouns and verbs, wherein they require ſome alteration to be made in others joined or conſtructed with them.

Conſtruction is divided into two parts; that of *concord,* and that of government, called alſo *regimen.* See CONCORD and REGIMEN.

GOVERNOLO, in *Geography*, a town of Italy, in the department of the Mincio; 12 miles S. E. of Mantua.

GOVERNOR, an officer veſted by a king, or ſovereign prince, with the command and adminiſtration of a province, place, &c.

A governor repreſents the king; and not only commands the garriſon, troops, &c. but the citizens, &c. A governor of a fortified place was anciently required to hold out three attacks, before he ſurrendered.

GOVERNOR is alſo frequently uſed for a preſident or ſuperintendant.

Thus we ſay, the governor of the bank; the governor and directors of the South Sea company; the governor of an hoſpital, &c.

GOVERY, in *Geography*, a town of Hindooſtan, in the circar of Rajamundry; 10 miles W. N.W. of Rajamundry.

GOUF. See GOLF.

GOUFRE, in *Geography*, a town of Canada, in the river St. Lawrence; 50 miles E. of Quebec.

GOUGANE-BANRA, a lake of Ireland, in the county of Cork, not far from Inchigeele. The river Lee riſes in a mountain above this lake, through which it flows. It was formerly the reſidence of St. Fin-Bar, and is viſited by great numbers of pilgrims, whilſt its romantic beauties attract a few travellers, notwithſtanding the ruggedneſs of the road.

GOUGE, WILLIAM, in *Biography*, who flouriſhed in the former part of the ſeventeenth century, was born in the pariſh of Bow, in the year 1575. He was educated partly at St. Paul's ſchool, and partly at Eton, and, in 1595, he was elected to King's college, Cambridge. Here, in due time, he performed with much applauſe all the exerciſes required by the ſtatutes, and took his degrees. In 1607, he was admitted into orders, and in the following year obtained the rectory of Blackfriars, London. In this ſituation he continued during the remainder of his life, diſcharging the paſtoral functions with great diligence and fidelity, and ſetting before his pariſhioners an example worthy of imitation. The zeal with which he performed the duties of his office, led him to eſtabliſh a weekly lecture, which was frequented not only by his own people but by many of the London clergy, the members of the Inns of Court, and the more reſpectable and ſerious citizens. In 1628, he was admitted to the degree of doctor of divinity, and about the ſame period he became one of the truſtees of the ſociety that had united for the purpoſe of buying up impropriations, to beſtow them on ſuch unpatronized clergymen as were diſtinguiſhed for piety and other miniſterial qualifications, which occaſioned his being proſecuted in the ſtar-chamber. In 1653, he was nominated one of the aſſembly of divines, and was held in ſuch reputation by that body, that he was often called to fill the moderator's chair during his abſence. He was ſelected as a proper perſon to write notes on the bible, and took, for his ſhare of the work, from the beginning of the firſt book of Kings to that of Job. He died in the year 1653, ſoon after he had completed his 78th year. He had, for ſeveral years, been eſteemed the father of the London miniſters. In his deportment, he was modeſt, humble, and affable; he had a pious and benevolent ſpirit, and continued to preach as long as he had ſtrength to walk into the pulpit. Beſides the “Annotations” already referred to, Dr. Gouge publiſhed many other theological pieces, as “A Commentary on the Epiſtle to the Hebrews;” “An Expoſition of the Lord's Prayer;” “The whole Armour of God,” &c.

GOUGE, THOMAS, ſon of the preceding, was born at Bow, in the year 1605; and having, in his academical courſe, followed the ſteps of his father, he was firſt choſen fellow of his college, and afterwards preſented with a living at Colſden, near Croydon, in Surrey, where he continued but a ſhort time; and, in 1638, he undertook the more important charge of St. Sepulchre's pariſh, London. During a period of twenty-four years he diſcharged the duties of his profeſſion with the moſt exemplary zeal. Beſides preaching twice every Sunday, and often on week days, he viſited his flock, catechiſed their children, enquired into and relieved the wants of the poor, and deviſed plans for their employment. He is ſaid to have given the hint which produced the humane and benevolent inſtitutions of Mr. Firmin, which have been referred to in the memoir of that excellent citizen. When the act of Uniformity took place, he was too conſcientious to ſacrifice his principles on the ſhrine of power, and was ejected from his living. His time was now zealouſly devoted to acts of beneficence and charity. He employed his own fortune, which was conſiderable, in relieving the wants of his poorer brethren, who, on account of their non-conformity, were deprived of their means of ſubſiſtence; and he was a ſucceſsful applicant to the rich, from whom he received large ſums, which were applied to that humane purpoſe. In the year 1671, he ſet about a plan for introducing knowledge and religion into the different parts of Wales, which at that period were in the moſt deplorable darkneſs. He eſtabliſhed ſchools in different towns where the poor were willing that their children ſhould be taught the elements of learning, and he undertook to pay all the expences which were incurred in the outſet of the buſineſs. By degrees theſe ſchools amounted to between three and four hundred, and they were all annually viſited by Mr. Gouge, when he carefully enquired into the progreſs made by the young people, before whom he occaſionally preached in a ſtyle adapted to their age and circumſtances in life, until he was obliged to deſiſt by proſecutions carried on againſt him in the eccleſiaſtical courts. With the aſſiſtance of his friends, whoſe purſes were ever open at his command, he printed eight thouſand copies of the bible in the Welſh language, a thouſand of theſe were diſtributed freely among thoſe who could not afford to purchaſe them, and the reſt were ſent to the cities and chief towns in the principality, to be ſold at reaſonable rates. He procured likewiſe the church catechiſm, and other practical pieces, to be printed in the Welſh language, and diſtributed among the poor. To theſe and ſuch like charitable undertakings did Mr. Gouge devote his time, his talents, and his fortune, when precluded by the intolerance of the laws from officiating in the capacity of a preacher He was accuſtomed to ſay with pleaſure, “that he had two livings which he would not exchange for two of the greateſt in England.” Theſe were Wales, where he travelled every year to diffuſe the principles of knowledge, piety, and charity: and Chriſt's Hoſpital, where he catechiſed and inſtructed the children in the fundamental principles of religion. He died ſuddenly in 1681, in the ſeventy-ſeventh year of his age. His death was regarded as a public loſs. A funeral ſermon was preached on the occaſion by Dr. Tillotſon, afterwards archbiſhop of Canterbury; who, at the concluſion of an animated eulogium on his piety and virtue, obſerves, that “all things conſidered, there have not, ſince the primitive times of Chriſtianity, been many among the ſons of men, to whom that glorious character of the ſon of God might be better applied, that “he went about doing good.” And Mr. Baxter, in his Narrative of his own Life and Times, ſays of Mr. Gouge, “I never heard any one perſon, of whatever rank, ſort, or ſect ſoever, ſpeak one word to his diſhonour, or name any fault that they charged on his life or doctrine; no, not the prelatiſts themſelves, ſave only that he conformed not to their impoſitions; and that he did ſo much good with ſo much induſtry.” This eminent Chriſtian divine publiſhed a few practical pieces, of which the following may be mentioned; “The Principles of Religion Explained:” “A Word to Sinners:” “Chriſtian Directions to walk with God:” “The ſureſt and ſafeſt Way of Thriving, *viz.* by Charity to the Poor;” “The Young Man's Guide through the Wilderneſs of this World.” Gen. Biog. Neal's Hiſt. of the Puritans.

GOUGE, an inſtrument uſed by divers artificers; being a ſort of round, hollow chiſſel; ſerving to cut holes, channels, grooves, &c. in wood, ſtone, &c.

GOUGEON, JOHN, in *Biography*, a French ſculptor and architect in the reigns of Francis I. and his ſucceſſors, is reckoned the firſt who introduced a true taſte for ſculpture in France, and freed it from the barbariſm of former times. He was employed in many of the public works with which Paris began to be decorated in the reign of Francis I. Of theſe the moſt conſiderable is the fountain of the Nymphs, called the Innocents, finiſhed in the year 1550. Among the other remains of his workmanſhip is a tribune in the hall des Cent-Suiſſes, at the Louvre, enriched with ſculptures, and ſupported by four gigantic Caryatides. He was an able medaliſt, and ſtruck ſeveral pieces for Catharine de Medicis, which are ſought by the curious. He generally worked in ſmall, and there are no detached figures or groups by his hand. His reliefs are executed with taſte, his drapery is light and elegant, his figures graceful and flexible, but their attitudes ſomewhat forced. He was a Huguenot, and was ſhot as he was working on a ſcaffold, on the infamous St. Bartholomew's day, 1570. Gen. Biog.

GOUGH'S ISLAND, in *Geography*, a ſmall iſland in the Southern Atlantic ocean, diſcovered by captain Gough in 1715. It is very high land, in S. lat. 40° 15'. W. long. 81° 57'. Some doubt being entertained with reſpect to its true longitude, it was recommended to M. de la Perouſe to aſcertain its true poſition, as it lies in the way of ſhips going directly to India, or China, early in the ſeaſon, without touching at the Cape.

GOUJET, CLAUDE PETER, in *Biography*, was born at Paris in 1697. His father, a taylor by trade, in vain oppoſed his inclination for a ſtudious life. He was educated among the Jeſuits, and, having taken orders, became a canon of the church of St. Jacques de l'Hôpital in Paris. He was an aſſociate of ſeveral academies in France, and was generally eſteemed for his learning, and alſo on account of the mildneſs of his temper and the purity of his morals. He died in 1767, and had collected a library of ten thouſand well choſen volumes, which was the baſis of his numerous works. Of theſe, the following may be mentioned, “Vies des Saints," in two vols. 4to. "Supplement to Moreri's Dictionary," two vols. folio. "Bibliotheque des Ecrivains Eccleſiaſtiques," three vols. 8vo. "Diſcours ſur le Renouvellement des Etudes depuis le xiv Siècle." "De l'Etat des Sciences en France depuis la Mort de Charlemagne juſqu'à celle du Roi Robert." This diſſertation obtained for the author the prize of the Academy of Belles Lettres, and he was complimented by a deputation from that body, deſiring permiſſion to nominate him to the vacant place of the deceaſed abbé Vertot. Goujet was likewiſe author of "Bibliotheque Françoiſe, ou Hiſtoire de la Litterature Françoiſe," 18 volumes 12mo. which is reckoned his moſt valuable work. Moreri.

GOUJIN, in *Geography*, a town of Portugal, in the province of Beira; 12 miles S.W. of St. Joao de Peſqueira.

GOVINPOUR, a town of Hindooſtan, in Bahar; 26 miles S. of Bahar.—Alſo, a town of Bengal; 10 miles W. of Nuldingah.

GOULAMCONDA, a town of Hindooſtan, in the Myſore; 9 miles S. of Gooty.

GOULART, Simon, in *Biography*, a French Proteſtant divine, was born at Senlis in 1543. He began his ſtudies late in life, but by perſevering induſtry, he made a great proficiency in the learned languages, and was choſen paſtor of the church of which Calvin had been miniſter. Here he diſcharged the duties of his office with much diligence and ſucceſs, till within a few years of his death, which took place in 1628, when he was about 85 years of age. He edited many works, performing at the ſame time the buſineſs of a commentator. Among theſe were the "Works of Plutarch;" "St. Cyprian's Works;" "Seneca's Works," &c. He made a collection of "Remarkable Hiſtories" in 2 vols. 8vo., and wrote ſeveral pieces relating to the hiſtory of his own times. The moſt intereſting and curious of the latter deſcription is his "Collection of the moſt memorable events which occurred during the League, with notes and original documents," in ſix vols. 4to. Many of his pieces were anonymous, but to theſe he uſually affixed the initials S. G. S. ſignifying "Simon Goulart Senliſien." He had ſuch an extenſive acquaintance with the literature of his time, and knew ſo well to whom different publications, that were printed without the writer's name, were to be attributed, that Henry III. of France, being deſirous of knowing who was the author of a piece publiſhed under the aſſumed name of Stephanus Junius Brutus, and intended to propagate republican doctrines, ſent a perſon to Geneva to enquire into the matter of Goulart, but the latter refuſed to communicate the fact, for fear of expoſing the author to ſerious injury. Moreri. Bayle.

GOULDSBOROUGH Harbour, in *Geography*, a harbour of the United States of America, in the diſtrict of Main. N. lat. 44° 25'. W. long. 67° 53'.

GOULERGAUT, a town of Thibet; 28 miles S. of Deuprag.

GOULOUR, a town of Hindooſtan, in the circar of Sanore; 18 miles N. of Sanore.

GOULSTON, Theodore, in *Biography*, was the ſon of William, rector of Wymondham, and was born in Northamptonſhire. He became probationer fellow of Merton college, Oxford, in 1596: and, after applying himſelf to the ſtudy of phyſic in this univerſity, he practiſed for a time with conſiderable reputation at Wymondham and its neighbourhood. At length, after taking his doctor's degree in 1610, he removed to London, and became a fellow of the College of Phyſicians, and afterwards cenſor. He reſided in the pariſh of St. Martin's, near Ludgate, and was in great eſteem, as well for claſſical learning and theology, as for the practice of his profeſſion. He died in the year 1632; and by an article in his will teſtified ſuch regard to the intereſts of medicine, as entitles him to grateful commemoration. This was a bequeſt of 200 pounds, to purchaſe a rent charge for the maintenance of an annual pathological lecture within the College of Phyſicians, to be read by one of the four youngeſt doctors of the College. The public has been indebted on ſeveral occaſions to this inſtitution for ingenious diſſertations, delivered as Gulſtonian Lectnres; as thoſe of Dr. Muſgrave; Dr. Fordyce's Treatiſe on Digeſtion; &c.

Dr. Goulſton publiſhed the following works. "Verſio Latina et Paraphraſis in Ariſtotelis Rhetoricam." Lond. 1619, &c. "Ariſtotelis de Poetica Liber, Latine converſus et Analytica Methodo illuſtratus." Lond 1623. And after his death, his intimate friend Thomas Gataker, B. D. publiſhed his "Verſio, variæ Lectiones et Annotationes Criticæ in opuſcula varia Galeni." Lond. 1640. Aikin, Biograph. Mem. of Med.

GOUMEL, in *Geography*, a town of Africa, and capital of the country of the Foulahs, and reſidence of the Siratik. N. lat. 16° 16'. W. long. 11° 32'.

GOUNDA, a town of Hindooſtan, in Oude; 32 miles E.N.E. of Manickpour.

GOUPIA, in *Botany*. See Glossopetalum.

GOUPIL, James, in *Biography*, a phyſician of the ſixteenth century, was born in the province of Poitou. He acquired a conſiderable knowledge of the ancient languages, and afterwards directed his ſtudies to medicine, in the ſchools of Paris, where he graduated in 1547. His talents attracted the attention of the court, and he was appointed by Henry II. to the profeſſorſhip of medicine in the royal college, in 1555, a vacancy being occaſioned by the death of Sylvius. He is principally known as an editor and annotator of the writings of Dioſcorides, Alexander Trallian, Actuarius, and ſome other Greek writers: and he was engaged in the ſame labour, in reſpect to ſome of the writings of Hippocrates, when his ſtudies were terminated by death, in 1568. Eloy.

GOUR, called alſo *Lucknouti*, in *Geography*, the ancient capital of Bengal, ſuppoſed to be the "Gangia Regia" of Ptolemy, which ſtood on the left bank of the Ganges, about 25 miles below Rajemul. N. lat. 24° 53'. E. long. 88° 14'. It was the capital of Bengal 730 years B. C. and was repaired and beautified by Acbar, A. D. 1575, who gave it the name of "Jennuteabad," which name part of the circar in which it was ſituated ſtill bears. It was deſerted, as it is ſaid, on account of the inſalubrity of its air. Taking the extent of the ruins of Gour at the moſt reaſonable calculation, it is not leſs than 15 miles in length, along the old bank of the Ganges, and from two to three in breadth. Several villages ſtand on part of its ſcite; the remainder is either covered with thick foreſts, the habitations of tygers and other beaſts of prey, or become arable land, whoſe ſoil is chiefly compoſed of brick-duſt. The principal ruins are a moſque lined with black marble, elaborately wrought; and two gates of the citadel, which are grand and lofty. The bricks, which continue to be an article of merchandize, are of a peculiarly ſolid and durable texture.

GOURA, or Gura, a town of the duchy of Warſaw on the Viſtula; 12 miles from Warſaw.

GOVRA, a town of Perſia, in the province of Irak; 35 miles E. of Iſpahan.

GOURAY, a cape on the E. coaſt of the iſland of Jerſey; 4 miles E. of St. Helier.—Alſo, a town of France, in the department of the North Coaſts; 8 miles S. of Lamballe.

GOURD, in *Botany*. See Cucurbita.

Gourd, *Bitter*. See Colocynthis.

Gourd, *Indian tree*. See Crescentia.

Gourd, *Sour*. See Baobab.

Gourd-*worm*, the Engliſh name of a ſpecies of worm found in the inteſtines of ſeveral animals. It has this name from its reſembling the ſeed of the gourd in figure.

GOURDON, in *Geography*, a town of France, in the department of the Lot, and principal place of a diſtrict, 16 miles N. of Cahors. N. lat. 46° 44'. E. long. 1° 28'. The place contains 3703, and the canton 12,115 inhabitants, on a territory of 150 kiliometres, in 15 communes.

GOURDY, *Legs of Horſes*. See Grease.

GOUREY, in *Geography*, a town of Hindooſtan, in Oude; 10 miles N. W. of Lucknow.

GOURGONG, a town of Hindooſtan, in Allahabad; 10 miles N. of Corah.

GOURGOUTY, a town of Hindooſtan, in Golconda; 36 miles W. S. W. of Rachore.

GOURIN, a town of France, in the department of the Morbihan, and chief place of a canton, in the diſtrict of Pontivy; 26 miles W. N. W. of Pontivy. The place contains 3674, and the canton 11,819 inhabitants, on a territory of 242½ kiliometres, in five communes.

GOURMA, a town of Abyſſinia, on the coaſt of the Red ſea. N. lat 14° 52'.

GOURMUNGUL, a town of Hindooſtan, in Golconda; 12 miles S.W. of Malkar.

GOURMELEN, Etienne, in *Biography*, was a native of Brittany, and was ſent at an early age to Paris, where he ſtudied ſurgery, and afterwards medicine; in the latter of which he took the degree of doctor in the year 1559, and was elected dean of the faculty in November, 1574. Surgery, however, continued to be the favourite object of his attention, and he was appointed by Henry III. profeſſor of ſurgery in the Royal College in the year 1588. But he did not long fill his chair, for he died in 1594. His writings, which were valuable in their day, have now loſt their intereſt, in conſequence of the great improvements of modern ſurgery: they conſiſt of a "Synopſis Chirurgiæ," printed in 1566, and afterwards tranſlated into French;—a Latin tranſlation of Hippocrates "De Alimento," with a commentary;—and a treatiſe, entitled "Chirurgiæ Artis ex Hippocratis et Veterum decretis ad rationis normam redactæ, Libri tres," 1580. Eloy. Dict. Hiſt.

GOURNAI, Le Jars de, Mary, was born at Paris in 1506. She was, while very young, deprived of her father, and acquired an adoptive one in the celebrated Michael Montagne, who became the object of her enthuſiaſtic admiration. After the death of Montagne ſhe became heireſs of his writings, and publiſhed an edition of his "Eſſays," dedicated to cardinal Richelieu. She had well improved the leſſons of youth, and was intimately acquainted with the learned languages. She maintained a correſpondence with many of the moſt eminent literary characters of the age, by ſome of whom ſhe was honoured with the title of the "Tenth Muſe;" by others ſhe was denominated the "French Syren;" it is not, however, improbable, that the uncommonneſs of female learning at that time in France, rather than the intrinſic merit of her writings, excited admiration. In her own language ſhe wrote a ſtiff and awkward ſtyle, and her taſte in reading was uſually turned to the compilations and commentaries of paſt ages. She paſſed her life in celibacy, contented with a ſmall penſion from the court, and much eſteemed by her particular friends, ſome of whom were perſons of high rank. She died at Paris in 1645, in her 79th year, and was honoured with many epitaphs from literary characters. Her works were collected in a quarto volume, under the title of "Les Avis ou les preſens de la Demoiſelle de Gournai." Her temper was apt to be violent, and ſhe was very reſentful of real or ſuppoſed injuries; by theſe means ſhe made herſelf many enemies, who attacked her in their writings, in which neither her perſon, nor the defects in her character were ſpared. Bayle. Moreri.

GOURNAY, in *Geography*, a town of France, in the department of the Lower Seine, and chief place of a canton in the diſtrict of Neufchatel, 24 miles E. of Rouen. N. lat. 49° 29'. E. long. 1° 47'. The place contains 3543, and the canton 11,301 inhabitants, on a territory of 180 kiliometres, in 19 communes.

GOURNEI, a town of Egypt, on the ſcite of the ancient Thebes.

GOUROCK. See Greenock.

GOURRI, a town of Abyſſinia; 35 miles S.W. of Aſſab.

GOURVILLE, John Herauld de, in *Biography*, born at Rochefoucauld in 1625, was taken by the celebrated duke of that title into his ſervice as valet de chambre, but in a ſhort time he became his confidential friend. He was patronized by the great Condè, and was employed by the ſuperinrendant Fouquet, in public buſineſs. So well did he approve himſelf to his employers for political talents and integrity that he was propoſed to the king as ſucceſſor to Colbert in the miniſtry. He died in 1705, leaving behind him "Memoirs of his Life from 1642 to 1698," in two volumes 12mo. Theſe memoirs are written with frankneſs and ſimplicity, in a lively, though incorrect ſtyle, and they contain many curious and well authenticated anecdotes of the miniſters and principal perſons of his time, of which, it is ſaid, Voltaire made much uſe. Moreri.

GOURY Pashnum, in *Natural Hiſtory*, a name given by the people of the Eaſt Indies to a kind of orpiment of a deep yellow colour, veined with red in ſeveral places, and in ſome with white. It is found principally at the bottoms of mountains. They calcine it ſeveral times, and afterwards give it internally after intermitting fevers, and uſe it externally in ointments for the itch.

GOUSSET, James, in *Biography*, was born at Blois in the year 1635. He was educated for the miniſtry, and was choſen paſtor of the Proteſtant church at Poitiers in the year 1662. He was thrice invited to undertake the profeſſorſhip of divinity at Saumur, but refuſed to quit his flock till compelled to become a fugitive from the kingdom, in conſequence of the revocation of the edict of Nantz. On this occaſion he took refuge in Holland, and afterwards was ſettled, as French miniſter, at Groningen, where he likewiſe exerciſed the offices of profeſſor of divinity, and of the Hebrew language in the univerſity of that city. He died there in 1704, in his ſixty-ninth year. His principal works were "Diſſertations in Controverſy with the Jews," 1699. "Commentarii Linguæ Hebraicæ," 1702, which form a valuable Hebrew dictionary, of which the beſt edition was publiſhed at Leipſic in 1743. "Diſſertationes in Epiſtolam Pauli ad Hebræos," &c. 1712. At his death he left behind him numerous MSS., among which are commentaries upon the whole of the ſacred ſcriptures. Moreri.

GOUST, Gout, a French term, for what the Italians call *guſto*, and we *taſte*.

GOUT, in *Medicine*, a diſeaſe principally characterized by inflammatory attacks of the joints, more eſpecially of the foot, which return at intervals, and are connected with derangement of the digeſtive organs. The term, however, includes ſuch a variety of morbid affections, in its extended ſenſe, that it is not eaſy to give a conciſe definition of it; and we muſt have recourſe to a more ample deſcription of thoſe affections, in order to convey a juſt notion of its ſignification.

The ancient phyſicians included all the varieties of inflammation, that are liable to occur in the joints, under the general term, *Arthritis*, (from ἄρθρος, *a joint*, with the termination *itis*, denoting inflammation,) for the diſtinctions, made by modern phyſicians, between the two modifications of inflammation in the joints, now denominated *gout* and *rheumatiſm*, had not then been attended to. The term *Arthritis*, however, was uſed both as a generic and ſpecific term, and ſignified, not only inflammation of the joints generally, but the ordinary form of gout by way of excellence. But the Greeks alſo gave ſpecific names to the varieties of arthritis, according to the particular joints which the diſeaſe occupied: thus, for the ordinary form of gout in the foot the term ποδάγρα, *podagra*, was employed, which alſo became a generic title; for gout in the hand, the word χειράγρα, *chiragra;* and for gout in the knee, γονάγρα, *gonagra;* and ſo on. Among the ſpecies of arthritis was alſo included the *iſchias*, *ſciatica*, or *hip-gout*, which is now deemed a ſpecies of rheumatiſm. Theſe terms the Romans adopted; and they are ſtill retained in medical language. Our vernacular term *gout*, which came to us probably through the French, *la goutte*, originated in the dark ages among the humoral pathologiſts, who conſidered the diſeaſe as ariſing from the ſlow depoſition of a morbid humour, *guttatim*, as it were, upon the joints; hence, the name *gutta*, or *drop*, was applied to the diſeaſe. This term, according to Du Cange, was uſed by Radulfus, a Dominican of the 13th century, who writes, "cum *gutta*, quam podagram vel arthreticam vocant, frequenter vexaretur." Muſgrave de Arthritide.

In conſequence of the various forms which gout aſſumes, phyſicians have divided it under two heads, *regular* and *irregular* gout, or, as ſome have termed it, *tonic* and *atonic* gout; the former occurring in the earlier periods of life, while the ſtrength or tone of the ſyſtem remains unbroken; the latter, after a certain degree of weakneſs, or atony of the conſtitution, has been produced by the frequent attacks of the diſeaſe, advanced age, or other cauſes. We ſhall firſt deſcribe the ſymptoms by which theſe forms of the diſeaſe are characterized, and afterwards ſtate the cauſes and method of treatment, together with the ſpeculations of pathologiſts, reſpecting the nature of the diſeaſe, beginning with an account of the paroxyſm of

Regular Gout.—It is an inflammatory affection of the joints of the foot, which conſtitutes what is called a fit or paroxyſm of the regular gout. This ſometimes comes on ſuddenly without any warning of its approach; but it is generally preceded by ſeveral ſymptoms, eſpecially by thoſe of indigeſtion, as heart-burn, flatulence, and heavineſs after meals, with eructations of acid or bitter matters, and ſome degree of languor and torpor of the body; but immediately before the fit the appetite is ſometimes unuſually ſharp. There is alſo often an unuſual coldneſs of the feet and legs for a few days preceding the fit, with the ceſſation of the perſpiration about the former; a frequent numbneſs, alternating with a ſenſe of prickling, along the whole of the lower extremities; occaſional cramps of the muſcles of the legs; and an unuſual turgeſcence of the veins, are occaſionally obſerved.

The attack is ſometimes felt in the evening, but more commonly about two or three o'clock in the morning; when the patient is awakened from a quiet ſleep by a pain affecting one foot, generally the ball or firſt joint of the great toe, but ſometimes the other parts of the foot, or the ankle. This pain is accompanied with more or leſs of chillineſs and ſhivering, which, as the pain increaſes, gradually ceaſe, and are ſucceeded by a hot ſtage of pyrexia, or ſymptomatic fever, which continues during the ſame time as the pain. The pain becomes by degrees more and more violent: at firſt it is attended with a ſenſation, as if warm water were poured upon the membranes affected, and is ſaid to reſemble the pain of a diſlocated joint; as it becomes ſevere it is ſometimes deſcribed as reſembling the pain of a tenſion, or laceration of the ligaments, ſometimes as like that from the gnawing of a dog, and ſometimes as a feeling of weight and conſtriction of the membranes of the part, which becomes ſo exquiſitely tender, as not to endure the weight of the bed-clothes, nor even the ſhaking of the room from a perſon walking briſkly in it. Hence, great reſtleſsneſs of the whole body, and eſpecially of the part affected, always accompanies the fit; the patient conſtantly changing his poſture, with a view to eaſe the pain, which, nevertheleſs, continues ſevere all the following day, until mid-night, after which it gradually remits; and about two or three in the morning, that is, after twenty-four hours from the firſt attack, it commonly ceaſes almoſt entirely; and this freedom, with the breaking out of a free perſpiration, allows the patient to fall aſleep. On waking, he finds the pain ſlight, and the part affected with ſome redneſs and ſwelling.

When a paroxyſm has thus come on, although the violent pain, after the period of twenty-four hours, be conſiderably diminiſhed, yet the patient is not entirely without pain. For ſome days he has a return every evening of pain and fever, which continue, with more or leſs violence, till morning. After continuing in this manner for ſeveral days, the diſeaſe ſometimes goes off entirely, not to return till after a long interval; and in ſuch caſes it generally leaves the perſon in very perfect health, enjoying greater eaſe and alacrity in the functions both of body and mind, than he had for a long time before experienced.

It often happens, however, that the diſeaſe does not thus ſpeedily quit the patient, eſpecially when he has previouſly ſuffered conſiderably from its attacks. For, inſtead of ceaſing altogether after a few days, it ſeizes the other foot in the ſame manner as it did the former, both in reſpect to the vehemence and duration of the pain. Moſt commonly the foot firſt affected becomes quite eaſy, in ſuch a caſe, and even as ſtrong and healthy as if it had not been diſeaſed; but ſometimes both feet are affected together, and with equal violence. When this happens, the ſucceeding exacerbations, as Sydenham remarks, are leſs regular both as to the time of coming on, and as to their continuance; but the pain always increaſes in the evening and remits in the morning; and what is called a fit of the gout, which goes off ſooner or later, according to the age and conſtitution of the patient, is made up of a number of theſe little fits. For when this diſeaſe laſts two or three months, it is not to be eſteemed one continued fit, but rather a ſeries or aſſemblage of ſmall fits, the laſt of which proves milder and ſhorter, until the whole is terminated. In ſtrong conſtitutions, and ſuch as have the gout ſeldom, the attack is commonly finiſhed in fourteen days; but in thoſe of advanced life, or who have frequent returns of the diſeaſe, theſe ſeries of fits will continue for two months; and in ſuch perſons as are more debilitated, either by age or the long continuance of the diſorder, it will not go off till the ſummer advances, (beginning, as is moſt common, in January, or early in February,) which ſeems to drive it away.

When the fit is going off, a violent itching ſeizes the foot, eſpecially between the toes, and the cuticle peels off. The appetite and ſtrength return ſooner or later, according to the greater or leſs ſeverity of the preceding fit, and the interval of health between the paroxyſms is generally nearly in the ſame ratio; *i. e.* longer in proportion to the greater violence of the laſt fit. At the beginning of the diſeaſe, Dr. Cullen obſerves, the returns of it are ſometimes only once in three or four years; but after ſome time the intervals become ſhorter, and the attacks become annual: afterwards they come twice each year, and at length recur ſeveral times during the whole courſe of autumn, winter, and ſpring; and as it happens that, when the fits are frequent, the paroxyſms become alſo longer, ſo, in the advanced ſtate of the diſeaſe, the patient is hardly ever tolerably free from it, except, perhaps, for two or three months in ſummer.

Before the diſeaſe becomes thus inveterate, however, it has gradually aſſumed other appearances, and attacked other parts of the body. At firſt it commonly affects one foot only; but afterwards every paroxyſm affects both feet, the one after the other, and then both together; and its changes of place, as it continues to recur, are not only from one foot to the other, but alſo from the feet into other joints, as the hands, wriſts, elbows, knees, &c.; ſo that there is ſcarcely a joint in the body that is not, on one occaſion or other, affected. It ſometimes ſeizes on two different joints at the ſame time; but more commonly it is ſevere in a ſingle joint only, and paſſes ſucceſſively from one joint to another; ſo that the patient's affliction is often protracted for a long time. The pains, indeed, are commonly leſs violent, in this ſtate of the diſeaſe, than they were at firſt; but, in addition to them, loſs of appetite, ſickneſs, and other ſymptoms of the atonic gout, now afflict him. Beſides, in the intervals between the firſt paroxyſms of the diſorder, the joints which had been affected were entirely reſtored to their former ſuppleneſs and ſtrength, and were free from pain or uneaſineſs, and all the functions of life were well performed. But in this protracted condition of the diſeaſe, the joints remain not only weak and ſtiff, after the termination of the fit, but they become at length ſo contracted and diſabled, that although the patient can ſtand, and perhaps walk a little, yet it is very ſlowly, and with great lameneſs and difficulty, ſo that he is ſcarcely able to move from room to room; and ſometimes the joints loſe their motion altogether.

In many perſons, though not in all, when the diſeaſe has frequently recurred, this immobility of the joints is farther increaſed by the formation of concretions, of a chalky appearance, upon the outſide of them, and for the moſt part immediately under the ſkin. The ſecretion or depoſition of this matter is characteriſtic of the diſeaſe, being the conſequence of gouty inflammation alone. It ſeems to be depoſited at firſt in a fluid form, but afterwards becomes dry and firm; in which ſtate the concretions have the appearance of a friable earthy ſubſtance, and have been called CHALK-*ſtones* (which ſee). From the inveſtigations of Dr. Wollaſton, however, and other modern chemiſts, it has been aſcertained that they contain no calcareous or earthy matter, but conſiſt of a neutral ſalt, formed by the combination of the lithic or uric acid, with the fixed alkali, ſoda,—conſtituting a lithate or urate of ſoda. Theſe concretions form principally about the joints of the toes and fingers, in little nodules, which Sydenham compares to crab's eyes; but ſometimes they appear about the larger joints, as the elbow and knee, occaſioning a whitiſh ſwelling almoſt as large as an egg, which becomes gradually inflamed and red. Mr. Watſon has related an example of a very extenſive depoſition of urate of ſoda, in a gouty man, who was a martyr to the diſeaſe. Chalk-ſtones not only enveloped the joints of his great toes, formed tumours upon his legs, and, being mixed with the ſynovia of the large joints, rendered this fluid as thick as cream; but "the joints of the fingers were ſwelled and knotty, every knot being a lump of chalk; and I was told," he adds, "that when he played at cards, he uſed frequently to ſcore up the game with his knuckles." (See Medical Communications, vol. i. art. 3.—See alſo Parkinſon's Obſ. on the Nature and Cure of Gout, p. 5.)

Such is the progreſs of gout, as it affects the joints, and while it may, therefore, be called *regular* gout. Sydenham, indeed, and ſome other writers, confine the appellation of *regular* to gout in the feet only; and conſider it as *irregular*, when it attacks the hands or other joints. But Dr. Cullen, Warner, and the phyſicians of the preſent day, in general, agree in calling the diſeaſe, when it conſiſts only of an inflammatory affection of the joints, the regular gout: "and," Dr. Cullen obſerved, "whatever ſymptoms we can perceive to be connected with, or to depend upon, the diſpoſition which produces that inflammatory affection, but without its taking place, or being preſent at the ſame time, we name the *irregular gout.*" Firſt Lines, § 518.

Irregular gout, anomalous, internal or atonic gout, as it has been alſo called, conſiſts of various ſymptoms of diſorder in the internal organs of the body, which do not differ from the ſymptoms affecting the ſame organs under other circumſtances; it is, therefore, ſuſpected that theſe ſymptoms are of gouty origin, when they occur in perſons bearing the marks of a gouty diatheſis or diſpoſition: and eſpecially when, in ſuch habits, either a manifeſt tendency to the inflammatory affection of the joints has formerly appeared, or when the ſymptoms alluded to are intermixed with, and are relieved by, ſome degree of the inflammatory affection. The morbid ſymptoms which appear, in ſuch caſes, and are conſidered as ſigns of *atonic* gout, are principally affections of the ſtomach; ſuch as loſs of appetite, indigeſtion, and its various concomitants of ſickneſs, nauſea, vomiting, flatulency, acid eructations, and pains in the region of the ſtomach. Theſe ſymptoms are frequently accompanied with pains and cramps in the upper extremities of the body, which are relieved by the diſcharge of wind from the ſtomach. Together with theſe affections of the ſtomach, coſtiveneſs alſo commonly occurs; but ſometimes a looſeneſs with colic pains. Theſe affections of the alimentary canal are often attended with all the ſymptoms of hypochondriaſis; as dejection of mind, a conſtant and anxious attention to the ſlighteſt feelings, an imaginary aggravation of theſe, and an apprehenſion of danger from them. In the ſame atonic gout, the viſcera of the thorax are alſo ſometimes affected, and palpitations, faintings, and aſthma occur. And the head alſo is often diſordered, with pains, giddineſs, ſomnolency, and even apoplectic and paralytic affections. (Cullen. See alſo Muſgrave "De Arthritide Anomala," where theſe various modifications of irregular gout are deſcribed at length; and Warner's "Full and Plain Account of the Gout," where his obſervations are tranſlated, pp. 70—90, ſecond edit.)

We may here remark, in paſſing, that many errors have probably been committed, in conſidering almoſt every ſpecies of indiſpoſition, that occurs in gouty habits, as ariſing from the gouty diatheſis. We remember to have heard this point ſtrenuouſly inſiſted upon by the able profeſſor of phyſic, in the univerſity of Edinburgh, Dr. Gregory. Many of the ſymptoms above enumerated are obviouſly connected with the impaired functions of the ſtomach, and occur in dyſpepſia, or indigeſtion, in habits not gouty; ſuch are the various hypochondriac ſenſations; the palpitations of the heart, often ariſing from over-diſtenſion of the ſtomach with flatus, by which the heart is mechanically preſſed upwards: the cramps in different parts of the body, which are often relieved by a diſcharge of wind from the ſtomach; the difficulty of breathing, often occaſioned by great diſtenſion of the ſtomach, which impedes the deſcent of the diaphragm; and the head-ache, giddineſs, &c. which are daily obſerved to be connected with impaired digeſtion. On the other hand, inflammatory diſorders of the lungs and other viſcera, congeſtions in the head, inducing head-ache, ſomnolency, vertigo, &c., and ultimately various degrees of paralytic and apoplectic diſeaſe, not eſſentially different, in any reſpect, from the ſame affections in habits not tainted with gout, have probably been ſuffered to go on, and to prove fatal, under a notion that they were gouty, and the proper remedies have been therefore neglected.

The *irregular* gout occurs in a leſs equivocal form, when the inflammatory ſtate of the joints has come on in the uſual manner, but when, without ariſing to the ordinary degree, or at leaſt without continuing for the uſual time, and receding gradually, as is common, the pain and inflammation ſuddenly and entirely ceaſe, while ſome internal part becomes diſordered. This has been called the *retrocedent* or *repelled gout.* When the gout is thus retrocedent, the ſame internal parts are attacked, and the ſame diſorders produced, as in the irregular or atonic gout, where no previous imperfect attack upon the joints had ſhewn itſelf. The ſtomach is for the moſt part commonly affected, whence violent pain, ſickneſs, vomiting, anxiety, &c.: the heart and lungs are alſo occaſionally attacked; and ſometimes the occurrence of apoplexy, palſy, or delirium, mark the head as the ſeat of the retrocedent diſeaſe.

Another variety of irregular gout has been denominated *miſplaced gout;* namely, when, inſtead of the joints of the extremities, the ſtomach, brain, lungs, inteſtines, kidnies, or bladder, become affected with ſymptoms of inflammation, which give way upon the appearance of the inflammation in the extremities, when that takes place. This inflammation of the internal organs, however, is indicated by the ſame ſymptoms which accompany inflammation of the ſame parts, ariſing under other circumſtances, and in conſtitutions not gouty: and it has probably been ſometimes ſuppoſed to be of gouty origin, when it aroſe from the ordinary cauſes. Dr. Cullen affirms, that he never met with any inſtances of miſplaced gout in his practice, and that no caſe has been diſtinctly made out by medical writers, except that of pulmonary inflammation. But he had known two varieties of internal diſeaſe alternate with external gouty inflammation; *viz.* the one an affection of the neck of the bladder, producing pain, ſtrangury, and catarrhus veſicæ; the other an affection of the rectum, ſometimes marked by pain alone in that part, and ſometimes by hæmorrhoidal ſwellings.

Such are the phenomena, by which the various forms of regular and irregular gout are chiefly characterized. The next object of our inquiry will be the

Cauſes of Gout.—Among the *prediſpoſing* cauſes of gout, an original peculiarity of conſtitution, often tranſmitted from the parent to the offspring, appears to be the moſt common; in other words, the diſeaſe is ſaid to be *hereditary.* This poſition, indeed, has been controverted, eſpecially by Dr. Cadogan (ſee his Diſſ. on the Gout, and all Chronic Diſeaſes, p. 7.); but the diſcuſſion has turned upon a mere diſpute about words. For it is admitted, on all hands, that the *prediſpoſition* of the conſtitution to be affected by gout is tranſmitted from father to ſon, like other peculiarities of habit; like the family-likeneſs, for inſtance, in features, in voice, complexion, &c. It is true, indeed, as Dr. Cadogan contends, that ſome perſons acquire this gouty diſpoſition, who have it not by hereditary tranſmiſſion; and, on the other hand, that the hereditary prediſpoſition may be counteracted by various cauſes, but particularly by certain modes of life, ſo that the diſeaſe itſelf ſhall never appear. Yet it is equally true, that the ſame occaſional cauſes, which will excite the diſeaſe in thoſe who are hereditarily prediſpoſed to it, will not produce it in others, although applied in greater force; and, therefore, the exiſtence of an original conſtitutional prediſpoſition muſt neceſſarily be inferred. The middle and advanced periods of life are alſo more diſpoſed to gout, than the early periods: thus it does not commonly attack men until after the age of thirty-five, and generally not till a ſtill later period. When the gout does appear, in more early life, of which there are inſtances, it ſeems to be in thoſe in whom the hereditary diſpoſition is very ſtrong, and to whom the exciting cauſes have been applied in a conſiderable degree. Hippocrates remarks, that eunuchs are not liable to be affected by gout, nor boys previous to venery: but the intimation included in the remark is probably unfounded; ſince, with reſpect to the latter, the diſeaſe, as we have already ſtated, is almoſt peculiar to an advanced period of life; and the eunuchs, who, in the time of Hippocrates, were chiefly Perſian ſlaves, were doubtleſs confined to the ſtrict diſcipline and the frugal and temperate life, which the rigorous laws enjoined to all, and therefore not expoſed to the moſt active cauſes of gout. For Galen, in his commentary upon this obſervation of Hippocrates, obſerves that, in his time, the remark was no longer true, "owing to too much indulgence on their part in an indolent, as well as intemperate mode of life:" and the remark is confirmed by modern experience. (Van Swieten, loc. cit.)

It has been fully aſcertained, indeed, that the principal ſource of the gouty habit conſiſts of high feeding and indolence conjoined. Sydenham (who, upon the ſubject of gout, ſtands unrivalled in accuracy of obſervation, and the model of all ſucceeding writers, many of whom have done little more than copy his hiſtory of it) begins his account of the diſeaſe with theſe remarks. "The gout generally attacks thoſe elderly perſons who have ſpent the greater part of their lives in eaſe and indulgence, both in the uſe of high feeding and of wine, or other ſpirituous and fermented liquors; and who, in conſequence of the ſluggiſhneſs of advanced life, have ceaſed from all thoſe exerciſes to which they were accuſtomed in their youth. The gout, however," he adds, "does not always wait till an advanced age; it ſometimes attacks thoſe who are in the prime of life. But theſe perſons have unfortunately received the ſeeds of the diſeaſe from their parents; or, if not, they have indulged in premature and exceſſive venery, or left off entirely thoſe exerciſes which they had previouſly uſed with great activity, and have been beſides moſt indulgent to the appetite, and drank to exceſs of vinous and ſpirituous liquors, afterwards ſuddenly turning to thoſe that are thin and cold." (Sydenham, Tractatus de Podagra.) Theſe facts have been long known. There is a Greek epigram literally ſignifying, "of limb-relaxing Bacchus and limb-relaxing Venus is born a daughter, the limb-relaxing Gout." And a ſimilar obſervation is contained in the adage, "Bacchus pater, Venus mater, et Ira obſtetrix Arthritidis." While this fact is confirmed, on the one hand, by the teſtimony of ages in the affirmative, it is corroborated alſo, on the other hand, by obſervation in the negative. Dr. Cullen remarks that gout ſeldom attacks thoſe who are employed in bodily labour, or who live much upon vegetable aliment, or thoſe who make no uſe of wine or other fermented liquors. Indeed, the gout is ſaid to be altogether unknown where theſe liquors are not uſed, as among the common people of Turkey. Among the lower orders of people, even in this country, the diſeaſe is very rare, and ſtill more rare in Scotland and Ireland, where animal food and ſtrong ale and beer are leſs uſed. Van Swieten obſerves, that ſome people who, from comfortable circumſtances, have been reduced to labour for their ſuſtenance, and to exchange a luxurious table and indolence for a ſpare diet and activity, have loſt their gout. He mentions particularly the inſtance of a certain prieſt, who enjoyed a rich living, and had been an old and conſtant ſufferer from the gout; but happening to be taken by the pirates of Barbary, he was kept conſtantly at work in the galleys for the ſpace of two years: "which had this good effect, that afterwards, when he was ranſomed from captivity, having loſt all his troubleſome and monſtrous fatneſs, he never once had a fit, though he lived ſeveral years after the event." (Van Swieten, Comment. ad Aph. 1255.) Several anecdotes of a ſimilar nature are related by the induſtrious Schenckius. (Obſ. Med. Rarior. lib. v. p. 657. edit. 1644.) In a word, much exerciſe, which will often counteract the influence of intemperance, will, when combined with temperance, counteract even the hereditary diſpoſition to the diſeaſe.

The effect of full living and indolence, in producing the gouty diatheſis, is alſo manifeſt from the form and temperament of the perſons in whom it occurs. Theſe are eſpecially men of robuſt and large bodies with large heads, and of full and corpulent habits. They have commonly alſo a coarſer ſkin; and if, with the ancients, we might denote the temperaments of men by certain terms, we ſhould ſay that the gout eſpecially aſſails men of a *cholerico-ſanguine* temperament, and ſeldom attacks the purely ſanguine or melancholic. Women are not very liable to the gout, probably from their leſs intemperate mode of life, in general, than that of men: but thoſe females whom it attacks are generally of robuſt and full habits. It is ſaid not to occur in them commonly till after the ceſſation of menſtruation; which perhaps only implies that it is a diſeaſe of advanced life. For as Dr. Cullen juſtly remarks, "it often happens to ſuch (the robuſt) long before the menſtrual evacuation has ceaſed," and he had "found it occurring in ſeveral females, whoſe menſtrual evacuations were more abundant than uſual." (Firſt Lines, § 494.) A fact, which we may explain, with Dr. Gregory, by obſerving, that thoſe women who indulge much in vinous and fermented liquors, are more liable to menorrhagia than others.

It is obvious, then, that the experience of all ages concurs in aſſigning intemperance and indolence as the principal ſources of that habit of body, in which the gout is liable to occur. This habit, or prediſpoſition, ſeems to be ſufficient, in many caſes, to produce the diſeaſe itſelf, or at leaſt to require the application of ſlight and imperceptible exciting cauſes to bring it forth. The diſeaſe, indeed, depends ſo much upon prediſpoſition, that it is difficult to aſſign the occaſional cauſes; the ſame agents appear to be ſometimes the generators of a prediſpoſition to it only, and at other times actually to excite the diſeaſe.

The exciting cauſes which often ſuddenly bring on a fit of the gout, in thoſe who are prediſpoſed to it, are, in the firſt place, thoſe circumſtances which induce a ſudden debility, eſpecially of the ſtomach. The concurrence of *indigeſtion,* and the local inflammation in gout, is one of the characteriſtics of the diſeaſe; and, as we have already ſtated, the latter is uſually preceded for ſome time by the former. Hence whatever ſuddenly depreſſes the digeſtive power, is liable to induce the local and conſtitutional diſeaſe. Thus a paroxyſm of gout has frequently been excited by an occaſional exceſs in the uſe of wine or ſpirits; by overloading the ſtomach with food, or by eating ſuch as is not eaſily digeſtible in its nature; by the copious uſe of vegetable acids or aceſcent matter, eſpecially by weak aceſcent wines, punch, &c.; all of which tend to debilitate the digeſtive organs either directly or indirectly. In the ſame way, exceſs of venery, which powerfully influences the ſtomach, (Van Swieten, Aph. 586, and 1255,) has often brought on a fit. This ſeems to have been univerſally underſtood by the ancients. We have already noticed the obſervation of Hippocrates; and Aëtius, in recounting the general cauſes of gout, ſays, theſe are, "abounding crudities, frequent drunkenneſs, and, above all, an immoderate uſe of venery." (Sermon xii. Cap. 6.) Sydenham and Van Swieten add their teſtimony to the fact. Intenſe ſtudy, night-watching, exceſſive anxiety and attention to buſineſs, all of which greatly depreſs the power of the body in general, and of the ſtomach in particular, deſtroying the appetite, and producing a ſenſe of uneaſineſs, ſinking, or weight about the region of the ſtomach, are likewiſe enumerated among the occaſional cauſes of the gouty paroxyſm. The ſame is true with reſpect to the violent emotions and paſſions of the mind, more particularly of anger. "Ira obſtetrix arthritidis" is part of the adage above quoted: and the three cauſes of gout, inſiſted on by Dr. Cadogan, are intemperance, indolence, and *vexation.* The influence of violent mental emotions on the functions of the body is, indeed, very manifeſt, and more eſpecially on the function of digeſtion; the diſturbance of which, we have already obſerved, is exceedingly inſtrumental in the production of gout. "The firſt immediate effect of violent grief or vexation," ſays Dr Cadogan, "is to take off the action of the ſtomach entirely. Let us ſuppoſe a man in the beſt health, the higheſt good humour and ſpirits, as well as good ſtomach, ſitting down to dinner with his friends, receives ſuddenly ſome very afflicting news. Inſtantly his appetite is gone, and he can neither eat nor ſwallow a morſel. Let the ſame thing happen after he has made a hearty cheerful meal, as ſuddenly the action of his ſtomach, the whole power of digeſtion is cut off totally, as if it were become paralytic, and what he has eaten lies a moſt oppreſſive load. Perhaps as the exceſs of weakneſs is often convulſion, it may be rejected by a violent vomit, or do greater miſchief: for which reaſon ſuch ſtrokes of diſtreſs are leſs hurtful received upon an empty than a full ſtomach." &c. (Loc. cit. p. 55.) The gouty habit, indeed, is often an irritable habit; and Sydenham obſerves, that a fit of gout may be called a fit of anger." (See alſo Van Swieten, § 1258.)

Among other exciting cauſes of gout, the ſudden ceaſing from the cuſtomary exerciſes or labour is commonly mentioned, and its principal effect is probably upon the function of digeſtion, which is ſo much under the influence of exerciſe. Indolence, in general, as contributing to induce the gouty diſpoſition, is well underſtood; and the ſudden ceſſation of activity, like all other ſudden changes, is apt to produce a ſudden acceſſion of the paroxyſm, in thoſe who are pre-diſpoſed to the diſeaſe. In a ſimilar manner, a ſudden change in the mode of living, the oppoſite to exceſs, namely, from high feeding to a very ſpare and abſtemious diet, is liable to induce the paroxyſm of gout. That ſuch a ſudden abſtraction of the powerful ſtimulus of a copious ſupply of food and ſtrong liquors, muſt neceſſarily induce a conſiderable direct debility in the organs of digeſtion, is well underſtood by thoſe who are acquainted with the laws of ſtimulants on the animal body. (See DEBILITY and EXCITABILITY.) This fact, however, although ſometimes adduced as an argument againſt the advantages of an abſtemious regimen, in preventing the gout, affords no ſuch legitimate inference. It is too obvious, indeed, to require an elaborate diſcuſſion, that all extremes, haſtily adopted, are liable to derange the animal economy; and that habit alone can render extreme moderation invariably beneficial, on the one hand, and enable us to bear exceſs with a conſiderable degree of impunity on the other. Another mode of debilitating the ſyſtem, which ſometimes brings the paroxyſm of gout, is exceſſive evacuation of any kind; ſuch as by hæmorrhage, briſk purging, vomiting, &c.; eſpecially in aged perſons, whoſe conſtitutions are already much broken down by the diſeaſe.

Sudden viciſſitudes of weather, eſpecially when connected with moiſture, as from mild to cold, or from ſevere cold to damp and mild weather, often excite the gout; hence, Sydenham remarked, that the moſt frequent occurrence of the gouty paroxyſm takes place in the latter end of January, or the beginning of February. The fit may be produced either by the local application of cold and moiſture to the feet, or by a general expoſure to it; for ſuch expoſure, which in moſt people will occaſion rheumatiſm, a catarrh, or a ſore throat, will, in a gouty ſubject, excite a fit of the gout. In like manner, bruiſes or ſprains of the leg or foot, or mere over-exerciſe of the muſcles and ligaments of thoſe parts, as in long walking, will ſometimes bring on a paroxyſm.

There is another alleged cauſe of the gout, which it would not now be neceſſary to mention, were it not noticed by Boerhaave, Van Swieten, and others, *viz. contagion.* Van Swieten conſiders the diſeaſe as analogous to dyſentery and other maladies, which, although originating from very obvious cauſes, neverthelеſs propagate themſelves afterwards by contagion. But the ſtories, by which this doctrine is ſupported, are ſomewhat ridiculous; ſuch as this, that a dog lying at his maſter's feet during a paroxyſm of the gout, ſuddenly ran howling and barking round the room, expreſſing the pain which he had caught from his maſter, whoſe torture at the ſame time became greatly alleviated, &c. (Swieten Com. ad § 1255.)

Of the Diagnoſis.—The attack of the *regular* gout is readily diſtinguiſhable from the only diſeaſe which reſembles it, *viz.* acute rheumatiſm, if all the ſymptoms are taken into conſideration. In the firſt place, gout is commonly a diſeaſe of advanced life; acute rheumatiſm is moſt frequent from the age of 18 to 30. Nor does rheumatiſm, like the gout, ſeize the feet in preference to the other joints, or remain for a conſiderable time in the ſame joint; but at the firſt attack it often attacks every joint of the body in ſucceſſion, and ſometimes continues for ſeveral months. The colour of the ſkin of the part affected in rheumatiſm, if it be changed, is only ſlightly red, whereas it becomes of a deep bright red in the gout. The pain in the rheumatiſm is not extremely acute, while the part is at reſt, but becomes violent when it is moved only; which is not the caſe in the gout. And the ſymptoms of indigeſtion and diſordered ſtomach, which precede the paroxyſm of the gout, together with the marks of diſtinction juſt mentioned, will ſerve particularly to determine the nature of the paroxyſm. It muſt be admitted, however, there are inſtances of the combination of the ſymptoms of the two diſeaſes, which renders it difficult to decide to which of them the individual examples belong. (Heberden, Comment. de Morb. p. 58.)

Again, the ſymptoms which the *irregular* gout preſents, are extremely numerous and proteiform, appearing frequently as dyſpepſia, hyſteria, hypochondriaſis, aſthma, palpitation, ſyncope, vertigo, apoplexy, paralyſis, &c. according to the original or acquired tendency of the conſtitution to thoſe diſeaſes. Hence the diſcrimination between theſe modifications of gout, and the diſeaſe which it mimics, is occaſionally very difficult.

Of the nature or proximate cauſe of Gout.—This is a part of the ſubject upon which, if we were to confine ourſelves to the communication of actual and uſeful knowledge, we ſhould be altogether ſilent, or ſay but a few words. The obſervation, indeed, will apply to many other diſeaſes, as well as to gout; but as gout is an affection almoſt excluſively occurring in the higher claſſes of ſociety, among the wealthy and intelligent, it has claimed a more general attention, and become the object of more general diſcuſſion. It is greatly to be lamented, however, that the moſt miſtaken notions have prevailed, from the earlieſt times, in regard to the nature and extent of the inſight, which we are capable of obtaining, into the operations of the animal economy, and to the means by which we can obtain it. Inſtead of confining themſelves to the obſervation of the phenomena of health and diſeaſe, faithfully recording theſe phenomena, and arranging them according to their moſt obvious analogies, phyſicians have been buſy in ſearching after their hidden cauſes; and, fancying a reſemblance between the moſt diſſimilar things, have ſucceſſively called to aid the analogies of every human ſcience, as it advanced in cultivation, to explain the phenomena of animal life. The ancient doctrines of numbers and elements, and their qualities, and the modern diſcoveries and ſuppoſitions of the chemical, mathematical, and mechanical philoſophers, have in turn been aſſumed as affording the moſt perfect elucidation of the operations of the living body; and, as they have, of courſe, been in turn exploded, we need not recur to any other argument in proof of their want of foundation. By theſe remarks we wiſh only to ſhew the futility of reaſoning on the ſubject of proximate cauſes of diſeaſe, which, as we are and muſt remain entirely ignorant of the proximate cauſe of health and life, muſt be equally inſcrutable. "Nam quæ demum cauſæ," as Celſus juſtly obſerves, "vel ſecundam valetudinem præſtent, vel morbos excitent, &c. ne ſapientiæ quidem profeſſores ſcientia comprehendunt, ſed conjecturâ proſequuntur.' (De Med. Præf. lib. i.) The inquiry reſpecting the proximate cauſe of diſeaſes is as futile as the ſpeculations of the Carteſians to explain the eſſence of gravitation, and have as little to do with the advancement of true medical ſcience, as the hypotheſis of an ether aſſiſted Newton in his obſervations and calculations reſpecting the phenomena of that agent.

If theſe obſervations ſhould not be ſufficiently intelligible to the general reader, a brief enumeration of the hypotheſes, which have been invented by medical writers, in order to explain the eſſential nature of gout, will probably be ſufficient to prove the abſurdity of ſuch attempts. Moſt of the Greek and Roman phyſicians, with the exception of the methodiſts, conſidered the preſence of a corrupted humour in the ſmall veſſels as the eſſential cauſe of gout. Hippocrates believed this humour to conſiſt of bile and phlegm, which flowed upon the joints. Galen followed him in ſuppoſing the defluxion upon the joints to be chiefly pituitous or phlegm, or bile mixed with phlegm. Paulus Ægineta attributed the diſeaſe to a redundancy of blood, black bile, and phlegm. Trallian and Caſſius imagined, that it aroſe from the blood itſelf being forced into the joints; and Oribaſius affirmed that the blood in gouty people was viſcid, reſembling melted glaſs, which remaining in the joints, produced the cretaceous matter. Aretæus, one of the moſt able of the Greek writers, is the only one who paſſes over the eſſential cauſe of the diſeaſe, a knowledge of which he aſſigns to the gods alone; the evident cauſes, he ſays, are apparent to man. Themiſon, Cælius Aurelianus, and the methodic ſect, attributed gout to relaxation or ſtricture of the parts; ſome, however, imputed it to the one ſtate, and others to the oppoſite. The Arabians followed cloſely in the path of their maſters, and taught that one or other of the humours was predominant, or that they were variouſly combined, in caſes of gout. So luminous and inſtructive were the doctrines of the ancients!

In the dawn of modern ſcience, the humours were almoſt baniſhed by the hypotheſes of the chemiſts; but although we hear little more of bile, phlegm, and melancholy, or black bile, all diſeaſe was nevertheleſs attributed to a morbific or peccant matter, and ſalts, earth, or tartar, were deemed the immediate cauſe of gout and other maladies; and Paracelſus, Van Helmont, and others, are very abuſive of the ancients for promulgating ſo many abſurd doctrines! When the mathematical and mechanical phyſicians aroſe, they took up the hypothetical doctrines of their predeceſſors, and reaſoned concerning the action of theſe ſuppoſititious humours, ſalts, &c. upon mechanical principles; the chemical doctrines predominated, however, over the ancient humours. Thus, to uſe the words of Dr. Warner, "according to Sydenham the arthritic matter conſiſts of the putrefying heat and acrimony of indigeſted juices: Boerhaave gives it the appellation of an acrimony or over-toughneſs of the liquid which waters the nervous parts: Liſter makes it to be a crude and viſcid ſerum become ichorous and corroſive: Bennet defines it an acrimony that is invariably of the putrid, volatile alkaline nature: Quincy ſays that it conſiſts of rigid particles, ſuch as approach near to the ſaline, of the nature of tartar, and not much unlike that which forms itſelf into concretions in the urinary paſſages: Cheyne in one place calls it tartarous, urinous, or other ſalts: Ingram will have it to be a coagulation made by a mixture of ſaline particles with the oil of the adipoſe membrane. As every one of theſe writers makes the gouty matter to be an acrimony taken in with our aliment, which they call either putrid, viſcid, corroſive, ſaline, urinous, or tartarous, ſo Dr. James, whoſe name needs no addition, diſagreeing with them all, hath judged this acrimony to be earthy." (See Warner on the Gout, p. 91.—See alſo a ſenſible and learned diſquiſition on this topic, in "An Hiſtorical, Critical, and Practical Treatiſe of the Gout, by Thomas Thomſon, M.D. Lond. 1742.) But ſuch hypotheſes did not die with Dr. James; for in a treatiſe on the gout, publiſhed in 1805, we find the following ſtatement: "The proximate cauſe of gout appears to be, a peculiar ſaline acrimony exiſting in the blood, in ſuch a proportion, as to irritate and excite to morbid action, the minute terminations of the arteries, in certain parts of the body:" (See Obſervations on the Nature and Cure of Gout, &c. by James Parkinſon,) a ſtatement, which is equally indefinite, hypothetical, and practically uſeleſs, with thoſe that have preceded it.

On reviewing theſe opinions of men, who have been deſervedly eſteemed the ornament of their profeſſion, ſome readers may expreſs their ſurpriſe that ſuch an extraordinary difference ſhould be found among them, and that ſo much error (for of oppoſite opinions one half at leaſt muſt be wrong) ſhould exiſt in the ſcience. But the only rational ground for wonder is, that ſo many men of ſound underſtanding ſhould have employed themſelves in inquiries beyond the reach of their faculties, and ſhould have imagined that, in framing hypothetical ſuppoſitions, they had acquired any actual knowledge, or had advanced one ſtep in the practical improvement of their art. If a number of philoſophers were engaged in inveſtigating the nature of light and heat, and ſhould not only execute a ſeries of experiments on the reflection, refraction, and diviſibility of the one, and on the properties of expanſion, inflammation, vaporization, &c. of bodies, which belong to the other; but ſhould likewiſe think it neceſſary to form conjectures relative to the nature and qualities of the ſun, which is the ſource or proximate cauſe of both; theſe conjectures, like the medical hypotheſes juſt quoted, however they might amuſe us, would add not a tittle to our knowledge, nor would the want of them be any diminution of our information, or of our practical powers.

The great ſource of theſe hypotheſes, reſpecting the exiſtence of a morbid humour in the gouty habit, is, no doubt, the appearance of a palpable matter, of a peculiar nature, in the joints diſeaſed. This chalk-like matter, however, will be found to afford no ground for ſuch a concluſion, if the circumſtances are duly examined. In the firſt place, the production of this morbid matter may be the *effect* of the diſeaſe; and that it is ſo, is apparent from its not occurring in all caſes of gout, and from its ſeldom or never accompanying the firſt attacks of the diſeaſe, but only appearing after repeated paroxyſms. Nor have we any direct evidence, from experiment or obſervation, of the ſmalleſt difference in the blood or other humours of gouty people, from thoſe of other perſons. On the other hand, we know that the veſſels in particular parts acquire the power of ſecreting or otherwiſe producing new fluids, when inflammation is induced. Thus a blow in a fleſhy or membranous part ſhall occaſion inflammation, and a conſiderable quantity of *pus* ſhall afterwards be accumulated or diſcharged, as in a common abſceſs: yet no one ſuppoſes that this *pus* was contained in the maſs of the circulating blood, any more than he ſuppoſes that urine and bile are contained in that maſs, and not elaborated by the kidnies and liver. The appearance of the chalky matter, or urate of ſoda, in the parts attacked by gouty inflammation, is therefore to be conſidered as the reſult of that inflammation, and not as its cauſe. If the general maſs of blood were contaminated with this morbid matter, or any peculiar acrimony tending to produce it, why is it never depoſited on the viſcera and other internal parts? yet no ſuch depoſition was ever obſerved: thoſe parts remain invariably free from it in the moſt inveterate forms of the gout, and the appearance of chalk-ſtones is confined excluſively to the membranous and ligamentous parts which exhibit inflammation externally. In the next place, the frequent and ſudden tranſlation of the diſeaſe from one part to another is not conſiſtent with the ſuppoſition of its dependance on the preſence of a morbid matter: but analogous changes or *metaſtaſes* of other inflammations, in which no peculiar matter is produced, are exceedingly common. Beſides, upon the ſuppoſition of ſuch a tranſlation of morbid matter, its operation ſhould be ſimilar on every part: whereas it ſeems to be very different, being ſtimulant and exciting inflammation in the joints, but ſedative and deſtroying the tone or energy of the ſtomach. Farther, as Dr. Cullen juſtly obſerves, "the ſuppoſition of a morbific matter is quite ſuperfluous; for it explains nothing, without ſuppoſing that matter to produce a change in the ſtate of the moving powers; and a change in the ſtate of the moving powers, produced by other cauſes, explains every circumſtance, without the ſuppoſition of a morbific matter: and to this purpoſe it may be obſerved, that many of the cauſes exciting gout do not operate upon the ſtate of the fluids, but directly and ſolely upon that of the moving powers." Dr. Cullen likewiſe remarks, that the ſuppoſition of a morbific humour being the cauſe of gout has been hitherto uſeleſs, ſince it has not ſuggeſted any ſucceſsful method of cure: but, on the contrary, that particular ſuppoſitions have often corrupted the practice, and have frequently led from thoſe views, which might be uſeful, and from that practice which experience had approved. (Firſt Lines, pt. 530.)

Having failed to explain the phenomena of the diſeaſe, on the ſuppoſition of a morbid condition of the fluids of the body; we might take up the doctrine of the *nervous* pathologiſts, and attempt an explanation of the ſymptoms, upon the notion of a derangement of the living ſolid, or moving fibre, as Dr. Cullen has done. (Loc. cit. §. 533—6.) But it is ſufficient to peruſe the account given by that celebrated phyſician, to be convinced that it is a mere repetition of the phenomena of the different varieties of the diſeaſe, couched in a new phraſeology; and therefore that it is practically as uſeleſs as that which he controverts. It cannot be queſtioned, we apprehend, in the preſent ſtate of our phyſiological knowledge, that the prime agents in the operations of the living body, whether in health or diſeaſe, are the ſolid, irritable, and moving parts; and that by theſe the fluids or humours are chiefly elaborated and modified: but it is likewiſe obvious, that the ſolids derive their powers from certain conditions of the circulating fluids, which are varied by reſpiration, nutrition, &c. Therefore the diſputes between thoſe, who confine the origin of gout to the one or other part of the ſyſtem excluſively, muſt be deemed frivolous. Our knowledge is neceſſarily limited to the phenomena of the diſeaſe, and the order in which they occur, and to the effects of phyſical agents upon them, as taught us by obſervation and experiment. "Nulla tamen adhuc obſcurior quæſtio eſt," ſays Dr. Heberden, "quam quæ verſatur de hujus morbi cauſis, effectibuſque, et remediis." (Comment. de Morb. Cap. 9.) But we cannot doubt that theſe numerous hypotheſes, which have at once diverted the minds of phyſicians from the labour of obſervation, and have perverted their views of facts, have rendered the ſubject more obſcure than it would otherwiſe probably have been.

Before we come to the method of treatment, there is another queſtion to be noticed, upon which much diſcuſſion has taken place, and which has perhaps been popularly ſolved with conſiderable incorrectneſs: we mean the queſtion, whether regular fits of the gout are ſalutary; *i. e.* whether they altogether remove or prevent other complaints. The affirmative is generally maintained: and this opinion has ariſen partly from obſervation, and partly from the hypotheſis, that a paroxyſm of gout conſiſts in an effort of the conſtitution, by which the morbific matter is thrown off through the part affected. In a number of inſtances, beyond a doubt, the various ſymptoms of indigeſtion, whether affecting the ſtomach and bowels only, or the lungs and heart by vicinity, and the head by ſympathy, are relieved or altogether carried off by the complete fit. Perhaps Dr. Heberden is ſcarcely correct, when he conſiders this relief as either, in a great meaſure imaginary, like that which many invalids invariably obtain from a change of their phyſician, or from a new medicine; or as not more frequent than ſimilar relief from ſlight indiſpoſition after other violent diſeaſes: he appeals, however, to an ample experience in ſupport of his opinion. He thus writes: (we tranſlate from the Latin edition) "There are ſome countries in which the itch is a very frequent diſeaſe, and there this eruption is deemed ſalutary. Even an ague was formerly conſidered by the majority of phyſicians as a wholeſome affection, and is ſtill ſo conſidered by ſome perſons: its occurrence was therefore a ſubject of congratulation both with the patients and their friends, and every precaution was taken not to get rid of it too ſoon. But theſe notions are almoſt exploded in this country; and if we ſhall diſcover a remedy equally effectual for the gout, as thoſe with which we cure the diſeaſes juſt mentioned, we ſhall at length learn with what perfect ſafety and advantage the gout may likewiſe be eradicated."—"I confeſs," he adds, "that I have ſeen ſome perſons who rejoiced on the firſt attack of the gout, as if it aſſured to them all future happineſs, and who, dreaming only of the moſt perfect health to come, eaſily perſuaded themſelves that this firſt fit had been wonderfully beneficial This is a common diſpoſition with mankind, as often as they have recourſe to new phyſicians, or to remedies not before tried. But, paſſing by ſuch perſons, let us inquire the opinion of thoſe, who have ſuffered under long and frequent paroxyſms, and who are better acquainted with the diſeaſe. Of a very great number of patients whom I have ſeen, and whoſe caſes I have committed to writing, more than twice as many, to ſay the leaſt, have found no relief whatever from their previous complaints, in conſequence of the regular fit, or have even ſuffered an increaſe of them, as have ſeemed to derive any benefit: and, in my opinion, the evils which were attributed to the diſeaſe, more certainly originated from that ſource, than the ſuppoſed advantages. Occaſionally, indeed, we find that other complaints have ceaſed on the ſupervention of the gout; but the ſame thing alſo happens after acute fevers, after palſy, aſthma, ſmall-pox, and inſanity, of all which I have witneſſed many examples; yet no one will call theſe diſeaſes ſalutary. On the other hand, gout frequently occurs to perſons affected with vertigo, aſthma, indigeſtion, and melancholy; where, ſo far from alleviating theſe diſorders, it produces a conſiderable aggravation of their ſymptoms. Beſides, in ſome patients, all theſe complaints conſtantly accompany the paroxyſm of gout, and continue during the whole of its courſe." (Loc. cit. p. 36.)

At all events, if we look at the life of the gouty in general, we find ultimately but little ground for congratulation. In ſome, it is true, the diſeaſe occurs at diſtant intervals, and ſoon goes off, and therefore occaſions very little, if any, obvious injury. Even epilepſy itſelf, when its attacks are rare, does not prevent the patient from reaching old age. But this is far from being the caſe frequently with either diſeaſe. In many perſons whom the gout attacks, the health ſuffers from the time of the firſt fit, and gradually grows worſe, until it is greatly broken, or fails altogether. It may poſſibly be doubted, in ſuch caſes, whether the gout cauſed theſe evils; but we are very certain that it has not been the remedy for them, nor in any way ſalutary.

We may juſtly wonder, therefore, with Dr. Heberden, how it has come to paſs, that the gout is held in ſo much honour in England; unleſs it be that it is a diſeaſe, which ſeveral great men have ſuffered, and which chiefly attacks thoſe happy perſonages who enjoy leiſure and affluence, and all the good things of life. Louis XIV. of France happened to labour under a fiſtula in the anus, and the ſurgeons of that time were conſtantly called in by his faſhionable ſubjects to adminiſter relief to imaginary fiſtulæ; which royal diſeaſe they perſuaded themſelves had attacked them; and it is probable, as Dr. Heberden ſuggeſts, that had there exiſted any medicated waters in France, capable of producing fiſtula, they would have been viſited with the ſame anxiety with which our countrymen haſten to thoſe of Bath, in the hope of returning with the gout.

Of the Cure.—Perhaps this may be deemed an improper term for the treatment of a diſeaſe, which, on the one hand, has been affirmed to be incurable by medicine, and called the opprobrium of phyſicians; and, on the other, has been conſidered ſo ſalutary, that it ought not to be cured, and could not be cured without the moſt imminent danger to the patient. Nay, farther, as much trouble has been taken to produce and excite the gout, as to relieve or cure it; and all the evils which arthritics ſuffer, are not ſuppoſed to ariſe from a ſuperabundance of gout, but becauſe they have not had enough. It would be only juſtice, however, as the intelligent writer juſt quoted remarks, to the art of phyſic, no longer to call the diſeaſe its opprobrium, until the patients lay aſide their prejudices and fears, and have a diſpoſition to be cured. "Utinam," he adds, "tam in promptu eſſet invenire, quam tutum adhibere, podagræ remedium." (Comment. p. 43.)

The treatment, it is obvious, muſt be neceſſarily very different according to the different forms of the diſeaſe, the different periods of life, and the ſtate of ſtrength of the patient, &c. We ſhall firſt ſpeak of the practice neceſſary to be purſued in the regular gout; which will reſolve itſelf into the treatment requiſite during the fit, and that which is proper during the interval.

Treatment of the Regular Fit.—All active meaſures, during the occurrence of a regular paroxyſm of gout, have been preſcribed by writers in general ſince the days of Sydenham. This phyſician remarked, that the more violent the pain and inflammation, the ſhorter in general will be the fit, the recovery moſt perfect, and the interval between this and the ſucceeding paroxyſm the longer. If this opinion were admitted as juſt, it would ſuggeſt the prohibition of any remedies which might moderate the inflammation. But againſt this doctrine another hypotheſis has been advanced by Dr. Cullen, which is at leaſt equally plauſible, and better ſupported by analogy, if not by fact: namely, that the violence of the inflammation may weaken the tone of the parts, and while it renders them leſs liable to ſimilar violent attacks, and the conſequent more perfect recovery, may, by that very debility, invite a return of the diſeaſe. On the whole, the indications of practice generally purſued at preſent, are to moderate the violence of the inflammation and febrile action, when it is ſevere, without applying any active remedies to the foot itſelf. After enumerating the various external applications, ſuch as poultices, fomentations, bliſters, ſinapiſms, camphor, and ſtimulating ſubſtances, which have been occaſionally recommended, Dr. Cullen concludes, that from any of them there is danger of rendering the gout retrocedent; "and that therefore the common practice of committing the perſon to patience and flannel alone, is eſtabliſhed upon the beſt foundation." As there is no danger from the fit of gout, when regular, in a conſtitution not much broken, this method may be purſued with a certain degree of impunity: but it cannot be queſtioned, that the loads of *flannel*, which are ſometimes uſed, often augment the neceſſity for a ſupply of *patience*, by increaſing the inflammation and pain in the foot. It is true, that the parts thus ſwelled and painful, are more acutely ſenſible to cold, as well as to other impreſſions, than in health; but no covering beyond what is ſufficient to prevent a troubleſome ſenſation of cold, if that ſhould occur, can be neceſſary. (Heberden.) All poultices, fomentations, and warm bathing during the inflammatory ſtage are pernicious.

It is more than probable, that conſiderable errors have been committed, upon the hypothetical notion of keeping the gout in the extremities, at leaſt in the younger ſubjects of gout, by deviations from the antiphlogiſtic regimen. In ſuch ſubjects vinous and fermented liquors ſhould be altogether abſtained from during the fit; and the diet ſhould conſiſt of light aqueous and vegetable matters, or thin animal broths: the bowels ſhould be kept open by laxative medicines, and the ſkin moiſt by diaphoretics of the neutral ſalts. This is at leaſt a palliative ſyſtem, and the prejudices of men in general are averſe to any more active interference with the diſeaſe. But in caſe the inflammation is extremely violent, in young and hale men, Sydenham, Cullen, Huxham, and other able authorities, concur in recommending the employment of blood-letting from the arm. This, however, they do not recommend to be often repeated, on account of the debility which may enſue; and as the part affected is not an organ important to life, and the inflammation ſo purely local, there does not appear to be any good reaſon for recurring to this remedy, except in caſes of extraordinary violence, in very plethoric habits, in which the ſymptomatic fever itſelf might prove hurtful. Local blood-letting, by means of leeches applied to the foot itſelf, promiſes more advantage, and experience itſelf has proved the efficacy and ſafety of the practice. (See Cullen, Firſt Lines, par. 563.—Muſgrave de Arthrit. regulari, cap. 8. § 4.) Cupping and ſcarifying the neighbouring parts have alſo been found beneficial.—(Muſgrave.)

We are perſuaded that hypotheſis has had much more influence than obſervation and experience, in exciting the general fears about interfering with the progreſs of the gouty inflammation, and of the danger of its being driven to ſome internal part by ſuch interference. When it was believed, that a quantity of morbific matter exiſted in the inflamed part, it was inferred, of courſe, that it could only be removed by expulſion or by repulſion, in which laſt caſe it muſt fall upon ſome other organ. We know very well, that the ſame hypotheſis, and the ſame fears prevailed no long time ago with reſpect to cooling the ſkin in fevers, and eſpecially in eruptive fevers, ſuch as ſcarlet fever and ſmall-pox. "The perſpiration will be checked," ſaid the theoriſt, "if you allow the ſkin to be cooled, and the *peccant matter* muſt therefore be thrown back upon the bowels, or the lungs, or the brain, and the effect may be fatal." But ample, and unvarying experience has now demonſtrated, not only that ſuch danger was altogether imaginary, but that waſhing the ſkin with cold water, even under the full eruption of ſcarlatina, and in the eruptive fever of ſmall-pox, affords the moſt grateful relief to the patient, and is the moſt effectual moderator of his diſeaſe. (See Cold, *effects of as a remedy.*) Nor is a conſiderable experience of the ſafety and efficacy of a ſimilar practice, in ſubduing the inflammation of gout, wanting. The great Dr. Harvey himſelf, whoſe name is immortalized by the diſcovery of the circulation of the blood, was in the habit of immerſing his foot in cold water, as ſoon as he perceived the approach of the gout, and thus removed the diſorder: he lived to the age of eighty. Van Swieten mentions an officer of infantry, who was induced to rub his gouty feet with ſnow, and afterwards, emboldened by ſucceſs, walked a little way barefoot upon the ſnow, and returned quite free from pain: the interval before another fit was alſo lengthened by this practice. Similar obſervations were likewiſe made by the ancients. Aetius informs us, that he had ſeen a perſon labouring under what he calls a bilious gout, "who obtained extraordinary relief from immerſing and keeping his feet ſome time in cold water." And it is an aphoriſm of Hippocrates, that "cold water, copiouſly poured upon ſwellings of the joints, painful ulcers, *gouty diſorders*, and convulſed limbs, leſſens and removes the pain." (Aph. 25. ſec. 5.—See alſo Heberden Comment. p. 45.—Van Swieten, Com. ad Aph. 1273.) But the moſt extenſive evidence of the efficacy of this practice, in *curing* the paroxyſm of gout, has been adduced by Dr. Kinglake, (ſee a Diſſertation on Gout, &c. Lond. 1804,) who brought forward about thirty caſes, in which the application of cold water to the inflamed part, during the gouty paroxyſm, was invariably and ſpeedily ſucceſsful in relieving the pain and removing the diſeaſe, without any untoward circumſtance enſuing. Dr. Kinglake maintains, that the inflammation of gout is to be treated upon the ſame principles as other local inflammations, and yields to the ſame treatment. That this propoſition is correct, while the conſtitution remains unbroken, we fully believe; but to what extent the principle will hold, in thoſe whoſe ſyſtem is greatly debilitated and decayed, as well by age as by frequent and protracted diſeaſe, remains as yet undetermined by experience. With the diminiſhed ſtrength of the patient, the paroxyſms become diminiſhed in violence, and active remedies are, therefore, the leſs required; but from what we have detailed above, it appears at leaſt highly probable that, in the firſt attacks of gout, the application of cold, judiciouſly employed, ſo as to remove the morbid heat and no longer, would always be ſafe, and would contribute as well to ſhorten the paroxyſm, as to diminiſh the ſuffering of the patient, and to preſerve the joints from the injury, which protracted inflammation and morbid effuſions neceſſarily occaſion.

The operation of *purgatives*, which is known to be eſſentially uſeful in other inflammations, has been conſidered as beneficial in the gout by ſome phyſicians, but has more commonly been altogether forbidden. Sydenham expreſſes himſelf very ſtrongly in prohibition of purging, at any period of the fit, or even in the interval of health. Had he expreſſed his conviction upon this point ſimply as the reſult of experience, we ſhould have been diſpoſed to bow to his authority: but his theory appears to have had at leaſt an equal ſhare in producing this conviction; and unfortunately this theory involves the moſt groſs contradiction. In the beginning of the paroxyſm, we are told that there is great danger leſt purgatives ſhould ſtop the inflammation of the foot, "by throwing back into the maſs of blood that *peccant matter*, which nature was protruding to the extreme parts." (Tractat. de Podagra.) But after the termination of the fit, there is extreme danger, "leſt a new paroxyſm in the foot, equally ſevere with the former, ſhould be produced by a purgative." (Ibid.) So that this theory blows hot and cold, like the ſatyr in the fable; and theſe dangerous purgatives draw the *peccant matter* out of the foot, when it happens to be in, and are the moſt effectual means of throwing it into the foot after it has been driven out not only from the foot, but from the whole body (according to the hypotheſis) by nature!

Sydenham, however, lived long enough to retract, in part, his opinion reſpecting the injurious influence of purgatives in the gout, eſpecially if the milder ones are uſed, and an anodyne given after the operation. (Diſſert. de Mictu Sanguineo, &c. 1686.) Van Swieten obſerves, "many phyſicians are of opinion, that part of the gouty matter may be carried off by purgatives, and the fit rendered much more mild, eſpecially if it be occaſioned from errors in diet;" and he quotes Hoffmann, who recommends gentle purgatives in all caſes of local pain, and has mentioned an inſtance in his own perſon of the moſt ſtriking benefit derived from a purgative taken immediately before the fit of gout. An inſtance has been related to us, in which the gout was completely baniſhed, during a ſpace of nearly twenty years, by the uſe of a briſk purgative, taken when the firſt ſymptoms of the fit began to appear; the medicine employed in this inſtance conſiſted principally of ſcammony, in the doſe of about fifteen grains. We have ſeen this medicine uſed in a few caſes, with ſome relief, in ſmaller doſes, and without any untoward conſequences. That purgatives, as well as cold applications, may be reſorted to with advantage in the beginning of the paroxyſm of gout wherever the conſtitution is unimpaired, we conſider as tolerably well eſtabliſhed on the grounds of obſervation; although we do not doubt that many of the caſes of repelled gout, which have been attributed to ſuch cauſes, may have really occurred, under circumſtances of broken and feeble conſtitution, or of peculiar idioſyncraſy. But the accidents ariſing from a careleſs or injudicious abuſe of any practice, afford no juſt argument againſt the rational and cautious uſe of it.

We apprehend, however, that many diſorders have been very erroneouſly attributed to repulſion of the gout, which might be more correctly explained upon other grounds. For every inflammatory diſeaſe that occurred, even at the diſtance of ſeveral months from the ceſſation of the fit, has been conſidered as the reſult of the premature cure of the gout: whereas, it is next to impoſſible that ſo long an interval could have taken place between the cauſe and its effect; and, on the other hand, as gout is moſt frequent in plethoric habits, which are alſo moſt liable to inflammatory diſeaſes, the occurrence of pleuriſy or apoplexy, in ſuch caſes, is doubtleſs to be attributed to the plethora, and not to the previous gout. Dr. Cullen mentioned that he had known about twenty perſons die ſuddenly, more than half of whom were of gouty habits.

The violence of the pain, in the paroxyſm of gout, would naturally ſuggeſt the uſe of opiates: but experience has ſhewn that opium, in any form, when adminiſtered in the beginning of any inflammatory diſeaſe, with which much heat of ſkin and great febrile excitement are connected, generally fails to give relief; on the contrary, that it tends to increaſe the heat, fever, and reſtleſſneſs, and, with them, the pain likewiſe. When, however, the violence of the paroxyſm is ſomewhat abated, yet continues to return, ſo as to occaſion painful and reſtleſs nights, opiates may then be given with ſafety and with advantage, eſpecially in the caſe of perſons advanced in life, and who have been often affected with the diſeaſe. The hypothetical objection to the uſe of opiates, that they tend "to lock up the morbid matter," is altogether groundleſs. Dr. Warner ſpeaks with delight of the ſoothing influence of opium in the fits of gout, which he ſuffered in the latter periods of his life. (P. 133—136.)

Hitherto we have ſeen that the practice, generally purſued in the paroxyſm of gout, is merely palliative; an actual cure being deemed a deſideratum by moſt perſons, and a thing improper to be attempted by others. Of late, however, a medicine has been introduced into this country from France, which is ſaid to poſſeſs a ſpecific power over the gouty paroxyſm, which it removes "cito, tuto, et jucundé." The compoſition of this medicine is at preſent unknown, but it has been aſcertained that it is a vegetable matter, and it is ſaid by the inventor to be a plant heretofore not uſed in medicine. It is called *eau medicinale d'Huſſon.*[†] It has appeared, in many inſtances in which it has been employed in this country, and that in perſons of the firſt rank and character, to poſſeſs the power of removing the paroxyſm of gout in the courſe of twenty-four hours, leaving the patient in a ſtate of good health, and in poſſeſſion of the ſame uſe of his limbs which he enjoyed before the fit. It is ſaid that, in general, it increaſes the various excretions conſiderably, if taken in the full doſe, producing ſeveral looſe motions from the bowels, a free perſpiration, and an increaſed diſcharge of urine. But the influence of the medicine on the gouty paroxyſm is not attributed to theſe evacuations; ſince, in ſome inſtances, in which a ſmaller doſe was taken, a ſimilar relief to the gout was procured, without any increaſe of the excretions. No untoward circumſtance whatever has yet occurred, in conſequence of the ſpeedy removal of the paroxyſm: but farther experience will be requiſite to enable us to form a ſatisfactory eſtimate of its properties. (See an Account of the Eau Medicinale d'Huſſon, by Edwin G. Jones. M. D. Lond. 1810.)

Treatment in the Interval.—Whatever method is adopted in the treatment of the fit of gout, whether it be merely palliative, or ſo active as to ſhorten the attack, the conſtitution retains its prediſpoſition, and is equally liable to ſuffer a return of the diſeaſe. It is not yet aſcertained, we believe, whether the fits, when warded off by the *eau medicinale*, do not recur more frequently. It is the treatment of the patient in the interval of health, by which alone the diſeaſe can be *cured*, *i. e.* the paroxyſms prevented from returning, and the gouty diatheſis eradicated. How this is to be effected, we cannot learn from a view of the proximate cauſe, or eſſential nature of the diſeaſe; for upon this point we have no actual knowledge: but, as we poſſeſs ſome knowledge of the exciting cauſes of the diſeaſe, or of the circumſtances which generate or foſter the prediſpoſition to its attacks; ſo, by removing theſe, we may hope to prevent the production of that prediſpoſition, or to diminiſh it, if not to remove it altogether. Now, we have ſeen that intemperance and indolence are the parents of the gouty diatheſis, where it is not hereditary, and are the chief agents in exciting it to activity, where it is. The inference, then, is obvious: by *temperance* and *activity*, and not by medicine, the return of the gouty paroxyſms is principally to be prevented.

There is, perhaps, no ſubject, on which Engliſhmen in general entertain ſo many unfounded prejudices, or liſten to argument with ſo little attention or conviction, as that of *temperance*. It is conceived that phyſicians, in inculcating the advantages of it, only talk idly about it, in the way of their profeſſion; and that what is called good living, when not carried to actual debauch, is favourable to the ſupport and health of the body. It is, indeed, ſo univerſally the practice, in this country, to indulge an artificial appetite, beyond the actual wants of nature, that temperance is a thing, as Dr. Cadogan obſerves, of which an Engliſhman can acquire no idea at home. It is, however, altogether comparative with reſpect to individual conſtitution; for ſome perſons will become plethoric to a morbid degree, upon diet which is barely ſufficient to ſupport life in others. Perhaps Dr. Cadogan's teſt is correct. "As long as a man eats and drinks no more than his ſtomach calls for," (*i. e.* when unexcited by variety of diſhes, by ſauces and condiments, or by interpoſing liquor of any kind) "and will bear without the leaſt pain, diſtention, eructation, or uneaſineſs of any kind, &c. he may be ſaid to live in a very prudent well-regulated ſtate of temperance, that will probably preſerve him in health and ſpirits to great old age." (On the Gout, p. 31)

We know too well, however, the general want of power or inclination to reſiſt the pleaſures of the table, with that degree of perſeverance and to the requiſite extent, to expect that many cures of the gout will be effected in this way; but this we may aſſert, that the only inſtances of the eradication of the diſeaſe, which are known, have been accompliſhed by rigid and perſevering temperance. Dr. James Gregory, the preſent profeſſor of medicine in the univerſity of Edinburgh, is a remarkable example of the perfect cure of the gout by ſuch means. Born of gouty parents, he was attacked ſeverely when young, and ſuffered ſeveral paroxyſms, which, after being baniſhed by abſtemious living, recurred on a ſhort indulgence on reviſiting Oxford; but he has ſince that time entirely kept the foe at a diſtance for about thirty years, by extreme temperance and much exerciſe, and is now hale and ſtrong, though advanced ſeveral years beyond the age at which his father died, broken down by the gout. This he repeats annually to his pupils with no ſmall exultation. His diet has been chiefly broth, or a ſparing quantity of plain animal food, with little or no wine. Dr. Cadogan affords another inſtance of the benefit of rigid temperance in his own perſon, "having not only got rid of the gout," he ſays, "of which I had four ſevere fits in my younger days, but alſo emerged from the loweſt ebb of life, that a man could poſſibly be reduced to by colic, jaundice, and a complication of complaints, and recovered to perfect health, which I have now uninterruptedly enjoyed above ten years." (Loc. cit. p. 83.) Dr. Heberden likewiſe obſerves, that although complete cures of the gout are extremely rare, yet he has ſeen more than one inſtance in which, by a total abſtinence from animal food and wine, the patients were reſtored from a ſtate of extreme debility and miſery, to ſuch a degree of health and ſtrength, as rendered their life no longer uſeleſs to others, nor painful to themſelves. Comm. p. 44.

It can ſcarcely be doubted, indeed, that a complete cure of the diſeaſe might, by a rigid plan of life, be accompliſhed in moſt caſes, when the patients are not above the age of 30 or 35 years, even if they ſhould already have experienced two or three paroxyſms. In older habits, where the diſeaſe is of longer ſtanding, a complete cure cannot be ſo confidently anticipated; but experience has ſhewn that the ſeverity and the conſequent evils of the diſeaſe may be effectually mitigated by temperance, even under ſuch circumſtances. It is a moſt dangerous and miſtaken notion that the gout is to be encouraged; for its tendency is to increaſe in frequency, and in duration, to cripple the limbs, and to render the body liable to a variety of diſorders, which tend to render life both ſhorter and more miſerable than it would otherwiſe be.

The fear of the pernicious conſequences of rigid temperance is an unfounded prejudice, very prevalent in this country; but if there be any danger, it can only originate in general from the ſuddenneſs with which an extreme change is made. We have ſeen, in the caſe of the fat miller of Billericay, however, what a ſmall quantity of nutriment is abſolutely requiſite for the wants of the conſtitution, and how beneficial even an extreme change of diet ſometimes proves. (See Corpulence.)

The next point of management in the interval, which, together with temperance, conduces to the prevention of the recurrence of gout, is *exerciſe*. This tends to obviate plethora, on the one hand, by promoting the circulation and all the ſecretions, and to ſtrengthen the ſtomach, on the other hand, and promote the function of digeſtion; and plethora and indigeſtion, as we have already ſtated, commonly precede the gouty paroxyſm, and are connected with the gouty diatheſis. By thoſe who cannot walk, which is the beſt mode of exerciſe for the gouty, riding on horſeback, or even in a carriage, ſhould be ſubſtituted. Even friction, where theſe modes of exerciſe cannot be reſorted to, may be an uſeful ſuccedaneum. Dr. Cadogan's directions on this head are worthy of attention. If the patient "can neither walk nor ride at all, he muſt by degrees be brought to do both by the aſſiſtance of others, which may be given him in the following manner: let a handy active ſervant or two be employed to rub him all over, as he lies in bed, with flannels, or flannel gloves, fumigated with gums and ſpices, which will contribute greatly to brace and ſtrengthen his nerves and fibres, and move his blood without any fatigue to himſelf. This may take up from five to ten minutes at firſt, but muſt be repeated five or ſix times a day, ſuppoſing him totally unable to help himſelf. But if he can walk a hundred yards only, it will forward him greatly to walk thoſe hundred yards every two hours; and if he can bear a carriage, let him go out in it every day, till he begins to be tired. The firſt day or two all this may diſturb and fatigue him a little; but if he has patience to perſevere to the fourth, I dare promiſe him ſome amendment and increaſe of ſtrength; which he muſt employ, as young merchants do a little money, to get a little more. Thus he muſt go on rubbing, walking, and riding a little more and more every day, ſtopping always on the firſt ſenſation of wearineſs to reſt a little, till he be able to walk two or three miles at a ſtretch, or ride ten without any wearineſs at all." He muſt ever remember, however, that the habit of body is only to be corrected by habitual meaſures; and perſeverance, therefore, muſt be his motto in regard to exerciſe, not leſs than with reſpect to temperance. But it muſt be obſerved, in general, that the exerciſe ſhould not be violent; for if violent, it cannot be long continued, and muſt always endanger the production of atony and debility in proportion to the degree of violence. "It muſt be moderate," to uſe the words of Dr. Cullen, "but at the ſame time conſtant, and continued through life."

It has been ſuppoſed by ſome perſons, that an abſtemious and active mode of life for a limited time, as for inſtance, an abſtinence from animal food and fermented liquors, and a diet of milk and farinaceous matters alone, for the ſpace of one year, might be ſufficient for a radical cure of the gout. Such an opinion was expreſſed by Celſus, who ſays that "ſome, by cleanſing themſelves thoroughly by drinking aſſes' milk, have for ever baniſhed the diſeaſe; and others, by abſtaining, during a whole year, from wine, mulſe, and venery, have obtained a ſecurity from it for the remainder of their lives." (De Medicina, lib. iv. cap. 22.) In a few caſes, this plan may poſſibly have ſucceeded; but it is well known that many perſons, who, by entering on an abſtemious courſe, had been delivered from the gout, have, on returning to their former mode of living, had the diſeaſe return with at leaſt equal violence.

While an abſtemious regimen, combined with exerciſe, will tend to correct the gouty habit, if ſteadily purſued; it will be at the ſame time adviſable to avoid as much as poſſible ſome of thoſe circumſtances, which we have mentioned above as among the frequent exciting cauſes of the diſeaſe; more eſpecially when the gouty habit has become eſtabliſhed by a repetition of the fits, or is hereditary in its origin. In ſuch caſes, the meaſures, which we have propoſed, are not eaſily purſued to the requiſite extent, and are commonly attempted even with reluctance: men, therefore, have been very deſirous to find a medicine which might anſwer the purpoſe, without requiring a reſtraint on their manner of living. Of this deſire numerous empirics and ſelf-intereſted pretenders have taken advantage, and have been induced either to amuſe the gouty with inert medicines, or have raſhly employed thoſe of the moſt pernicious tendency. It is unneceſſary for us to inquire into the nature of thoſe alleged *ſpecific* noſtrums, which, after being for ſome time in vogue, were neglected or exploded, as their inutility or injurious qualities were thus acknowledged. But after premiſing that we are much diſpoſed, with Dr. Cullen and others, to believe the impoſſibility of curing the gouty habit by medicines, we ſhall notice one or two known medicines, which have been in vogue no long time ago. If the gouty conſtitution is created by a ſeries of high-feeding and indolence, how is it to be expected that medicine can change that conſtitution, eſpecially while the cauſe continues to operate?

The *Portland powder* is a medicine which obtained conſiderable reputation, as a cure for the gout, about the middle of the laſt century. This powder derived its name from the duke of Portland, who received ſo much relief from it, that he ordered the formula to be printed, and delivered to all who ſhould aſk for it. It was brought from Switzerland by a friend of the duke's. The powder conſiſts of the roots of ariſtolochia rotunda and gentian, and of the tops and leaves of germander, ground-pine, and centaury, well dried and powdered, equal weights. This powder was ordered to be taken for a year or two, at firſt in the doſe of a drachm daily, but afterwards in ſmaller quantities. (See Medical Obſ. and Inquir. vol. i. art. 14.) In the work juſt referred to, Dr. Clephane has ſhewn that a ſimilar compoſition was uſed by the ancients for the cure of gout. Such a formula is given by Galen, in his treatiſe De Antidotis, lib. ii. cap. 17., which he ſays he had uſed himſelf. Cælius Aurelianus ſpeaks of ſimilar medicines, under the denomination of *annalia medicamina*, from their being taken for the ſpace of a year. Aëtius gives, among other gout medicines, an "antidotus podagrica ex duobus centaureæ generibus," which differs from the Portland powder in one ingredient only. But ſeveral of the ancients conſidered the long uninterrupted uſe of theſe medicines as dangerous; and aſſure us that they are extremely hurtful in the hot and bilious, and are only proper in cold and phlegmatic conſtitutions. The Portland powder has fallen into neglect, under a notion that it was ultimately prejudicial. "In every inſtance," ſays Dr. Cullen, "which I have known of its exhibition for the length of time preſcribed, the perſons who had taken it were indeed afterwards free from any inflammatory affection of the joints: but they were affected with many ſymptoms of the atonic gout; and all, ſoon after finiſhing their courſe of medicine, have been attacked with apoplexy, aſthma, or dropſy, which proved fatal." (Firſt Lines, par. 557.) Dr. Heberden, however, is of opinion, that the popular prejudices againſt this medicine at preſent are as far beyond the truth, as they formerly were in its favour. (Comment. p. 48.) He attributed to it conſiderable powers of alleviating the diſeaſe, by ſtrengthening the ſtomach and ſupporting the function of digeſtion; and believes that many of the evils (which, becauſe they followed its exhibition, were imputed to its operation,) were in reality the conſequences of the diſeaſe, and not of the remedy. That thoſe caſes, however, of apoplexy, &c., which, it is admitted, occur in gouty habits, would be probably accelerated, if not occaſioned, by the uſe of a ſtomachic powder, while the full diet was continued, appears to be extremely probable: for the plethora muſt have been increaſed in proportion to the artificial increaſe of the digeſtive powers. We ſhould, therefore, be diſpoſed to conclude, that the conſtant uſe of ſuch a medicine muſt be pernicious, unleſs it were combined with temperance in eating and drinking; and that, with ſuch a regimen, it would in all probability be highly beneficial, if taken whenever the ſymptoms of indigeſtion ſhould appear.

Another claſs of remedies has been employed in the interval between the paroxyſms of gout, and in many inſtances with conſiderable alleviation to the diſeaſe, rendering the fits milder, and the intervals between them longer: we allude to the *antacids*; ſuch as the alkalis, and abſorbent earths. The nature of the chalky matter, produced in inveterate gout, which is an acid, and denominated lithic or uric acid, (being the ſame which is found in the urine and urinary concretions,) has led to the theory, that this acid, or its elements, is the morbific humour of the gouty; and therefore naturally ſuggeſted the idea of uſing alkaline medicines as remedies for the diſeaſe. And as aceſcent drinks are found to increaſe the gouty diatheſis, and to increaſe the diſordered ſtate of the digeſtive organs; ſo alkaline medicines have been found to relieve the ſymptoms of indigeſtion, and at the ſame time to leſſen the diſpoſition to gout. Thus the cauſtic alkalis have been found beneficial; but not more ſo, we believe, than the mild or carbonated alkalis, eſpecially potaſs; and the abſorbent or alkaline earths have likewiſe afforded relief, and ſometimes ſpeedily removed ſome of the urgent ſymptoms of diſordered ſtomach; eſpecially the preparations of chalk, lime-water, and magneſia. The magneſia is perhaps one of the beſt medicines of this ſort for the gouty, as it not only corrects the acidity of the ſtomach, but at the ſame time is laxative to the bowels, and thus contributes to obviate plethora. When theſe antacids do not ſufficiently open the bowels, or do not prevent coſtiveneſs, a little rhubarb, aloes, or ſome other aromatic purgative ſhould be conjoined with them. It appears, from ſome experiments made by Mr. Home and Mr. Brande, and recently publiſhed in the Philoſophical Tranſactions, (Part I. for 1810) that magneſia has a much more powerful influence in preventing the formation of the uric acid, in the urine, than any of the alkalis; it is probable, therefore, that it may be more beneficial in the gout. As a warm laxative the tincture of guaiacum was much recommended, and as it combines a ſtimulant with an evacuant property, it may be ſerviceable in ſome conſtitutions.

Cure of the irregular Gout.—We have already remarked, that falſe theory has led to much falſe alarm, and doubtleſs to many miſtakes in practice, eſpecially relative to the atonic gout; all the various ſymptoms of dyſpepſia, and hypochondriaſis being often ſuppoſed to be gouty, when no actual gout had ever appeared. Hence fomentations, bliſters, rubefacients, and other local ſtimulants to the extremities, the Bath waters, hot pediluvia, &c. have been employed to bring on the gout in the feet, inſtead of relying on the remedies which might reſtore the functions of the digeſtive organs. The Bath waters are certainly to be recommended in thoſe caſes, as they are poſſeſſed of conſiderable powers in reſtoring the healthful condition of the ſtomach, eſpecially when it has been diſordered by irregular and intemperate living; and of relieving thoſe wandering pains, which are deemed gouty, but which, as Dr. Heberden obſerves, are the common accompaniments of declining years and a broken conſtitution.

In theſe caſes of atonic or wandering gout, as it is called, all the means uſually employed to ſtrengthen the habit in general, and the ſtomach in particular, are to be reſorted to. Moderate, but frequent and regular exerciſe on horſeback, or walking, muſt be purſued; the diet ſhould be a little more generous, and ſome wine may be neceſſary; but both food and drink of the aceſcent kind muſt be ſhunned, and if wine, of whatever ſort, ſhould be found to increaſe the acidity of the ſtomach, ſpirits much diluted with water ſhould be ſubſtituted. At the ſame time, for the purpoſe of ſupporting the tone of the ſtomach, preparations of iron, the Peruvian bark, bitters, and aromatics in moderation may be reſorted to; and laxatives, employed only ſo as to prevent coſtiveneſs, muſt be taken. The propriety of frequent gentle vomits, where the indigeſtion is troubleſome, is more than problematical; for, while they give a temporary relief, by removing a load of undigeſted food, they tend to debilitate the organ, and thus to increaſe the evil which they were intended to remove. At the ſame time, all the cauſes of debility formerly mentioned, muſt be ſhunned, and expoſure to cold eſpecially muſt be carefully avoided: the moſt certain means of doing this is by repairing to a warm climate during the winter ſeaſon.

Cure of miſplaced or retrocedent Gout.—Theſe, like the atonic gout, are in a conſiderable degree the bugbears of medical ſpeculation, more eſpecially the miſplaced gout; they do, we believe, occaſionally occur in caſes of old and inveterate gout, but certainly much more rarely than is generally believed. This opinion Dr. Heberden ſtates from his own experience. (Comment. p. 41.—See alſo "Letters on the Cauſe and Treatment of Gout," by Dr. Robert Hamilton, Lynn, 1809.) The laſt mentioned phyſician, who had employed bleeding and other antiphlogiſtic remedies, both upon himſelf and ſeveral of his friends for eighteen years, never ſaw any thing like a retroceſſion of gout; and Dr. Cullen never ſaw an inſtance of miſplaced gout.

When the gout has diſappeared in the extremities, the ſtomach and bowels are ſometimes attacked with moſt acute pain, which is of a ſpaſmodic nature, and to be relieved only by ſtrong diffuſive ſtimulants, and opium in full doſes. Opiates are doubtleſs the moſt effectual antiſpaſmodics; but their operation will be aided by combining with them the ethers, volatile alkali, the free uſe of ſtrong wines, and aromatics, given warm, or ardent ſpirits, if theſe are not effectual. Camphor, muſk, aſſafœtida, and other ſtrong ſmelling ſubſtances, may be employed as adjuvants, eſpecially in leſs violent caſes. External heat to the region of the ſtomach, hot pediluvia, or the warm bath, will contribute by their ſtimulant powers to overcome the ſpaſms and pain. If the ſtomach is known to be loaded, as by a previous repaſt, its contents may be evacuated upwards, by draughts of warm water, with wine, or of chamomile tea, or downwards by means of ſome of the cathartic tinctures, as of ſenna, or rhubarb.

As thoſe perſons, who are ſubject to paroxyſms of the gout, are generally plethoric in their habits, ſo they are liable to inflammatory diſeaſes: and it cannot be doubted, that ordinary attacks of inflammation of the lungs, of palſy, and apoplexy, have been deemed gouty, and have proved fatal from the omiſſion of blood-letting. When the ſymptoms of pleuriſy, or peripneumony, or the acute pain of head, vertigo, ſomnolency, threatening apoplexy, or the actual ſymptoms of apoplexy and palſy occur; we ought not to delay the exhibition of the uſual remedies for thoſe diſeaſes, or be induced to be ſparing in the uſe of the lancet, becauſe we apprehend a gouty diatheſis; for death may be produced in a few minutes. And, as Dr. Heberden juſtly obſerves, "where the danger is imminent, from the violence of the ſymptoms, and we are doubtful whether they be gouty or inflammatory, we incur much greater riſk by omitting blood-letting in a diſeaſe ariſing from inflammation, than by drawing blood in a diſeaſe ariſing from gout." Indeed thoſe very phyſicians, who condemn bleeding and other evacuations in gout, in the extremities, gravely preſcribe the prompt adminiſtration of theſe remedies, when the lungs, head, or other viſcera are attacked with it. In a word, when the internal viſcera are affected with unequivocal ſymptoms of inflammation, the ſame treatment by local and general evacuation, bliſtering, &c. muſt be reſorted to, as in all other caſes of inflammation, regard being had at the ſame time (an obſervation, indeed, which applies to the practice of medicine univerſally) to the peculiar circumſtances of the patient's age, ſtrength, and conſtitution.

Gout-*wort*, in *Botany*. See Angelica.

GOUTIER, Gótre, or *Góître*, terms in *Surgery*, applied to a chronic enlargement of the thyroid gland. See Bronchocele and Goitre.

GOUTY-Land, in *Agriculture*, a term uſed by the farmers to denote a hollow fuzzy black earth, with little ſprings, that have no free outlet, and therefore ſwell and elevate the ſurface in many places.

GOUVEA, in *Geography*, a town of Portugal, in Eſtremadura; 20 miles S.E. of Viſeu.

GOUX de la Boulaye, Francis le, in *Biography*, a celebrated traveller, was born in the province of Anjou about the year 1610. Little is known of his early life, but that he felt a ſtrong propenſity for rambling into foreign countries: he employed ten years ſucceſſively in traverſing various parts of the globe. He ſeems to have been willing to become all things to all men, in order to obtain his wiſhes in ſafety. In Africa and many parts of Aſia he paſſed for a Mahometan, and in Europe he was a good Catholic. On his return, he publiſhed an account of his travels, under the title of "Les Voyages des Obſervations de François de la Boulaye le Goux, en divers Pays, d'Europe, d'Aſie, et d'Afrique, juſqu'a l'Année 1650." This work was publiſhed in 4to. and illuſtrated and adorned with engravings. The ſtyle is incorrect, but the facts, as far as they are borne out with truth, are ſaid to be very curious. He was ſo much altered in his perſon during his abſence from France, that his mother even, either could not, or would not recognize him, and he was obliged to inſtitute a law-ſuit to eſtabliſh his rights as heir in the family. In 1668 he was appointed ambaſſador to the Porte and the great mogul, by Lewis XIV. who was very deſirous of renewing his commerce with the Eaſt. Le Boulaye died in Perſia of a fever before he had executed this miſſion. Moreri.

GOUYE, Thomas, was born at Dieppe in the year 1650. He was brought up among the Jeſuits, and was at an early period diſtinguiſhed by an ardent love for mathematical and ſcientific purſuits. In 1699 he was elected a member of the Royal Academy of Sciences at Paris, of which body he became an aſſiduous attendant, and was highly eſteemed for the uſeful contributions which he made to their memoirs. He died at Paris in 1725, leaving behind him, as memorials of his learning and induſtry, "Phyſical and Mathematical Obſervations tending to the Improvement of Aſtronomy and Geography, ſent from Siam to the Academy of Sciences at Paris, by the Jeſuit Miſſionaries, with Reflections and Notes, in two volumes." The firſt volume was publiſhed in 1688, the ſecond in 1692, and both have been inſerted in the ſeventh volume of the collections of the Academy. Moreri.

GOW, in *Geography*, a town of Hindooſtan, in Bahar; 40 miles S.S.W. of Bahar. N. lat. 25 . E. long. 84° 48′.

GOWER, John, in *Biography*, an ancient Engliſh poet of the fourteenth century, is ſaid to have been deſcended from a family at Stitenham in Yorkſhire. He had the beſt education which the times afforded, and at a proper age became a member of the ſociety of the Inner Temple, where he attained to a high degree of reſpectability in the profeſſion of the law, and where he became acquainted with Chaucer. Some writers affirm that, in the courſe of his profeſſional duties he was appointed chief juſtice of the court of Common Pleas, though others think the judge was another perſon of the ſame name who was a contemporary with the poet. Gower attached himſelf to the duke of Glouceſter, uncle to Richard II., and was much noticed by the king himſelf, at whoſe deſire he wrote his principal work. He had, however, a pliable mind, and could turn his pen to different intereſts; for on the acceſſion of Henry IV. he not only wrote in adulatory terms to the new king, but even reflected on the miſ-government of the one who had been depoſed, and who had been his patron. His circumſtances were ſuch as to put him beyond the fear of want, for he appears to have been a liberal contributor to the rebuilding of the church of St. Mary Overy in Southwark. During the firſt year of Henry's reign, our poet had the misfortune to be deprived of his ſight, an affliction which he did not long ſurvive. He died in the year 1402, at a very advanced age. Gower, ſays his biographer, is entitled to a place among Engliſh writers only relatively to the time in which he flouriſhed; for though well furniſhed with learning, and a ſucceſsful cultivator of his native language, he has not the leaſt pretenſions to genius or invention. He is characterized by his friend Chaucer, as the "moral Gower;" he was uniformly grave, even upon topics that might inſpire vivacity. He was author of three volumes, entitled "Speculum Meditantis;" "Vox Clamantis;" and "Confeſſio Amantis." Of theſe, the firſt is a moral tract, and relates to conjugal duties; the ſecond is a metrical chronicle concerning the inſurrection of the people under Richard II., in Latin elegiac verſe: the third, or "Lover's Confeſſions," relates to the morals and metaphyſics of love. This is the only one that has been printed, and it was among the earlieſt products of the Engliſh preſs, by Caxton in 1483. It ſeems, ſays Mr. Warton, to have been his object to crowd all his erudition into this elaborate performance. The moſt intereſting part of the work is a variety of ſtories adduced as moral examples, and taken from authors moſt in vogue, ancient and modern. The language is perſpicuous, and the verſification frequently harmonious. Biog. Brit. Warton.

Gower, in *Geography*, a diſtrict of Wales, in the ſouth-weſtern extremity of Glamorganſhire, below the town of Swanſea, and bounded by the Iriſh ſea and the Briſtol channel.

Gower, *Cape*, a cape on the E. coaſt of China, lying in the track from the ſouthward to the gulf of Pekin. A reef of rocks runs out from a neck of land near this cape, which appeared to have a compact harbour. The entrance to it was between the cape and the reef juſt mentioned. When the perſons concerned in the embaſſy to China paſſed this cape, a conſiderable number of veſſels were deſcried in the harbour, and a pretty large town behind it. N. lat. 36° 57′. E. long. 122° 15′.

Gower's *Iſland*, a ſmall, flat, low iſland, in the Pacific ocean, ſo called by captain Carteret, who paſſed it in Auguſt 1767; he found no anchorage, and could only obtain a few cocoa-nuts in exchange for nails; the inhabitants reſembled thoſe of Egmont iſle. S. lat. 7° 56. E. long. 158° 56′.

Gower's *Harbour*, a bay on the S. W. coaſt of New Ireland; 5 miles N. of cape St. George. M. Bougainville calls this "Praſlin Bay," and by Dampier it is called "St. George's bay." S. lat. 4° 50′. E. long. 150° 48′.

GOWGAT, a town of Hindooſtan; 12 miles W. of Agra.

GOWGATCHY, a town of Bengal; 12 miles N. of Calcutta.

GOWN, Robe, a long upper garment, worn by lawyers, divines, and other graduates, who are hence called *gentlemen of the gown*, or *gown-men*.

The gown is an ample ſort of garment, worn over the ordinary clothes, hanging down to the feet. It is faſhioned differently for eccleſiaſtics, and for laymen.

At Rome, they give the name virile gown, *togas viriles*, to a plain kind of gown, which their youth aſſumed when arrived at puberty. This they particularly denominated *prætexta*.

In ſome univerſities, phyſicians wear the ſcarlet gown. In the Sorbonne, the doctors are always in gowns and caps. Beadles, &c. wear gowns of two colours.

Among the French officers, &c. they diſtinguiſh thoſe of the ſhort gown, or robe; which are ſuch as have not been regularly examined. They have alſo barbers of the ſhort gown, who are ſuch as are obliged to practiſe in an inferior way to ſurgeons, or thoſe of the long robe.

GOWN is alſo taken, in the general, for the civil magiſtrature, or the profeſſion oppoſite to that of arms.

In this ſenſe it was that Cicero ſaid, "Cedant arma togæ."

GOWRAH, in *Geography*, a town of Bengal; 27 miles S. S. E. of Doeſa.—Alſo, a town of Hindooſtan; 5 miles N. E. of Benares.

GOWRAN, a poſt town of Ireland, in the county of Kilkenny. It is a place at preſent of no importance, but was a borough before the Union, and there are ſome ruins which ſeem to intimate its former importance. It is 52 miles S. from Dublin.

GOWREY, a town of Hindooſtan, in Oude; 53 miles W. of Kairabad.

GOWRY-BIRD, in *Ornithology*, a name given by Edwards to the LOXIA *punctuloria*.

GOWRYPOUR, in *Geography*, a town of Bengal; 26 miles S. E. of Dacca.

GOWT, in *Engineery*, or go-out, is a name applied to the ſea ſluice, or valves uſed in embankments next the ſea or tidal rivers, for letting out the land-waters when the tide is out, and preventing the ingreſs of ſalt-water. Some of the gowts in the fens of Lincolnſhire and Cambridgeſhire are very large works, and coſt immenſe ſums of money.

GOY, in *Geography*. See ANGOI.

GOYANES, a town of Spain, in Gallicia, on the ſea-coaſt; 25 miles S. W. of Santiago. N. lat. 42° 32′. W. long. 8° 50′.

GOYAS, GOJAS, or *Goyaz*, a town and government of Brazil, extending from 42° to 54° W. long. and from 6° 30′ to 19° S. lat. the inhabitants of which are eſtimated at 8930 whites, 29,630 Indians, and 34,100 negroes, who are employed in ſearching for gold in the mines, which were diſcovered in the year 1726.

GOYAVA, a town on the W. coaſt of the iſland of Grenada. N lat. 12° 13′. W. long. 61° 31′.

GOYAVES, a town of the iſland of Guadaloupe, giving name to a bay in which it is ſituated.

GOYEN, JOHN VAN, in *Biography*, a painter, born at Leyden in 1596, who ſtudied ſucceſsfully the practice of landſcape-painting under ſeveral maſters, and having an uncommon readineſs and ſkilfulneſs of hand, he produced a great many works of a light agreeable kind; with much character of nature, but no great reliſh of art; which, in their time, however, were very highly eſteemed and widely ſpread over Europe.

Views of he ſcenes on the banks of the canals and rivers of the Low Countries were his favourite ſtudies; ſometimes he emerged to the ſea ſhore, or ſunk into the interior of the country, and ſketched the villages that preſented themſelves to his taſte in the one, or the harbours, &c. of the other; but all are touched by the ſame kind of pencilling, and generally in the ſame hue of colour, when he came to work them up into pictures. Certainly, they have much merit of a peculiar kind, ſuch as lightneſs in the handling, and freedom in their effect; but frequently they are vapid and flimſy, and by no means juſtify the high value and reputation affixed to them. It is ſaid that the grey tone, too frequently found in his pictures, aroſe from the uſe he made of Haerlem blue, which is apt to fade into that tint, and therefore no longer in uſe. It may be ſo; but that grey is not the predominant defect in his pictures: it is the evident haſte with which they are wrought, and their conſequent imperfection of imitation, that induces us thus to condemn what the world have too long eſtimated in a high ratio, which ought only be given to works completed with the ſkill and purity of taſte of a Caracci or a Claude. He died in 1656, aged 60.

GOZ, or GOZEN, in *Geography*, a ſea-port town of Morocco, on the coaſt of the Atlantic, in the vicinity of Mogodor.

GOZO, an iſland of the Mediterranean, ſituated N. W. of Malta, and at a little diſtance from it. This iſland is about 25 miles in circumference, rather fertile, and containing about 3000 inhabitants.

GOZO, or *Gaſda*, a ſmall iſland in the Mediterranean, about 27 miles from the S. W. coaſt of Candia; anciently "Clauda," near which St. Paul ſailed in his voyage to Rome. Some biblical writers ſuppoſe that the Gozo near the iſle of Malta is the Clauda of the Book of Acts. It is occupied by about 30 families; who have a Greek church, and is occaſionally viſited by veſſels for a ſupply of water and proviſions. At a ſmall diſtance to the weſt is a very little iſland called "Pulo Gozo," or Little Goz. N. lat. 34° 48′. E. long. 23° 46′. See CLAUDA.

GOZZANO, a town of Italy, in the department of the Gogna; 18 miles N. of Novara.

GOZZOLI, BENOZZO, in *Biography*, one of the early practitioners of the art of painting on its revival. He was a Florentine, and diſciple of Fra. Angelico; but ſubſequently imitated with very great ſucceſs the ſtyle of Maſſaccio, his contemporary. Vaſari ſpeaks of him with great eſteem under the name of Benozzo, and relates hiſtories of his many productions at Florence, Volterra, Rome, and Piſa; at which latter place are his moſt conſpicuous labours, both in hiſtory and portraits, which indeed at that time were uſually introduced in hiſtorical pictures. At Piſa he died in 1478, aged 78, and a monument, with a Latin epitaph, is placed near his principal work in the Campo-Santo; a memento of his powers, and the eſteem in which they were held.

GRAAF, REINIER DE, an excellent phyſician, was born at Schoonhove, a town in Holland, where his father was an eminent architect, on the 30th of July, 1641. He ſtudied phyſic at Leyden, where he made great progreſs, and at the age of 22, publiſhed his treatiſe "De Succo Pancreatico," which gained him conſiderable reputation. In 1665, he went to France, and received the degree of M. D. at Angers; but he returned to Holland in the following year, and ſettled at Delft, where his great ſucceſs in practice excited the envy of his profeſſional brethren. He married in 1672, and died in Auguſt, 1673, when he was only 32 years of age. He publiſhed three diſſertations relative to the organs of generation in both ſexes, upon which he had a controverſy with Swammerdam. His works were publiſhed in 8vo. at Leyden, in 1677 and 1705; they were alſo tranſlated into Flemiſh, and publiſhed at Amſterdam in 1686. Hutchinſon, Biog. Med. Eloy.

GRAAF REYNET, in *Geography*, a diſtrict of ſouthern

Africa, in the colony of the Cape of Good Hope, extending to the eaſtern extremity of the colony. On the E. it is divided from the Kaffers by the Great Fiſh river, the Turka, the Bambarſberg, and the Zuureberg; on the W. from the diſtricts of Zwellendam and Stellenboſch by the Camtoos river, the Gamka or Lion's river, and Nieuwveld mountains; on the N. from the Boſjeſman Hottentots by Plettenberg Landmark, the great Table mountain, and the Karreeberg; and on the S. it is terminated by the ſea-coaſt; the whole length and breadth of this diſtrict may be about 250 by 160 miles, making an area of 40,000 ſquare miles, which is peopled by about 700 families, each family commanding about 57 ſquare miles of territory. Great part of it has been occaſionally abandoned on account of the incurſions of the Kaffers and Boſjeſmans. The inhabitants are a ſort of Nomades, who would long ago have penetrated with their flocks and herds far beyond the preſent boundaries of the colony, if they had not been reſiſted by the Kaffers. The boors of this diſtrict are graziers; and it is entirely compoſed of loan-farms, which were grants made to the original ſettlers of certain portions of land to be held on reaſonable yearly leaſes, on condition of paying to government an annual rent of 24 rix-dollars. Barrow's Travels in S. Africa, vol. ii.

GRAAT, or GRAET BARENT, in *Biography*, an hiſtorical painter, whoſe name is remembered principally upon account of his cloſe imitation of the works of Bamboccio, and of his having founded an academy at Amſterdam, where he was born, to which the beſt artiſts of his time reſorted to ſtudy after living models; by which means much improvement was obtained, and ſpread among thoſe who cultivated taſte and ſcience in the arts. He died in 1709, aged 81.

GRAB, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 17 miles W. N. W. of Leitmeritz.

GRABATARII, GRABBATARII, in *Church Antiquity*, ſuch perſons as deferred the receiving of baptiſm till the hour of death; or who did not receive it till they were dangerouſly ill, and out of hopes of life: from an opinion, that baptiſm abſolutely waſhed away all former ſins.

The word is formed of *grabatum, bed;* and that from the Greek *κράββατον*, *a hanging bed*, of *κρεμαω*, *I ſuſpend:* ſuch as was the bed of ſlaves, poor people, Cynic philoſophers, &c. who are enemies of luxury and eaſe.

GRABAU, in *Geography*, a town of the duchy of Warſaw; 12 miles S. of Kaliſh.

GRABAW, a town of Auſtrian Poland, in the palatinate of Belcz; 28 miles N. N. W. of Belcz.

GRABE, JOHN ERNEST, in *Biography*, a learned divine, and editor of the Alexandrian manuſcript, in the Royal Library at London, was born at Koningſberg, in Pruſſia, in the year 1666. Here he received his education, and in due time took his degree of M. A. applying himſelf with all diligence to the ſtudy of divinity, and the peruſal of the fathers. He had been brought up in the Lutheran principles, but having imbibed ſome notions inconſiſtent with the commonly received faith, reſpecting the uninterrupted ſucceſſion of biſhops being eſſential to the exiſtence of the true church, he was ſummoned before his ſuperiors and impriſoned. Upon his releaſe, after a few months, he choſe rather to quit the church than abandon his opinion, and determined to become a member of the Catholic religion. He delivered, in a memorial to the electoral college at Sambia, in Pruſſia, in 1695, containing the reaſons for his change, and then left Koningſberg, that he might be at liberty to carry his plan into execution, in ſome place where he ſhould be beyond the reach of the Pruſſian juriſdiction. While he was on the road to Erfurt, through which he meant to paſs to a Catholic country, the elector of Brandenburg ſent three treatiſes to him in anſwer to his memorial, by three Pruſſian divines, written by order of the elector. This great attention of his ſovereign claimed the reſpect of Grabe, who not only read them with care, but felt deſirous of diſcuſſing the queſtion more cloſely before he formed his ultimate determination of abandoning the religion in which he had been educated. He accordingly wrote to one of the perſons that had anſwered his memorial, intimating a ſtrong wiſh to return to Berlin, that he might enjoy the benefit of a conference with him. This privilege was obtained for him; M. Grabe returned and was ſoon prevailed on to relinquiſh his purpoſe of joining the papal communion, but ſtill he maintained the obnoxious tenet for which he had ſuffered impriſonment. Finding him immoveable on this point, his friend adviſed him to remove to England, where, ſaid he, "you will find the outward and uninterrupted ſucceſſion which you want: take then your route thither: this ſtep will cauſe leſs uneaſineſs to your friends, and, at the ſame time, equally ſatisfy your ſcruples." He gladly complied with the advice, and was ſtrongly recommended to king William, who immediately granted him a penſion of 100*l.* per ann. to enable him to purſue his ſtudies. From this time he conſidered England as his country, becauſe he conceived that its eccleſiaſtical conſtitution approached nearer on the whole, than that of any other, to the primitive pattern. He ſhewed his gratitude for the liberal patronage which he received by the publication of ſeveral learned works. Having formed a deſign of printing ſome curious and ſcarce pieces of the fathers, in defence of his own opinions, he obtained acceſs to the univerſity of Oxford, to examine the treaſures of the Bodleian library, and, in 1698, he publiſhed "Spicilegium S. S. Patrum, &c." vol. 1. 8vo.; and in the following year, the ſecond volume of the ſame work appeared. Shortly after this, he was ordained a deacon of the church of England, and was appointed chaplain of Chriſt-church, Oxford. This promotion he accepted, in order that he might be entitled to the emoluments without being required to diſcharge the duties of the appointment, for he had refuſed, on his ordination, to receive the ſacrament, on account of the omiſſion of the prayer in the communion ſervice, mentioning the ſacrifice, before the elements were diſtributed, which had been inſerted in the firſt common-prayer book of king Edward VI., and he ever afterwards continued a non-conformiſt in this particular. In the ſame year in which he took orders, Mr. Grabe publiſhed "S. Juſtini Philoſophi et Martyris Apologia Prima pro Chriſtianis, &c." illuſtrated with the notes of ſeveral learned men, and additional remarks of his own; and in 1702 he publiſhed "S. Irenæi Epiſcopi Lugdunenſis contra omnes Hæreſes Libri quinque, &c." with prolegomena and notes. On the acceſſion of queen Anne to the throne, Mr. Grabe's penſion was continued, and her majeſty was adviſed to employ him in printing the Alexandrian MS. in the royal library, of the Septuagint tranſlation of the Old Teſtament. The queen took the opportunity of informing him of the appointment herſelf, and at the ſame time made him a handſome preſent as an encouragement to his exertions. In 1705, he publiſhed propoſals for printing that work by ſubſcription, ſetting forth the ſuperior value of this copy to the Vatican MS.; he alſo gave three ſpecimens, containing ſo many different methods for the projected edition, in the final choice of which he was to be determined by the learned world. As a teſtimony of their approbation of the deſign, the univerſity of Oxford preſented

ſented him with the degree of doctor of divinity. His propoſals met with a very favourable reception on the continent as well as in England, and he received a handſome preſent from his own ſovereign, the king of Pruſſia, and liberal ſubſcriptions from the principal nobility, clergy, and gentry of all parts. In 1707, he gave to the public his firſt volume, under the title of "Vetus Teſtamentum juxta Septuaginta Interpretes; tom. 1. continens Octateuchum." This volume contains the Pentateuch, and the three following books. In the expectation of an acceſſion of additional MSS. he deferred the ſecond and third volumes, and publiſhed the fourth volume in the year 1709. This contained the book of Pſalms, of Job, of the three books of Solomon, &c; and in the following year he publiſhed a Latin diſſertation, giving a particular account of the reaſons why he had departed from the uſual order of publication, and of the helps which he expected to receive in order to perfect his plan. Theſe were, a Syriac MS. of the hiſtorical books of the Old Teſtament, with Origen's remarks upon them, and two MSS. one belonging to cardinal Chigi, and the other to the college of Lewis XIV. When he received theſe MSS. and had collated them, he prepared a volume of annotations on the whole work, and collected materials for the Prolegomena. The time which theſe objects took, cauſed a material delay in the publication of the ſecond and third volumes, which did not, in fact, appear till after the author's death. This event took place in 1712, when he was only in the forty-fifth year of his age. He had previouſly to this publiſhed "An Eſſay upon the Arabic MSS. in the Bodleian library, and that ancient book, called the Doctrine of the Apoſtles, which is ſaid to be extant in them, wherein Mr. Whiſton's miſtakes about both are plainly proved." The third volume of his great work was publiſhed in 1719, and the fourth in 1720. On his death-bed he was attended by Dr. Smalridge, by whoſe means he deſired that the public might be informed that he died in the faith and communion of the church of England, though he conſidered its conſtitution to be defective in ſome points, in which he thought the nonjuring clergy adhered more cloſely to the apoſtolical doctrine and diſcipline. Of his talents there were different opinions, but of his induſtry and learning no one could harbour a doubt. Dr. Thirlby ſays, in the dedication of his edition of Juſtin's Apology, "he was a good man, and not unlearned, and well verſed in the writings of the fathers. But he was no critic, nor could be one, ſince he was not furniſhed with genius or judgment, or, to ſpeak the truth, with learning ſufficient for the purpoſe." In this opinion Le Clerc coincides, and adds, that his books gained him the character of a laborious perſon rather than that of a great critic. He was the author of many other works beſides thoſe which have been mentioned, and was editor of an elegant edition of biſhop Bull's works: he likewiſe aſſiſted in preparing for the preſs archdeacon Gregory's edition of the New Teſtament in Greek; and he left behind him many MSS. ſome of which have been publiſhed. Biog. Brit.

GRABEN, in *Geography*, a town of Croatia; 12 miles S. of Varaſdin.

GRABO, a town of Sweden, in Eaſt Gothland; 11 miles S.E. Linkioping.

GRABON, a town of the duchy of Mecklenburg, on the Elde; 80 miles N.W. of Berlin. N. lat. 53° 23′. E. long. 11° 44′.

GRABUSA, an iſland of the Mediterranean, near the N.W. coaſt of the iſland of Candy, confirmed to the Turks by the peace of Carlowitz, and generally garriſoned with 1000 men. N. lat. 35° 40′. E. long. 23° 33′.

GRABUT, in *Biography*, an obſcure French muſical compoſer, whoſe name is not to be found in the annals of the art. He was brought into England to flatter the partiality of Charles II. for the muſic of France; and employed by Dryden to ſet his political opera of "Albion and Albanius," though Purcell had already given indiſputable proofs of his ſuperior genius, and was rapidly riſing into fame and national favour.

This drama, written under the auſpices of king Charles II., was rehearſed ſeveral times, as the author informs us in his preface, before his majeſty, "who had publicly declared, more than once, that the compoſitions and choruſes were more juſt and more beautiful than any he had heard in England." We believe this prince was not very ſkilful in muſic, nor very ſenſible to the charms of any ſpecies of it but that of France, of the gayeſt kind; however, royal approbation is flattering and extenſive in its influence. Unfortunately for the poet and muſician, his majeſty died before it was brought on the ſtage; and when it did appear, the ſucceſs ſeems not to have been very conſiderable. Upon a peruſal of this drama, it ſeems hardly poſſible, ſo near a revolution, that it ſhould have eſcaped condemnation upon party principles; as, under obvious allegories, Dryden has laſhed the city of London, democracy, fanaticiſm, and whatever he thought obnoxious to the ſpirit of the government at that period. Had Orpheus himſelf not only compoſed the poem and the muſic, but performed the principal part, his powers would have been too feeble to charm ſuch unwilling hearers."

GRAÇAY, in *Geography*, a town of France, in the department of the Cher, and chief place of a canton, in the diſtrict of Bourges; 9 miles S.W. of Vierzan. The place contains 2204, and the canton 5459 inhabitants, on a territory of 145 kiliometres, in 9 communes.

GRACCHURIS, an ancient town of Hiſpania Tarragonenſis, mentioned by Livy, Antonine, and Ptolemy, and ſaid to be built by the proconſul Titus Gracchus Sempronius, after having conquered the Celtiberians. Others ſuppoſe that it exiſted before Sempronius, under the name of "Illurcis," and that he only repaired it. It is now called Arreda.

GRACCHUS, Tiberius Sempronius, in *Biography*, a perſon very memorable in the hiſtory of Rome, was the ſon of a father of the ſame name, a diſtinguiſhed commander, and excellent citizen, who, from the Plebeian ranks, arrived at diſtinguiſhed honours, and the higheſt offices in the ſtate, having been maſter of the horſe to the dictator, Junius, after the celebrated battle of Cannæ, afterwards conſul, and, at length, to complete his glory, he was ſlain while fighting for his country. The mother of the ſubject of this article was Cornelia, daughter of Scipio Africanus, whoſe character has been illuſtrated in the proper place. Tiberius received every advantage of education that the pious affection of a wiſe parent could beſtow, and his natural diſpoſition ſeconded the efforts of his inſtructors. He was modeſt, and remarkably mild in his temper; and became, at a very early age, diſtinguiſhed for eloquence, ſobriety, and political knowledge; and his reputation was ſealed by an admiſſion into the venerable college of augurs. It is mentioned, as a proof of the high character which he ſuſtained, that Claudius Appius, one of the moſt illuſtrious perſons in Rome, and preſident of the ſenate, offered him, ſpontaneouſly, his daughter in marriage, which he thankfully accepted. When Appius informed his wife what he had done, ſhe replied, "Why ſo ſuddenly, you might have taken time, even if Tiberius Gracchus were the man." In conformity with the Roman cuſtom, Tiberius paſſed his youth in military ſervice; firſt in Africa, under his brother-in-law, the younger Scipio, where he obtained great credit in the army, being equally beloved by thoſe above and thoſe below him. He was made queſtor, in the Numantian war, to the conſul C. Hoſtilius Mancinus. This was in the year B. C. 137: the campaign was unfortunate, and the Roman general was under the neceſſity of negociating a treaty of peace with the enemy. The Numantines, who had been betrayed in a former treaty by the Romans, refuſed to negociate, unleſs it were with Tiberius Gracchus, with whoſe character for probity and ſtrict honour they were well acquainted. This being admitted, a peace was immediately concluded. The treaty, though as favourable as, from circumſtances, could be expected, was received by the Romans with great indignation: they determined to annul it, and to deliver thoſe, who had been inſtrumental in making it, into the hands of the Numantines. The conſul was accordingly given up to them, naked and in chains, and it is probable that Tiberius Gracchus would have ſhared the ſame fate had not a powerful intereſt been exerted in his favour. A ſenſe of the injuſtice of the ſenate on this occaſion, and reſentment of the diſhonour they had thrown upon his treaty, was ſuppoſed to be a principal cauſe of the ſubſequent hoſtilities in which he engaged againſt that body. The condition of the Romans, at this period, afforded a good opportunity for the exertions of patriotiſm; for the great maſs of the lower claſſes of citizens were in a ſtate of abject poverty. Lælius the Wiſe, the friend of Scipio, had attempted to introduce ſome remedy for this evil, but the ſerious oppoſition of men in power had deterred him from the execution of his plan. Tiberius Gracchus reſolved to take up the cauſe. He was accordingly elected a tribune of the people, and propoſed a revival of the Licinian law, with certain modifications, which greatly ſoftened its operations. (See AGRARIAN LAW.) It offered a full compenſation out of the treaſury for all the land above the 500 acres allowed, which any one might be obliged to reſign to the public, and permitted every child of a family to hold 250 acres above the 500 held in the father's name. This propoſal was received, as it might be expected, by the ſuperior orders, whoſe rights and properties were to be affected by it: they were determined to ſtand by one another in reſiſting the innovation. On the other hand, Gracchus loſt no time in rouſing the people to a knowledge and aſſertion of their claims as men and members of ſociety. His ſpeeches were addreſſed to their intereſts and their feelings: his arguments were ſpecious and highly dangerous to the peace of thoſe whoſe wealth was become the object of popular diſcuſſion. In one of his harangues, he exclaimed, "The wild beaſts have their caves and dens, but the brave men who ſhed their blood in the cauſe of their country have nothing free but the air and the light. It is a mere mockery when their generals exhort them to fight for their ſepulchres and houſhold gods, when, perhaps, not a man among them is poſſeſſed of a domeſtic altar, or ſepulchre, of his anceſtors. The private men bleed and die to ſecure the luxuries of the great, and they are denominated the maſters of the world, while they are not owners of a foot of ground." At length, after much tumult in the ſtate, the Agrarian law was paſſed, and Appius Claudius, Tiberius Gracchus, and his younger brother Caius, were appointed commiſſioners to carry its proviſions into execution. In his progreſs in the buſineſs he was embarraſſed with many obſtacles, and, on his part, he took meaſures effectually to thwart the purpoſes of the great; and, by new laws which he got enacted, he rendered the property of all the old families inſecure. The difficulties which occurred in carrying the new law into effect were ſuſpended by the death of Attalus, king of Pergamus, who made the Roman people his heirs. Gracchus procured a law for the diſtribution of his treaſures among the poorer citizens, and for the diſpoſal of the revenues of Pergamus, not by the ſenate, but by the aſſembly of the people. Theſe meaſures gave him a great degree of influence among the citizens, and he conceived the deſign of ſecuring the powers of which he felt himſelf poſſeſſed, by raiſing his father-in-law to the conſulate, his brother to the tribuneſhip, and continuing to himſelf the ſame office another year. He alſo planned other regulations for abridging the authority of the patricians, and throwing more weight into the popular ſcale. The day of election was approaching, and the ſenators reſolved to make a ſtand againſt the innovations which he propoſed, and a conſpiracy was openly formed to take away the life of Tiberius Gracchus. Of this he was informed by a friendly ſenator, as he was proceeding to the capitol. He, nevertheleſs, advanced, and his party prepared to repel force by force. In the uproar, he attempted to ſpeak, but his voice could not be heard. He made ſigns to his friends, by raiſing his hand to his head, to ſhew that his life was in danger. This ſignal was inſtantly interpreted by his enemies as a demand of the regal crown, and Scipio Naſica, the inveterate enemy of Gracchus, cried out "Since we are betrayed by our conſul, let thoſe who love the republic follow me." A general conteſt now commenced. The adherents of Gracchus were quickly diſperſed, and himſelf was diſpatched with a thouſand blows. Not leſs than 300 perſons were ſlain in this commotion, and the bodies of the dead, even that of Gracchus himſelf, were ignominiouſly thrown into the Tiber. Several of his friends were afterwards baniſhed, and not a few put to death, without the form even of trial, and the ſenate paſſed an act of indemnity for all thoſe who were concerned in the maſſacre. The people, however, indignant againſt his enemies, drove Naſica from Italy, and would never permit him to return. With reſpect to Tiberius Gracchus, his character has been celebrated either as that of a martyr to liberty, or as a victim to lawleſs ambition, according to the different principles of thoſe who have commented on his actions. Many have thrown on his memory reflections as unmanly as they are ſevere. It ſeems to be acknowledged on all hands that he poſſeſſed great talents, and was eſteemed for his private worth. That he was a man of ambition none will deny, and it may be that a love of popularity ſuggeſted the great meaſures which he propoſed; nevertheleſs, the hiſtorian may be ſafely followed, who ſays, that he was actuated by the beſt intentions, but that he proſecuted his deſign with too much violence.

GRACCHUS CAIUS, brother to Tiberius, but his junior by nine years, enjoyed the ſame advantages of education with his brother, which he ſo well improved as to become one of the ableſt orators of his time. Cicero ſays of him, that he knows not if he had his equal in eloquence, and recommends his compoſitions, though unfiniſhed, to the ſtudy of youth. After the tragical end of his brother, Caius paſſed ſome time in retirement, cultivating his rhetorical talents, and ſecretly preparing to act his part on the theatre of the public. In the year 126 B. C. he accompanied the conſul Aurelius Oreſtes to Sardinia as his queſtor, and obtained great applauſe, as well for his humanity and temperance, as for a ſtrict attention to the duties of his office. The ſenate ſhewed evident ſigns of jealouſy on account of the popularity which he acquired, and retained him as proqueſtor in Sardinia in order to keep him at a diſtance from the Roman forum. Perceiving their intentions, he ventured, in defiance of their orders, to quit the iſland without leave of his commander, and ſuddenly made his appearance at Rome. He was called to account for this breach of military diſcipline, but was readily acquitted. Soon after he became a candidate for the tribuneſhip, and ſuch was the zeal of the people in his favour, that the Campus Martius was not able to contain the multitude who flocked from the Italian towns to ſupport his election, and many gave their votes from the tops of the adjacent houſes. Caius had not forgotten the enemies of Tiberius, and would have purſued them to their deſtruction, but was probably diſſuaded from it by his mother. His ſpeeches were calculated to revive the indignation of the people againſt the ſenators for their conduct towards Tiberius, and he propoſed and carried motions for confirming his brother's laws, and the paſſing of others ſtill more obnoxious to the patricians. He was appointed commiſſioner for the diviſion of lands among the poor citizens and allies, and in his progreſs through Italy he employed his talents and wealth in repairing roads, building bridges, and in other works equally uſeful and important. He eſtabliſhed public granaries in Rome, from which the citizens were to have their monthly diſtributions of corn at a low price, the expences of which were to be defrayed by duties laid on goods imported into the dominions of the late king Attalus. By theſe, and other acts of a like kind, he ſo ingratiated himſelf with the people, that he was choſen a ſecond time tribune. Triumphing in his ſucceſs, he propoſed a law for transferring from the ſenators to the knights the cognizance of all private cauſes. When he had obtained his purpoſe he exclaimed, "at length I have humbled the ſenate." He now felt himſelf the arbiter of the republic, and treated the patricians with contempt. This behaviour haſtened his ruin. There is a point, beyond which the moſt ſucceſsful man, whatever be his pretenſions, cannot go with ſafety. Caius had tranſgreſſed this boundary, and his enemies were perpetually on the watch for opportunities to check his power, and to introduce rivals who might, by the appearance of more liberality, depreciate his reputation and influence in the ſtate. During his abſence in Africa his enemies were ever on the alert to injure his fair fame, and to aſcribe unworthy and baſe motives to all that he did or propoſed to do; and in the tumult which accompanied the diſcuſſion of ſome of his laws after his return, he fled to the temple of Diana, and, unwilling to ſacrifice either himſelf or his adherents to popular fury, he propoſed terms of accommodation. Theſe were rejected by the arts of Opimius the conſul, and a price was inſtantly ſet upon the heads of Gracchus and his friend Fulvius. A formal battle enſued, in which multitudes were ſlain on both ſides, and the populace without heſitation deſerted their friends: Fulvius concealed himſelf, but, being diſcovered, was inſtantly killed. Gracchus, having ſolemnly imprecated upon the heads of the Roman people perpetual ſlavery for the baſe deſertion of the cauſe, left the city and paſſed acroſs the bridge named Sublicius. His retreat was favoured by two faithful friends, who defended the bridge till they fell covered with wounds. In the mean time Gracchus reached a grove ſacred to the furies, where it is ſaid a ſlave, by his order, firſt diſpatched him, and then put an end to his own life. Others have, however, given a different account of the matter; they ſay that he was overtaken by his enemies, and by them ſlain. His head was cut off and ſold to the conſul for its weight in gold. The body was thrown into the Tyber, but afterwards being taken from the water it was delivered to his afflicted mother for burial. This cataſtrophe, in which three thouſand perſons periſhed, happened in the year 121 B.C., and the ſenate immediately proceeded to aboliſh all the laws of the Gracchi. Their names, however, were ſtill fondly cheriſhed by the people, ſtatues were erected to their memory, and the places in which they were killed were conſecrated, by religious rites, to their manes. Caius has been generally conſidered as leſs pure in his intentions, and leſs moderate in his plans, than Tiberius. From the evidence of hiſtory it ſhould ſeem, that the diſturbance of the public tranquillity was rather owing to his oppoſers than to him; "ſo that," ſays the hiſtorian, "inſtead of calling the tumults of that period the "ſedition of the Gracchi," we ſhould rather call them the ſedition of the ſenate againſt the Gracchi, ſince the efforts of the latter were made in vindication of a law, to which the ſenate had aſſented, and as the deſigns of the former were ſupported by an armed power from the country that had never before interfered in the buſineſs of legiſlation, and the introduction of which gave a moſt irrecoverable blow to the conſtitution. Caius in his perſon was graceful, his action was ſtrong and impreſſive, his voice of great compaſs and melodious when the vehemence of his pleading did not raiſe it to too high a key; to correct this defect he was accuſtomed to place a judicious perſon behind him with a pitch-pipe, by which he was enabled to regulate his tone. In temper he was warmer than Tiberius, nor was he diſtinguiſhed by ſobriety of manners, though in this reſpect he might be advantageouſly compared to the Roman youth in general. Plutarch. Univer. Hiſt.

GRACE, Gratia, χαρις, in *Theology*, denotes in general any gift or favour, which God *freely* beſtows upon mankind; whether ſuch gift pertains to the preſent or future life: but as thoſe which relate to the improvement of their temper, and their fitneſs for final happineſs, were favours of the greateſt importance, this term is by way of eminence applied to them. The proper ſignification of the word *grace* is favour;—favour in ſuch a ſenſe as denotes mercy and goodneſs in a ſuperior, either remitting ſomewhat of his own right, or conferring ſomewhat beneficial upon others, *freely* and without any obligation of debt. And becauſe this may be done in various modes and in a great diverſity of inſtances, hence the word *grace* in ſcripture is accordingly applied in a correſponding diverſity of ſignifications. Sometimes it ſignifies thoſe extraordinary gifts and favours of the Holy Ghoſt, by which the apoſtles were enabled to demonſtrate the truth of their commiſſion, to preach their doctrines with authority, to convince gainſayers with evidence, and to govern the churches by a proper diſtribution of different truſts and offices. The gifts or powers, by which the apoſtles were enabled to do all theſe things with extraordinary efficacy and ſucceſs, are therefore called grace, becauſe they are not at all natural acquiſitions but free gifts of God; diſtributed to every one, not according to the will of man, but at ſuch times, and in ſuch proportions, and to ſuch perſons, and for ſuch purpoſes as God himſelf pleaſed. See Rom. i. 5. Epheſ. iv. 7. 11.

In other paſſages, the ſame word is uſed to ſignify that extraordinary aſſiſtance and ſupport which God has been pleaſed ſometimes to afford to his ſervants under extraordinary difficulties and trials; and this is called grace, becauſe it is conſidered as given particularly and gratuitouſly upon extraordinary occaſions over and above the general ſupports ariſing from the conſiderations of reaſon, and from the promiſes and motives of the goſpel in general. See 2 Cor. xii. 9.

A third ſenſe, in which the word grace ſometimes occurs in the New Teſtament, is to expreſs ſuch moral virtues as are the effects of men's being influenced by the ſpiritual motives of the goſpel, and the practice of which preſerves men in the favour of God, and recommends them to his gracious acceptance. (See Epheſ. iv. 29. 2 Pet. iii. 18. 2 Cor. viii. 1. 6.) Moral virtues are plainly for this reaſon diſtinguiſhed by the denomination of grace, becauſe they proceed from and are founded on a regard to God in general, and in particular to his will revealed under the gracious diſpenſation of the goſpel of Chriſt.

Another ſignification of the word grace in Scripture is to expreſs the merciful acceptance of repentance and amendment, by which God is pleaſed, not out of any obligation of juſtice, but in gracious goodneſs, to reſtore men to favour. In this ſenſe Paul ſays (1 Cor. xv. 9.) "By the *grace* of God I am what I am:" ſo John, i. 17., the doctrine of Chriſt is ſtyled "grace and truth." The Apoſtles' preaching is by St. Luke (Acts, xiv. 3.) called "the word," or declaration "of God's grace:" ſo when St. Paul declares (Rom. iii. 24.) that repenting ſinners are "juſtified freely by grace," and blames thoſe "who continue in ſin, that grace may abound." The word grace in all theſe paſſages ſignifies that merciful and compaſſionate diſpoſition of the divine nature, by which God freely remits of his right of puniſhment, and receives penitent ſinners, upon more gracious terms, and to greater degree of his favour, than he was bound to do by any obligations of juſtice.

Hence it is, that the goſpel itſelf, as being the great and ſtanding declaration of God's mercy and goodneſs towards men, ſhewn forth in the free pardon and forgiveneſs of ſin upon the gracious terms of repentance and amendment, is in the New Teſtament very frequently meant by the phraſe, "the grace of God." (Clarke's Serm. vol. ii. p. 265—275. 8vo. fol. ed. vol. i. p. 180, &c.) Biſhop Pearce (Comm. vol. ii. p. 259.) renders χαριτι in 1 Cor. x. 30. thankſgiving, and not grace, as it is in our verſion; and he obſerves that this ſenſe of the word χαρις is too frequent in St. Paul's writings to require a proof of it. He adds that ευχαριστω in the latter part of the verſe confirms this ſenſe.

Some divines define grace to be any degree of divine influence on the mind, inclining it to believe in Chriſt, and to practiſe virtue; and thoſe divine influences, which are not effectual in producing ſaving faith and ſincere obedience, they call *common* grace, in contradiſtinction to *ſpecial* grace, the operation of which is completely efficient and ſaving; and thoſe influences which introduce *ſpecial* grace, though they do not actually amount to it, are with reſpect to that introduction ſometimes called *preparatory*. It is diſputed among theologians whether ſpecial grace, which they ſuppoſe is never on the whole finally rejected, ſo as to fail of working faith in thoſe who are the happy objects of it, be in the nature of its operations upon the human mind *irreſiſtible* or not; and it is alſo queſtioned, whether common grace be *ſufficient*. Whether the mind be entirely *paſſive* in the firſt moment of its converſion, or whether there be any cooperation of our own together with the influences of divine grace upon the heart, is a queſtion, which has been alſo very much diſputed amongſt divines of a particular deſcription; and another queſtion, no leſs the ſubject of controverſy, is ſimilar to the former, and that is, whether the work of regeneration and converſion be accompliſhed in an *inſtant*. But we ſhould far exceed our preſcribed limits if we were to ſtate the arguments *pro* and *con* on queſtions of this nature.

Grace, in *Law*, is ſometimes uſed for a faculty, licence, or diſpenſation; but this ſeemeth to be only in a caſe where the matter proceedeth, as it were, *ex gratia*, of grace and favour; and not where the licence or diſpenſation is granted of courſe or of neceſſity.

Grace is alſo a term in the formula of all patents, &c. which begin, George, by the grace of God, king of Great Britain, &c. The Romiſh biſhops frequently began their mandates in the like manner: ſuch a one, by the grace of God, and the holy ſee, biſhop of, &c.

The Engliſh archbiſhops ſay, by divine grace, or divine providence. See Archbishop.

All ſovereigns uſe the phraſe grace of God; as emperors, kings, princes, &c. Anciently dukes, counts, and even lords, talked in the ſame ſtyle. In the new collection of Father Martene we meet with a mere ſeigneur, or lord, qualified by the grace of God ſeigneur de Comborn. Louis XI. forbade the duke of Britanny to ſtyle himſelf by the grace of God.

Grace is alſo a title of dignity, attributed to princes of inferior rank, and who are not qualified for that of highneſs.

In former times the kings of England were addreſſed under the title of grace, as they are now under that of majeſty. See King.

Our Engliſh dukes and archbiſhops are ſtill addreſſed under the title of grace. But that title is moſt frequent in Upper Germany, and particularly Auſtria, where it is borne by the barons, as being inferior to that of excellence.

Grace is alſo applied to perſons, and various kinds of performances, to denote a quality, or rather the reſult of a combination of qualities, which attracts peculiar notice, and affords peculiar pleaſure.

Grace is alſo uſed for a ſhort prayer offered before and after meat. This practice is very ancient, and has very generally obtained both in the heathen and Chriſtian world: and hence grace-cup is uſed by ſome of our poets for the cup or health drank after grace.

Grace, in the arts of *Painting* and *Sculpture*, is uſed to ſignify a peculiar quality which heightens the effect that beauty of form is calculated to produce, and renders it ſtill more engaging.

We have already, in the article Beauty, ſlightly touched upon this ſubject, and there mentioned the origin of the term among the Greeks; who gave to the Charites or Graces, whom they deified, the preſidency over whatever was amiable and engaging in the actions or ſentiments of mankind. By the undiſguiſed nakedneſs in which they always repreſented theſe goddeſſes, to whom they gave the names of Aglaia, Thalia, and Euphroſyne: they allegorized the pure ſincerity and ſimplicity in which acts of kindneſs ſhould always be wrought. By the union of theſe perſons, which are gently holding each other by the hands, or with their arms round each other's necks, they marked the union of ſpirit which dictates acts of benevolence and ſocial intercourſe; and by devoting them to the ſervice of Venus, exemplified the neceſſity of uniting the virtues of humanity to the beauties of perſon, in order to become truly engaging.

This allegory of the ancient Greeks leads us to the juſt conception of the meaning of the word grace when applied to the arts. Whatever can lend to beauty, increaſe of intereſt upon the beholder, is entitled to be called graceful, or at leaſt elegant. (See Elegance, in *Painting*.) As the heart of man, when inclined to good, is to his mental, ſo is grace to his perſonal accompliſhments; that, which gives the moſt delightful gratification to thoſe with whom he aſſociates. Without it, art is nothing, compared with the values it acquires by its preſence. Independent of all which conſtitutes mere beauty of form, it is abſolutely neceſſary to give it its full force, its greateſt effect, *viz.* that which beauty acquires by motion, wherein alone grace is viſible.

Poets as well as painters and ſculptors acknowledge the value of this quality: and the beſt have conſtantly applied it to the objects of their adulation when moving. Milton ſays of Eve, "Grace was in all her ſteps." Arioſto adds it to perfect the beauties of his Alvina; when he ſays,

> "Avea in ogni parte un laſcio teſe
> O parli, o rida, o canti, *o paſſo mova.*"

The graces, lurking about the mouth and the eyes of a beautiful perſon when in motion, are the moſt conſtant theme of poets, and as conſtantly the ſource of emulation to the painter and ſculptor to imitate; and when the artiſt has by his ingenuity diſcovered and repreſented truly thoſe minute variations of form which take place both in figure and features, when the mind is excited by ſome amiable emotion; he has obtained the ultimatum of his art; no power can go beyond it. Apelles, the ancient Greek artiſt of moſt repute, declared of his contemporaries, that their ſeveral works poſſeſſed every beauty but the perfection which grace alone can give: in this he found himſelf unrivalled. Ancient ſculpture is fraught with it; their figures, whether in action or repoſe, poſſeſs it; and when we ſay that it may be found in figures repoſing, we do not militate againſt the ſentiment that action is the baſis of grace; a previous motion being ſuppoſed to have taken place, to produce the graceful poſition. No figure, ſtanding, ſitting, or lying down, can be graceful, however beautiful it may be, whoſe parts or members are preſented altogether ſtraight and full to the eye. Without ſome varying turn being given to the head, the body, the arms, or the legs, it will be in vain to look for grace; and it is their being arreſted in the action they may aſſume, at the moſt agreeable and expreſſive point of view, which gives the conſummation of this invaluable quality to them. Then, if fixed for ever, they will be for ever graceful; and the delight which the contemplation of their mere beauty of form and proportion conveyed, will be heightened to the ſummit of that gratification which art is enabled to afford.

Wherein then lies this ſource of perfection? How, with certainty, may we expreſs it in our works? is the hitherto unanſwered query of the artiſt; or anſwered but in part and unſatisfactorily. All writers on painting have touched upon grace, and ſome have attempted to give information of the principles whereon it reſts. Lamozzo, in his Trattato della Pittura ſays, that Michael Angelo gave the following precept to Marcus de Sirena, his pupil. "That he ſhould always make a figure pyramidal, ſerpent-like, and multiplied by one, two, three!" In which precept (Lamozzo continues) in mine opinion the whole myſtery of the art conſiſteth. For the greateſt grace and life a picture can have, is, that it expreſs motion. Now there is no form ſo fit to expreſs *motion as that of flame of fire.*" This text is again repeated by Du Freſnoy, and thus has Dryden tranſlated the paſſage; "Large flowing gliding out-lines, which are in waves, give not only a grace to the part, but to the whole body, as we ſee in the Antinous, and in many other of the antique figures. A fine figure, and its parts, ought always to have a *ſerpent-like* and *flaming form;* naturally, thoſe ſorts of lines have I know not what of life and ſeeming motion in them; which very much reſemble the activity of the flame and of the ſerpent."

On theſe two remarks our own induſtrious and ſkilful Hogarth has built a ſyſtem, which, if it be not altogether compleat, has yet much ſagacity and utility in it, and which he has given to the world in his Analyſis of Beauty. He therein adopts the ſerpentine line, (which he illuſtrates by ſuppoſing a wire drawn ſpirally round a cone from its baſe to its apex), as the baſis of grace, with much apparent truth: and he is moſt certainly ſupported by all thoſe fine works wherein gracefulneſs is acknowledged to reſide. The Torſo of the Belvidere, the Venus de Medicis, the Apollo Belvidere, the Laocoon, who, in the midſt of the violent anguiſh he ſuffers, ſtill poſſeſſes grace. All theſe, and indeed all others, which have any pretenſions of the like kind, have the ſerpentine line for the baſe of their compoſition, in a greater or leſs degree. Who ſhall laugh at a ſyſtem upheld by ſuch authority! Walpole attempts to ridicule it, as well as others, becauſe Hogarth was not equal to put it in practice. The futility of ſuch an argument needs no illuſtration. To conceive a thing in the imagination, and not be able to exemplify it by practice, is by no means an uncommon occurrence among artiſts, or among men; yet the propriety of the conception may be unqueſtionable, taken on general grounds. Hogarth's miſtake appears to have been, having fixed the boundary of grace; having given what he calls the *preciſe line* of it; whereas, all the antique figures mentioned above are graceful, while each varies from the other in the quantum of curve which its action conſiſts of. Hence ariſes, that he ſo narrowed the ſphere wherein grace was obſervable, which in nature is found to be ſo widely extended, that, without juſt conſideration, his ingenuity was regarded as the ravings of excentricity; whilſt no good arguments were adduced to diſprove the general principle, which appears to us to be juſt. How to employ it, is another queſtion. And here we fear no rules will ſuffice to guide the practitioner in art. As we ſaid of elegance, we repeat of grace: he that is endowed by nature with a power to feel its beauties, and diſplay its effects, may, by cultivation, improve his original ſtock; but he that requires to be taught what grace is, will, in vain, ſeek to obtain the power of painting it; if he ever arrives at the knowledge of it, or the power of ſeeing it, in nature or in art. A conſtant obſervation upon the actions, in figure and feature, of thoſe who are by nature graceful, is the beſt ſchool in which to ſtudy it, and the readieſt mode to diſcover wherein it lies.

Grace is not, or rather ought not, to be confined to the figures in a compoſition. Every part of the picture ſhould have a conjunctive effect to produce grace in the whole. Contraſt of form will aid the beauty of the principal parts, but that contraſt ſhould never force itſelf into notice, the artifice would then become apparent, and the eye would not be led to the beautiful parts, but, on the contrary, be detained from them. The painter therefore who has conceived a graceful figure, ſhould either paint it ſingly, or be careful ſo to ſupport it, by proper accompanying lines and objects, that its beauty be not loſt in the maſs, and its effect overpowered by other forms of leſs value becoming obtruſive to the obſerver. And great care ſhould be taken to prevent every attempt to produce grace in the action of figures, from degenerating into affectation. Where that begins, grace ends: and deteſtation or ridicule, inſtead of admiration, becomes the meed of the artiſt! No vice in art is ſo odious as affectation! If the beſt executed work imaginable be unhappily tinctured with it, few minds of an elegant or graceful turn of feeling will bear to dwell upon it. Thoſe artiſts who allow their minds to be impreſſed with the paſſion or ſenſation they wiſh to convey in their figures, and thence conceive the action of them, are not ſo liable to fall into this error, as thoſe whoſe ideas are more intent on making an agreeable picture, and think of the actions, before they have conſidered the paſſions of their figures. Raphael is an inſtance of the former; Correggio and Parmigiano, great and graceful as they frequently were, nevertheleſs belong too often to the latter claſs, and even their extraordinary brilliancy of talent does not ſecure them from juſt cenſure when that is the caſe.

The beſt examples of grace are to be found in ancient ſculpture and paintings, and in the works of Raphael. Some few of the works of Correggio, of Parmigiano, and of Guido Rheni, poſſeſs it, perhaps, more refined than Raphael's; but they are ſo near the extreme boundary wherein real unaffected grace reſides, that they are dangerous exemplars to a ſtudent. A confirmed artiſt may obſerve them to advantage.

Sir Joſhua Reynolds poſſeſſed it largely, and perhaps we ought to have added his name to Raphael's. But yet he is not always pure: a little too much of the Correggieſque is admitted in ſome of his fancy pictures; and particularly in the expreſſions of the features.

GRACE, *Act of*, properly denotes an act of amneſty, or oblivion, for the pardon of all offenders who are qualified, or come within the conditions of it.

The term is alſo ſometimes extended to an act made for relief of inſolvent debtors in the ſeveral priſons; by ſetting thoſe who are qualified, at liberty from their debts and confinement.

GRACE, *Covenant of*. See COVENANT.

GRACE *Cup*, ſo called becauſe the beverage contained in it was circulated amongſt the community, or other company, at a particular time, and by a ſpecial favour. It was alſo called *Poculum Charitatis*, or the *Cup of Charity*, as being intended to indicate and promote brotherly love. At other times it was termed the *Waſſel Cup* or *Bowl*, becauſe each one of the company, in drinking out of it, drank health to his next neighbour in the old terms, *Was heil*. William of Malmeſbury, deſcribing the cuſtoms of Glaſtonbury abbey ſoon after the conqueſt, ſays, that on ſuch and ſuch particular days, the monks had "Medonem in juſtis et vinum in charitatem:" Mead in their cans, and wine in the grace cup. A large cup or bowl of this nature was always heretofore placed on the table of princes, &c. as well as of abbots. In the eleventh volume of the Archæologia there is an engraving of a grace cup, which formerly belonged to Glaſtonbury abbey, and a diſſertation upon it by Dr. Milner. The inſide of this cup, which holds two quarts, is furniſhed with eight pegs, at equal diſtances, one below the other, in conformity with Edgar's law, to repreſs exceſs in drinking. This meaſurement allowed of half a pint to each perſon.

GRACE, *Days of*. See DAY, in *Law* and *Commerce*.

GRACE, *Herb of*. See RUE.

GRACES, GRATIÆ, in the *Canon Law*, are the ſame with what we otherwiſe call *proviſions*; which ſee.

GRACES, *Expectative, Gratiæ Expectativæ*. See EXPECTATIVE.

GRACES, *Gratiæ, Charities*, in the *Heathen Theology*, were fabulous deities, three in number, who attended on Venus.

Their names are Aglaia or Eglé, Thalia, and Euphroſyne; *i. e.* ſhining, flouriſhing, and gay; and they were ſuppoſed by ſome to be the daughters of Jupiter and Eurynome, the daughter of Oceanus, and by others to be the daughters of Bacchus and Venus. Voſſius de Idol. lib. xiii. cap. 15. Homer (Iliad, lib. xiv.) changes the name of one of the graces, and calls her Paſithée, and he is followed by Statius. (Theb. lib. ii.)

Some will have the graces to have been four, and make them the ſame with the *Horæ*, *Hours*, or rather with the four ſeaſons of the year. See HOURS.

The Lacedæmonians admitted only two of them, whom they worſhipped under the names of Clito and Phaenné. The Athenians allowed the ſame number, but denominated them Auxo and Hegemone.

A marble in the king of Pruſſia's cabinet repreſents the three graces in the uſual manner, with a fourth, ſeated, and covered with a large veil, with the words underneath, AD SORORES IIII. Yet Monſ. Beger will by no means allow the graces to have been four: the company there preſent, he underſtands to be the three graces, and Venus, who was their ſiſter, as being daughter of Jupiter and Dione.

They are always ſuppoſed to have hold of each other's hands, and never parted. Thus Horace, (lib. iii. od. 21.) deſcribes them:

> "Segneſque nodum ſolvere gratiæ."

They were alſo repreſented in the attitude of perſons dancing; whence Horace ſays (lib. i. od. 4.):

> "Alterno terram quatiunt pede."

They were commonly thought to be young virgins. In the earlier ages they were repreſented only by mere ſtones, that were not cut; but they afterwards were repreſented under human figures, at firſt clad in gauze. But the cuſtom of giving them drapery was laid aſide; and they were painted naked to ſhew that the Graces borrow nothing from art, and that they have no other beauties than what are natural.

Yet, in the firſt ages, they were not repreſented naked, as appears from Pauſanias, lib. vi. and lib. ix. who deſcribes their temple and ſtatues. They were of wood, all but their head, feet, and hands, which were white marble. Their robe or gown was gilt; one of them held in her hand a roſe, another a die, and the third a ſprig of myrtle.

They had temples, as we learn from Pauſanias, at Elis, Delphos, Perga, Perinthus, Byzantium, and in ſeveral other places of Greece and Thrace. The temples conſecrated to Cupid were alſo conſecrated to the Graces: and it was alſo cuſtomary to give them a place in thoſe of Mercury, in order to teach men, that even the god of eloquence needed their aſſiſtance. Indeed ſome authors reckoned the goddeſs of perſuaſion in the number of the Graces, thus intimating, that the great ſecret of perſuaſion is to pleaſe. The Muſes and the Graces had commonly but one temple; and Pindar invokes the Graces almoſt as often as he does the Muſes. Feſtivals were appropriated to their honour through the whole courſe of the year, but the ſpring was chiefly conſecrated to them as well as to Venus. Greece abounded with monuments ſacred to theſe goddeſſes; and their figures were to be ſeen in moſt cities, done by the greateſt maſters. They were alſo repreſented on many medals. The favours which theſe goddeſſes were thought to diſpenſe to mankind, were not only a good grace, gaiety, and equality of temper, but alſo liberality, eloquence, and wiſdom, as Pindar informs us; but the moſt noble of all the prerogatives of the Graces was, that they preſided over all kindneſſes and gratitude; inſomuch that, in almoſt all languages, their names are uſed to expreſs both gratitude and favours.

GRACES. There is a good article for Fr. muſic, by M. Framery, under the term *Agrémens*, New Encycl. Meth. p. 54: in this he candidly acknowledges all the defects aſcribed to Fr. ſinging by Rouſſeau and Burney. See AGRÉMENS, RIFIORAMENTI, SHAKE, BEAT, TRILL, and *Muſical* CHARACTERS.

GRACIAN, BALTHASAR, in *Biography*, an eminent Spaniſh writer, was born in 1603. He entered among the Jeſuits at the age of ſixteen, and became a teacher in their ſociety;

ſociety, of the belles-lettres, of philoſophy, and of theology. He likewiſe exerciſed the duties of a preacher, and was at length rector of the Jeſuits' college of Tarragona, where he died in the year 1658. He was a much eſteemed author, and moſt of his works have been tranſlated into French and other foreign languages. The principal of theſe are "The Hero;" "Reflections on the political Conduct of Ferdinand the Catholic;" "A Treatiſe on the different Kinds of witty Conceptions." A work treating of the errors to which man is liable, and a collection of meditations on taking the holy communion. Moreri.

GRACIAS A' DIOS, in *Geography*, a town of Mexico, in the province of Honduras, and audience of Guatimala, ſituated at the mouth of a river, which communicates with the bay of Honduras. It has ſome gold mines in its neighbourhood. N. lat. 14° 30'. W. long. 90° 6'—Alſo, a cape on the N. coaſt diſcovered by Columbus. N. lat. 15°. E. long. 132° 50'.—Alſo, a cape, called "Falſe Cape Gracias a' Dios," on the coaſt of Nicaragua, 63 miles from the other. N. lat. 13° 36'.

GRACILIS, in *Anatomy*, a muſcle of the leg, thus called from its ſlender ſhape.

It ariſes partly tendinous, and partly fleſhy, from the os pubis internally, between the firſt and ſecond heads of the triceps; and in its deſcent on the inſide of the thigh, grows narrow, and becomes tendinous, a little below the ſartorius, and is thus inſerted into the tibia. It aſſiſts in bringing the thigh and leg inwards.

GRACILIS *Rectus*, a name given by Riolan to one of the muſcles of the leg, called by Winſlow the rectus cruris anterior, and by Cowper the rectus femoris. Albinus calls it the rectus cruris.

GRACULA, in *Ornithology*, a genus of the order Picæ, having the bill convex and acute at the edges, the baſe rather naked: tongue entire, ſharpiſh, and fleſhy; and the feet formed for walking. The genus gracula correſponds with the mainate of Briſſon, from whom it appears to have been adopted by Linnæus under the former term. Some of the ſpecies of this natural tribe were known to Ray, who refers them to the crows; and alſo to Willughby, who conſiders them as of the ſtare or ſtarling kind. The ſpecies of gracula, deſcribed in the Gmelinian Syſtema Naturæ, amount to twelve; and this number is increaſed to fourteen in the work entitled "Index Ornithologicus" of Dr. Latham, by the addition of the new ſpecies *icterops*, and the introduction of the Linnæan *Paradiſea triſtis*, which latter the laſt mentioned writer has deemed it requiſite to remove to this place. As a ſecondary to the eſſential or generic character above deſcribed, it may be proper to obſerve that the birds of this kind have the bill thick, and compreſſed at the ſides; the noſtrils ſmall, at the baſe of the bill and ſometimes ſituated near the edge; the toes three forward and one behind, the middle toe connected at the baſe to the outer one, and the claws hooked and ſharp. Their principal food conſiſts of fruits and inſects.

Species.

RELIGIOSA. Violet-black; ſpot on the wing white; band on the hind head naked and yellow. Gmel. Linn. *Mainatus*, Briſſ. *Sturnus indicus Bontii*, Ray. *Bontius's Indian ſtare*, Will. *Le Mainate*, Buff. *Minor grakle*, Albin.

The length of this bird is ten inches and a half, its bulk equal to that of the black-bird: the bill an inch and a half long, of an orange colour tipped with yellow; the legs tawny or orange; feathers of the head, except the middle ones, very ſhort and ſilky; and the naked band reaching nearly to the nape. This ſpecies is found in many parts of India, and not unfrequently in a tame or domeſticated ſtate, being naturally of a familiar diſpoſition, and capable of being taught to whiſtle, ſing, and imitate the articulations of the human voice with greater preciſion than any of the parrot tribe. In the iſlands of Sumatra and Java it is called by the natives *hill-maynoa*, and in China, whither it is imported from the latter place, its common name is Teeong. Several ſuppoſed varieties of this bird are deſcribed by writers, the moſt remarkable of which is that called the greater minor grakle, le grand mainate of Briſſon; this entirely correſponds with the ordinary kind, except in ſize, which it materially exceeds, being in this reſpect not inferior to the jackdaw; it inhabits the iſland of Hainan, in Aſia.

CALVA.—Sub-cinereous, with the head naked each ſide. Linn. *Merula calva Philippinenſis*, Briſſ. *Merle chauve des Philippines*, Buff. *Goulin*, ib. *Iting, Tabaduru, vel Gulin*, &c. Phil. Tranſ. *Bald grakle*, Lath.

Size of the black-bird, with the head and cheeks bare of feathers and fleſh-coloured, except a narrow liſt of ſhort brown feathers, extending from the baſe of the bill to the back of the head; the naked part becoming of a deep red when the bird is irritated: the general colour above is ſilvery-aſh, beneath grey-brown, bill and legs brown. Theſe birds build their neſt in the hollows of trees, eſpecially preferring thoſe of the cocoa-nut: it is repreſented as a noiſy chattering bird, of voracious appetite, and as living principally on fruit. Found in the Philippine iſlands.

FŒTIDA. Black; exterior part of the quill-feathers blueiſh; band round the neck naked. Linn.

Native of America, in ſize reſembling the magpie: the head with erect, ſhort, ſilky feathers; noſtrils oval and naked; tongue ſharp; and tail even at the tip.

BARITA. Somewhat grey; ſhoulders blue; quill-feathers at the outer edge green. Linn. *Monedula tota nigra*, Ray. *Boat-tailed grakle*, Lath.

Size of the cuckow: the bill ſhortiſh, rather black, paler beneath and naked at the baſe; the plumage black, inclining to grey, and gloſſed with purple; tail rounded, concave when folded, and becoming flat on being expanded; legs and claws black. The ſpecies inhabits the Antilly iſlands and North America. It feeds on inſects and fruits.

CRITATELLA. Black, the firſt quill-feathers at the baſe, and tail-feathers at the tip white; bill yellow. Gmel. *Merula ſinenſis criſtata*, Briſſ. *Merle huppé de la Chine*, Buff. *Chineſe ſtarling or black-bird*, Edwards.

A ſpecies rather larger than the black-bird; the plumage inclining to blue, with a creſt of feathers on the head which it can raiſe and depreſs at pleaſure; greater quill-feathers from the baſe to the middle white, the remaining part deep blue; tail-feathers, except the two in the middle, tipped with white; legs dull yellow. The creſted grakle ſings and talks like the ſpecies religioſa, but with inferior diſtinctneſs; and is frequently kept in cages in China, which country it inhabits in a wild ſtate; its principal food is rice, worms, and inſects.

SAULARIS. Blueiſh-black; belly, ſpot on the wings, and lateral tail-feathers white. Gmel. *Lanius bengalenſis niger*, Briſſ. *Pie grieſche noir de Bengale*, Buff. *Bengal magpie or dial-bird*, Albin. *Dial grakle.*

Native of Bengal. Size of the Miſſel thruſh, with the head, neck, breaſt, back, rump and upper tail-coverts black; belly, ſides, thighs, and under tail-coverts white; tail even at the end, black above, and white beneath. The female differs in being black inſtead of brown on the fore-part of the neck and breaſt, and in the white being more obſcure.

QUISCALA. Violet, black; tail rounded. Linn. *Picus jamaicenſis*, Briſſ. *Cornix purpurea*, Klein. *Fur-zeæ*, Kalm. *Izanatl*, Ray. *Black-bird, or maize-thief*, Kalm. Tr. *Purple grakle*, Arct. Zool.

Native of Mexico, and the warmer parts of America, and the Weſt Indies; ſings finely, builds on trees, is deſtructive to plantations, but uſeful in deſtroying the noxious inſects that infeſt them. The fleſh is black and unſavoury. Its ſize is about that of the black-bird, the male a little exceeding the female in bulk; the bill and legs are black; tail long and cuneated, and with the wings purple; the female entirely duſky.

ATTHIS. Greeniſh-blue; belly ruſty; legs blood-red, Linn. *Corvus Ægyptius*, Haſſelq. *Egyptian grakle*, Lath.

Size of a lark; and is ſuppoſed by Haſſelquiſt to feed on inſects, the remains of centipedes and ſcorpions being found in the ſtomach. The bill is black; neck with a longitudinal ruſty line each ſide, and the claws black.

LONGIROSTRA. Brown, beneath ochre-yellow; head and neck black; band round the neck naked and wrinkled; area of the wings white; tail cuneated, black, and at the tip white. Pallas, &c.

Native of South America; length eight inches. This appears to be the ſame ſpecies as that deſcribed by Sonnini under the name of merle des Savannes.

STURNINA. Hoary; ſpot on the crown and back between the wings violet-black; tail and wings with a tinge of green, the latter with a double white ſtripe. Pallas.

Inhabits the Ozier banks of Dauuria; the neſt and eggs reſemble thoſe of the thruſh; the plumage of the female is dirty aſh, with the back brown; and the wings and tail deep black.

ICTEROPS. Black; band on the wings and body beneath white; the region of the eyes naked and wrinkled. Lath. *Le mainate a face jaune*, Vieill. *Yellow faced grakle.*

Length ſeven inches and a half; bill compreſſed; noſtrils oval; legs yellow and wrinkled. Native of New Holland.

CAYANENSIS. Striated; above tawny, beneath yellowiſh; head and chin varied with tawny and white; tail wedged, ſharp and with the wings tawny. Gmel. *Climbing grakle.*

Inhabits the interior parts of Guiana; is about ten inches in length, and remarkable for climbing trees; the bill is black, about two inches long, and a little curved; the legs are alſo black.

CARUNCULATA. Cinereous; tail and quill-feathers black; crown and chin with warty excreſcences. Gmel.

Length ſix inches; and ſuppoſed to inhabit the Cape of Good Hope.

MELANOCEPHALA. Head black, front white; back, tail, and wing-coverts blueiſh-aſh, the laſt with a tranſverſe white ſtreak near the extremity. Don. *Gracula melanocephala*, Lath. *Le mainate a tête noire*, Vieill. *Black-headed grakle.*

A ſpecies recently diſcovered in New South Wales; its height is about eight inches; the bill yellow, a little bent, and formed at the baſe like that of the *Turdus*, or thruſh tribe; the tail three inches long; the legs very long in proportion, of a pale yellow ochre-colour, and armed with ſtrong blackiſh claws.

VIRIDIS. Dull green; throat above brown and blackiſh varied; under parts of the plumage whitiſh, with ſome blackiſh ſtreaks; wings blackiſh, edged with white; tail blackiſh, with white tip. Don. *Gracula viridis*, Lath. *Le mainate vert*, Vieill. *Green grakle.*

Lately found; the ſpecies inhabits New Holland, and appears to be very rare; the bill is ſtrong, ſomewhat inclining at the baſe, and the colour of horn; the legs blackiſh.

CYANOTIS. Space about the eyes bare of feathers and bright blue; head black, with a white croſs on the hind part; upper part of the neck, body, ſcapulars, wing-coverts, and tail yellowiſh-green; breaſt lead-colour; plumage beneath white. Don. *Gracula cyanotis*, Lath. *Le mainate a oreilles bleues*, Vieill. *Blue eared grakle.*

Length twelve inches and a half; bill black; legs blue black, with very hooked black claws. Native of New South Wales.

PICATA. Greater part of the head, the neck; tranſverſe band on the breaſt, back, border of the wings, and tail above nearly to the tip black; throat, breaſt, wing-coverts, body beneath, and under ſurface of the tail-feathers white. Don. *Gracula picata*, Lath. *Le mainate pie*, Vieill. *Pie grakle.*

Rather larger than the black-headed grakle, and like that ſpecies inhabits the regions of Auſtralaſia; the general colour black and white, the former partially gloſſed with purple; bill yellow, and correſponding in form with that of the black-headed grakle; and the legs lead colour.

GRACULUS, the *Shagge*, a ſpecies of *Pelecanus*; which ſee.—Alſo, a ſpecies of *Corvus*; which ſee.

GRADATION, the act of aſcending, ſtep by ſtep, to any pitch or eminence: from the Latin *gradus*, *degree*, *ſtep*.

GRADATION, in *Architecture*, ſignifies an artful diſpoſition of parts, riſing, as it were, by ſteps or degrees, after the manner of an amphitheatre: ſo that thoſe placed before do no diſſervice, but rather ſervice, to thoſe behind.

The painters alſo uſe the word gradation for an inſenſible change of colour, by the diminution of the teints and ſhades. See below.

GRADATION, in *Chemiſtry*, is a kind of proceſs belonging to metals. It conſiſts in gradually raiſing, or exalting them to a higher degree of purity and goodneſs, ſo as to increaſe their weight, colour, conſiſtence, &c.

GRADATION, in *Logic*, is an argumentation, conſiſting of four or more propoſitions, ſo diſpoſed as that the attribute of the firſt is the ſubject of the ſecond; and the attribute of the ſecond is the ſubject of the third, and ſo on, till the laſt attribute come to be predicated of the ſubject of the firſt propoſition. As in Porphyry's tree; man is an animal; an animal is a living thing; a living thing is a body; a body is a ſubſtance; therefore man is a ſubſtance.

An argument of this kind is liable to many fallacies; both from the ambiguity of words and things; *e. gr.* Peter is a man; man is an animal; animal is a genus; genus is an univerſal; therefore Peter is an univerſal.

GRADATION, in *Painting*, relates both to chiaro-ſcuro and to colour: that is, all the different degrees in which light and dark, and colour may be modified, are comprehended in it.

An object receding from the light, and gradually loſing it, becomes at its fartheſt extremity obſcurely defined. A coloured body, pure or bright in teint, under the ſame circumſtances, gradually diminiſhes in clearneſs of hue throughout its receding parts, and becomes dull and dark. By fixing the ſcale of gradation in both theſe particulars, effects of great force or great ſimplicity may be produced. The ſcale of deſcent being made rapid, great force will enſue, from the ſtrong oppoſitions it promotes; and the reverſe will take place when the degrees of deſcent are prolonged, and leſs contraſt thereby effected. The nature of the ſubject, jeĉt, and the ſituation of the figures with regard to light, muſt's be the artiſt's guide in this matter.

The gradation of colour includes not only what is mentioned above, *viz.* the different degrees of purity, or brilliancy of the ſame colour, but alſo the approximations of each colour to its neighbour, neceſſary to produce harmony; and alſo the art of gradually loſing the local colour in obſcurity, and yet maintaining the character of it in the object: which is extremely difficult and of great importance in the art of painting.

Gradation, in *Rhetoric*, is when a ſeries of conſiderations or proofs is brought riſing by degrees, and improving each on the other. See Climax.

Such is that in Cicero to Herennius: "Africano induſtria virtutem, virtus gloriam, gloria æmulos comparavit."

GRADI, *Italian*, degrees. Every eccleſiaſtical mode, and every key in ſecular muſic, has its *gradus*, its ſcale; no note of which can be changed by an accidental *flat*, *ſharp*, or *natural*, without changing the key. As in the key of F major with one flat at the clef, annul that flat by a natural, and the key is changed to C, add another flat and it modulates into B♭.

GRADISCA, or Gradisch, in *Geography*, a town of Germany, and capital of a ſmall county, annexed with Goritz to the dominions of Auſtria, ſeated on the Lizonzo, built in the year 1473 to ſtop the incurſions of the Turks, additionally fortified in 1764, and erected into a biſhopric in 1784; taken by the French in 1797:—5 miles S. of Goritz. N. lat. 46° 2′. E. long. 13° 27′.—Alſo, a town of Sclavonia, on the river Save, near the borders of Croatia, well peopled and fortified; 132 miles W. of Belgrade. N. lat. 45° 10′. E. long. 17° 50′.

GRADISELLO, a town of Italy, in the department of the Adda and Oglia; 8 miles S. of Breno.

GRADISTA, a town of European Turkey, in Bulgaria, on the borders of Servia; 40 miles S. of Viddin

GRADISZTE, a town of Walachia; 48 miles N.E. of Galacz. N. lat. 45° 23′. E. long. 27° 19′.

GRADITZ, a town of Bohemia, in the circle of Konigingratz; burnt by Ziſca; 12 miles N. of Konigingratz.

GRADO, a ſmall iſland in the gulf of Venice, near the coaſt of Friuli, with a town which was the firſt ſee of the Venetian patriarch. N. lat. 45°. E. long. 13° 17′.

GRADUAL, Graduale, was anciently a church-book, containing divers prayers, rehearſed, or ſung, after the epiſtle: called in ſome of our ancient writers *gradile*, *graduale*, *graile*, &c.

After reading the epiſtle, the chantor aſcended the ambo with his gradual, and rehearſed the prayers, &c. therein; being anſwered by the choir; whence the name gradual, on account of the ſteps or degrees of the ambo.

The gradual or graile, which the provincial conſtitutions of archbiſhop Winchelſea, made at Merton, A. D. 1305, required to be in every church, was a book containing all that was to be ſung by the choir at high maſs; the tracts, ſequences, hallelujahs; the creed, offertory; triſagium, and alſo the office for ſprinkling the holy water. "Gradale ſic dictum, a gradalibus in tali libro contentis."

It is ſometimes taken for a maſs-book, or part of it, inſtituted by pope Celeſtine, anno 430. See ſtat. 37 Hen. VI. cap. 32.

In the Romiſh church, gradual is an appellation ſtill given to a verſe which they ſing after an epiſtle, and which was anciently rehearſed on the ſteps of the altar: though Ugutio gives us another account, and ſays it took its denomination gradual becauſe ſung in the gradual aſcent from note to note. Magri ſpeaks differently ſtill, and will have it to have taken its name becauſe ſung while the deacon went up the ſtairs to the pulpit, to ſing the Goſpel.

Gradual, *Gradualis*, is alſo applied to the fifteen pſalms, ſung among the Hebrews, on the fifteen ſteps of the temple. Others are rather of opinion that they were thus denominated becauſe the ſingers raiſed their voice by degrees, from the firſt to the laſt.

Cardinal Bona, in his treatiſe of Divine Pſalmody, ſays, the fifteen gradual pſalms are intended to repreſent to the mind, that we only arrive at the perfection of goodneſs, or holineſs, by degrees. He goes on to lay down the fifteen degrees of virtue, correſponding to the fifteen pſalms; five of them are for beginners; five for proficients; and the reſt for the perfect.

GRADUATE, a perſon who has the degrees of any faculty: a graduate in phyſic, in divinity, in muſic, &c. See Degree, Doctor, &c.

This privilege of graduates is no older than the fifteenth century: it being obſerved, that men of learning were much neglected by the collators, and patrons of churches; complaint, therefore, was made to the council of Baſil, where this decree was made; which was afterwards confirmed by the Pragmatic Sanction, and again by the Concordat.

GRADUATION *of Aſtronomical Inſtruments*, is the dividing of a circle, or of ſome aliquot part thereof, into degrees and its ſub-diviſions, on the limb of any inſtrument that is uſed for meaſuring angles with a great degree of accuracy. (See the article Degree.) When the inſtrument to be graduated is of a portable ſize, admitting of only a ſmall radius of curvature for the limb that is to be divided, the operation is very readily as well as accurately performed by an engine, ſuch as Ramſden's or Troughton's, the former of which we have deſcribed under the article Engine *for dividing Circles*, &c. but when the radius of the inſtrument is too large to admit of diviſion by an engine, the taſk of graduating, by the determination and adoption of original dividing points or lines, requires no ordinary portion of ſkill, manual dexterity, and perſeverance to be united. Before the eſtabliſhment of the Royal Obſervatory at Greenwich, the art of graduating was in a rude ſtate, but a deſire to have this inſtitution furniſhed with ſuperior inſtruments of obſervation has ſtimulated the different aſtronomers royal, ſucceſſively, to encourage the talents of ſuperior artiſts from time to time, till at length ſuch perfection is attained, that little more can now be hoped for in the improvement of our beſt Engliſh inſtruments. The hiſtory of the art of graduating aſtronomical inſtruments, and the gradual developement of the moſt convenient and moſt accurate modes of proceeding, together with the difficulties to be ſurmounted in the various ſtages of progreſs towards perfection, will be beſt explained by a conciſe detail of each ſucceſſive method of dividing, that has been practiſed, agreeably to the order of time; and by remarks ariſing out of each detail, as they moſt naturally occur.

We know not ſufficient of the aſtrolabes of Hipparchus and Ptolemy to enable us to give any ſatisfactory account of the nature and accuracy of their diviſions and ſub-diviſions, though it is probable that the graduated circles on them contained each 360°, agreeably to the Egyptian mode of dividing the circle. Neither can we give a very perfect deſcription of the manner in which Copernicus, long afterwards, had his aſtrolabe and meridian quadrant graduated, though we have ſhewn under our article CIRCLE that his parallactical inſtrument, with which his altitudes were chiefly taken, had its limb divided by equal diviſions that were the ſubtenſes of 3′ 49.″137 each.

Tycho Brahe's inſtruments had the advantage of a long radius, which rendered any inequalities that might occur in his diviſions of leſs value than they would have been in inſtruments of ſhort radii; the ſmalleſt ſub-diviſions into which he profeſſed to mark his ſpaces were 10′ each, and the ſingle minutes and portions of a minute, even to 15″ and 10″, were indicated by triangular diagonals; but with what degree of preciſion the ſub-diviſions were effected, and what dependence could be placed on his diagonals, as to accuracy, at this diſtance of time, it is not an eaſy matter to aſcertain: it is recorded, however, that the operation of graduating his inſtruments was performed by his own manual labour.

And what we have here ſaid of the inſtruments of Tycho Brahe, is equally true of the *machina cæleſtis* of Hevelius; whatever accuracy his apparatus poſſeſſed, was the reſult of his own perſevering induſtry, but we are not aware that his methods of proceeding have been particularly detailed.

In Dr. Hook's Animadverſions on the *Machina Cæleſtis* of Hevelius, 1674, this very ingenious mechaniſt has publiſhed an account of his method of racking the exterior edge of the limb of his quadrant, as performed by Tompion, which method, he ſays, "does not at all depend upon the care and diligence of the inſtrument-maker, in dividing, graving, or numbering the diviſions, for the ſame ſcrew makes it from end to end." But, as Smeaton has very properly obſerved, this inventive contriver has not given his reader any precautions or particular directions how the perfection of the ſcrew is to be enſured, or how the notches of the rack work are to be rendered perfectly equal among themſelves, notwithſtanding the unequal denſities, and hardneſs of different portions of the metal ſo racked. The difficulties alluded to here, were acknowledged by the duc de Chaulnes, in a memoir of the Royal Academy of Sciences at Paris, publiſhed in the year 1765. The doctor called the account of his method, "an explication of the new way of dividing," and as an original invention, it may probably be called his own, though the want of a perfect ſcrew, with intervals exactly proportioned to the effective radius of his quadrant, was a ſource of error, that poſterior contrivances were required to remedy. See ENGINE (by Ramſden) *for cutting the ſcrews of the circular dividing engine.*

The uſe of Dr. Hook's ſcrew for racking the limb of an aſtronomical inſtrument was not, however, abandoned, without a fair trial of its accuracy in reading the quantity of the angles ſo meaſured; for Flamſtead, (or Flamſteed,) on his appointment to the Royal Obſervatory in 1676, employed Tompion to conſtruct him a ſextant of ſix feet nine and a quarter inches radius, at the expence of Jonas Moore, with an endleſs ſcrew of ſeventeen threads per inch, acting on the racked edge of the limb, and with teleſcopic ſights, which had not been before uſed: the reſult of this trial was, that ſome ſhake took place in the notches, that were worn by the ſcrew, and frequently an error of a whole minute in reading an obſervation was unavoidably produced thereby. To remedy this evil, in the following year degree ſpaces, with diagonal diviſions to read to the accuracy of 10″, were added as a check on the meaſures of the ſcrew, and a column, to contain the *check* angle by diagonal lines, was filled up from the 11th of September of the year 1677. Theſe additions, it appears, from the *Prolegomena* of the *Hiſtoria Cæleſtis*, were inſerted by Flamſtead himſelf, and a compariſon of the ſcrew with the diagonals proved that an error of as much as *one minute* was frequently the reſult of the reading by the ſcrew. In an obſervation of the moon, taken on the 9th of June 1687, Smeaton ſays, that on looking over the obſervations, he detected an error of 55″, which, upon a radius of ſix feet nine inches, he calculates amounts to more than $\frac{1}{50}$th part of an inch. The ſcrew, however, was uſeful for giving a regular ſlow motion to the teleſcopic ſights, and though its uſe, as an accurate meaſure of a large arc, was ſoon abandoned in aſtronomical inſtruments, it has been retained as an excellent mode of producing a ſlow motion, by the aid of a tapped clamping piece, and has been applied with great ſucceſs to the limb of a dividing engine, which, being a complete circle, admits of equalization of the contiguous notches, by a long continued ſimultaneous action of ſeveral threads of a very perfect ſcrew, carried many times all round the circle, when the exact ſituations of diſtant notches have been enſured by the checks afforded by accurate diviſions, previouſly made on its plane.

Notwithſtanding what we have above ſaid of the imperfect meaſurement of an angle by the ſcrew, it was not relinquiſhed without another trial in Flamſtead's time, by Abraham Sharp, his amanuenſis, to whoſe ſkill and dexterity in manual operations of a mechanical nature both Flamſtead and Smeaton have borne ample teſtimony; the latter of whom ſays, "I look upon Mr. Sharp to have been the firſt perſon that cut accurate and delicate diviſions upon aſtronomical inſtruments." The inſtrument at which Sharp laboured, and to which he applied the ſcrew in conjunction with the diagonals of the divided ſpaces, in 1689, was the *mural arc* at Greenwich, of which the radius is ſix feet ſeven inches and a half. "But yet," ſays Smeaton, in his paper on this ſubject, read November 17, 1785, at the Royal Society's room, "whoever compares the different parts of the table for converſion of the revolutions, and parts of the ſcrew belonging to the mural arc into degrees, minutes, and ſeconds, with each other, at the ſame diſtance from the zenith on different ſides, and with their halves, quarters, &c. will find as notable a diſagreement of the ſcrew-work from the hand-diviſions, as had appeared before in the work of Mr. Tompion; and hence we may conclude, that the method of Dr. Hook, being executed by two ſuch maſterly hands as Tompion and Sharp, and found defective, is in reality not to be depended on in nice matters."

This inference of Smeaton obviouſly implies, that what he calls the *hand-diviſions* of the mural arc, are more accurate than the readings by the ſcrew alone; but, as he has given no other teſt of the accuracy of theſe hand-diviſions, nor has explained by what proceſs they were inſerted, the more legitimate inference would have been, that either the ſcrew, or the hand-diviſions may be faulty, or both may be ſo in their reſpective degrees. It is to be regretted that Sharp, who was a mathematician as well as a mechaniſt, has not publiſhed the method he adopted of marking out and cutting his dividing lines, which is more immediately the ſubject of our preſent article. Had he made his hand-diviſions firſt, and checked his notches, made by the ſcrew, thereby, as Ramſden did with his engine afterwards, his meaſures by the ſcrew would have been more perfect, though the centre-work might have been liable to be galled by too much preſſure of the ſcrew againſt the notched edge of the inſtrument, when frequently uſed.

Nearly about the time that the mural arc was fixed at Greenwich, Olaus Roemer, the Daniſh aſtronomer, ſupplied his domeſtic obſervatory with an inſtrument that had diviſions and teleſcopic ſights moving in the meridian, by means of a long axis, common to both the divided arc and teleſcope, which therefore admitted of better adjuſtment for the vertical motion than the mural arc was capable of; and which may be conſidered as the firſt *tranſit inſtrument* that properly deſerves ſuch a name. In dividing his arc, Mr. Roemer diſregarded the total length, with reſpect to an exact number of *degrees*, and looked more particularly to the equality of the diviſions, which were convertible into degrees and minutes, by a table calculated for this purpoſe. The method he made choice of, for rendering his diviſions equal, was to begin at one end of his arc, and to proceed by ſtepping, and by marking the dividing points with a proper preſſure at each ſtep, till the whole arc was finiſhed: for this purpoſe he did not depend on a pair of dividers, however ſtrong their legs, but two fine pointed pieces of ſtrong tempered ſteel were tied, or otherwiſe fixed together in ſuch a way, that the diſtance between the two points was $\frac{1}{12}$th or $\frac{1}{10}$th of an inch, and the radius of the arc to be divided was ſo proportioned, from $2\frac{1}{2}$ to 3 feet, that this diſtance made a ſpace very nearly equal to 10′; whether exactly ſo, or not, did not ſignify, as the difference was allowed for by the calculated table, when an angle had been read by the divided ſpaces as numbered. It is eaſy to conceive that this mode of meaſuring an angle would be as accurate as any other, after the due allowance was made, provided the ſpaces were perfectly equal to each other; but the theory of this method is more perfect than the practice; for none of the mixed metals is ſo perfectly uniform in its denſity, and ſo free from hard particles, occaſionally met with by the ſtepping points, as to enſure the perfect equality of the divided ſpaces, however carefully the ſtepping points are preſſed in a vertical direction; the ſmalleſt deviation on making the firſt impreſſion becomes greater by preſſure, and an attempt to rectify any erroneous points can never be depended upon: but, what is worſe, every individual deviation from perfect equality is charged on the whole arc, which therefore will be either longer or ſhorter than the true length, by the aggregate of all the poſitive, or negative quantities, that predominate in the inequalities of the individual ſpaces thus divided; and the longer the arc is from the firſt point, when any angle is meaſured, the greater is the error of the meaſurement in all probability, becauſe the greater is the probable aggregate of the deviations from perfect equality in the ſpaces. The total arc thus divided was about 75°; but as Roemer applied no correction to the errors of the diſtant diviſions of this arc, no dependence could be placed on the reſult of the readings, even when converted into degrees and minutes by his table, which ſuppoſed the arc perfectly divided.

The next ingenious artiſt who diſtinguiſhed himſelf in the art of graduating aſtronomical inſtruments, was the celebrated Graham. At the appointment of Dr. Halley to the Royal Obſervatory of Greenwich, Flamſtead's inſtruments were removed by his executors, and in the year 1725, Graham undertook the conſtruction of a new mural quadrant, which remains as a ſtanding proof of his ſkill, to this day, in the ſaid obſervatory. This artiſt availed himſelf of every contrivance that had been practiſed by his predeceſſors, and invented ſuch a ſtrong, and, at the ſame time, light method of conſtructing the frame-work of the iron quadrant, conſtructed by Jonathan Siſſon, as evinced his ſuperior knowledge of mechanics, as well as Siſſon's preciſion in the workmanſhip. The diagonals were now rejected, as being incapable of being read by a fiducial edge with requiſite exactneſs, and the vernier ſcale was ſubſtituted as much preferable in this reſpect, and the beam-compaſs, with equal advantage, was ſubſtituted for the ruler and dividing knife, which were liable to conſiderable parallax, notwithſtanding the greateſt precaution taken in drawing the dividing lines, or in marking the dividing points. The ſcrew for ſlow motion was alſo uſed for dividing the vernier ſcale in a proper way, after its value was aſcertained; and its perfection was enſured, with reſpect to the due inclination of its threads all round, as well as to the equality of their ſpaces: and laſtly, in order that the advantage of *continual biſection* might be introduced as a *check* on the degree ſpaces, the quadrant was divided in 96 ſpaces, with ſub-diviſions, in a ſeparate arc: and the readings from the 96th arc were a conſtant teſt of the readings by the 90°, when converted into degrees and minutes by calculation, or by a table uſed for that purpoſe.

As it is not our intention to deſcribe here the ſtructure of Graham's quadrant, but merely to deſcribe his method of graduating the limb of braſs, which was laid over the iron frame, we ſhall ſatisfy ourſelves by ſtating that two ſeparate arches were ſtruck by a beam-compaſs, ſecured from bending by ſeveral bracing pieces; the reſpective radii of which were 96 85, and 95.8 inches. The inner arch was divided into exact degrees, and twelfth parts of a degree, or 5′ ſpaces; but the outer one was divided, as we have ſaid, into 96 equal parts, and each of theſe again ſub-divided into 16 equal parts, ſo that the ſub-diviſions were to each other as 1080 : 1536, or in ſmaller number, as 25 : 32. To convey to the reader an idea how the arcs were divided, ſuppoſe the quadrant to be repreſented by *fig.* 1. of *Plate* XVIII. of *Aſtronomical Inſtruments*, and that the occult line *a b d* be required to be divided into degrees by points inſerted thereon, as centres for cutting the dividing lines from; the known property of the circle, that the chord of ſixty degrees is always equal to the radius, afforded the means of laying down the total arc of 90° in the firſt place; thus, from the point *a*, or zero of the arc, the point *b* was marked by meaſurement of the ſame points of the beam-compaſs unaltered, that ſtruck the occult line; and this arc of 60° was biſected at *c* by an extent nearly equal to the chord of 30 from the points *a* and *b* reſpectively; the extent, however, being a trifle leſs than the chord of 30°, the two ſweeps did not interſect each other, but approached ſo nearly together, that the ſmall ſpace between the ſweeping lines was biſected by a point put in by hand, by the aſſiſtance of a magnifying eye-glaſs: the diſtance of this point *c* from *a* or from *b* being the chord of 30°, was laid along the limb from *b* to *d*, the extreme point of the whole arc of 90°, and when this operation was ſo carefully performed, that the arcs *a c*, *c b*, and *b d* were preciſely of the ſame length, when compared with each other, the total arc might ſafely be depended on, as being of its true dimenſions. During this nice operation, it was preſumed, that the length of the dividing beam had not altered by any variation of temperature. The next ſtep was to biſect each of thoſe three arcs of 30° into ſix of 15° each, in the ſame manner as *a b*, the arc of 60°, was biſected into *a c* and *c b*: but the arcs of 15° were not diviſible into a lower number than three parts of each 5°; in order to tripartite each arc of 15°, a ſeparate arc was uſed, as an arc of trial, deſcribed by the original radius unaltered, and 15° were transferred to it, and divided by trial till one-third of it was aſcertained to meaſure exactly the diſtance between the two points of the compaſs; this diſtance was then laid off each way from each of the aforeſaid points of the arcs of 15°, and the ſecond ſpace of each being found equal to their contiguous firſt and third ſpaces thus meaſured, the whole arc was ſub-divided into 18 equal arcs of 5° each: in the ſame manner, a fifth part of one of the arcs of 5°, firſt transferred upon another part of the arc of trial, was aſcertained by repeated adjuſtments and examinations, and then inſerted within the diviſions of the divided arc, by turning the points over twice each way, from every point already laid down, and then the middle ſpace of each five being found equal to the extreme as well as contiguous ſpaces reſpectively, the whole arc was ſubdivided into points of one degree of diſtance from each other. But to enſure a perfect equality among theſe ſpaces required great ſteadineſs of hand, as well as obſervation of the eye, and caution, to preſerve the regulated diſtances of the points, unaltered during the operation. Of courſe, the marking point was required to be fine, and at the ſame time well tempered, as well as ſtrong enough to bear preſſure, which preſſure was alſo neceſſary to be made in a perpendicular direction on the face of the limb. The ſub-diviſions of the degree ſpaces into 12 parts of 5′ each, were done firſt by triſection, and then by biſection, or *vice verſâ*, in the manner we have already deſcribed; and the delicacy of theſe operations, on ſo ſmall a ſcale, required extraordinary attention and care to enſure perfect equality among the ſmalleſt ſub-diviſions, which were now in a ſtate to be transferred by lines tending to the centre of the arc to be graduated. This was an operation that could not be done well by the ſtraight edge of a rule, and a marking point, or dividing knife that would be liable to deviate a little, notwithſtanding the greateſt care; here another, but ſmaller beam-compaſs was ſubſtituted for the ruler, probably for the firſt time, for the purpoſe of transferring the graduated points from the occult arc into the arc to be graduated, in the following manner; ſuppoſe the points g and e to be intended to be transferred; becauſe the lines to be cut, as the dividing lines, are required to be in a direction tending directly towards the centre o of the concentric arcs, deſcribed on the limb; the diſtance of the cutting point, from the ſtationary point of the compaſs, was taken of ſuch a length, that the cutting point croſſed the arc to be cut at right angles, or, in other words, the beam was ſo ſituated, as to become a tangent to the arc to be cut; therefore the diſtance of the two points of the beam was regulated by the diſtance of the occult line of dots a, b, d, from the arc to be graduated by the ſtraight lines, or rather by the curved lines, which in fact were ſubſtituted, and which paſſed without ſenſible error for ſtraight lines, when the tangent line in queſtion was long. From the point or dot g, the curve $h\ k$ was drawn, and from the dot e the curve $f\ i$; but in ſuch a way that a ſmall portion only of each, that lies between the circular lines, was cut on the face of the inſtrument. In the ſame manner all the other dots were ſucceſſively transferred, while each repreſentative of the numerals 5, 10, 15, &c. were made longer than their intermediate lines of diviſion, and the ſub-dividing lines were again ſtill ſhorter. The vernier carried by the teleſcope, when nicely and accurately divided, would detect any inaccuracy in the ſub-diviſions thus transferred, by the aid of a magnifier properly adjuſted.

The arc of 96 diviſions, with their ſub-diviſions, was not, properly ſpeaking, *graduated*, but divided and ſub-divided into portions of ſmaller value than *degrees*, and 5′ ſpaces; but as the number choſen is diviſible continually by the number *two*, it was completed by *continual biſections*, which method therefore requires no further explanation. We are told by Dr. Smith (in his Optics) that theſe two arcs were never found to differ from each other more than 5″ or 6″ on any part of the limb, but that when there is ſuch difference, the preference ought to be given to the biſected arc of 96 diviſions.

To prove that the ſpaces obtained by the lines of transfer are equal to thoſe between the correſponding dots or points, let $e\ f$ and $g\ h$ be joined, alſo $o\ f$, $o\ h$, $o\ e$, and $o\ g$; and the triangles $e\ o\ f$, $g\ o\ h$, will be every way ſimilar, and equal to each other; therefore, if the common angle $e\ o\ h$ be taken away from the equal angles $e\ o\ f$, $g\ o\ h$, the angles $e\ o\ g$ and $f\ o\ h$, that remain, will alſo be equal to each other.

It does not appear that Graham took any meaſures to guard againſt, or even to detect the errors that his method of dividing is liable to, from variations of temperature in his quadrant and beam, during the time that the operation is going on, and from the correſponding variations of length in the metals, according to their reſpective expanſibilities; nor is it quite certain that he was aware of the probable extent of ſuch errors, ſeeing he conſtructed the frame-work of his inſtruments of iron, and had his circle to be divided of braſs. In Dr. Bradley's zenith ſector made by Graham, Dr. Maſkelyne has cauſed an iron limb to be ſubſtituted for the original braſs one, and has had the points of diviſion inſerted on ſtuds of gold, to avoid the errors that aroſe from the unequal expanſibility of the different metals.

We might here mention Mr. H. Hindley's plan of dividing a circle by a toothed circular plate and endleſs ſcrew in form of an engine, about the year 1740, but that we think his method of dividing and drilling the holes of his plate, by bending a ſtraight ſlender bar of braſs into a circle, and transferring the holes therefrom, cannot be depended on where much accuracy is required in the diviſions of a circle. It was originally intended, and is much better calculated, for dividing and cutting the notches between the teeth of a wheel; but the reader may ſee the plan deſcribed, and ſome improvements on it propoſed by Smeaton, in his paper already mentioned, as contained in the Philoſophical Tranſactions of London, in the year 1785.

Jeremiah, the ſon of Jonathan Siſſon, was of Graham's ſchool of dividing, and did nearly as much juſtice to the method he adopted, as Graham himſelf, probably; and his nice care, and perſevering aſſiduity, have claſſed him among the firſt dividers of his time; but we are not aware that he was the inventor of any original contrivance, except, perhaps, that he applied a triple index to ſome of his inſtruments, one of which had the vernier, and each of the others had a ſingle line or ſtroke drawn at one-third of a circle from each other, and from zero of the vernier, which might act as a check on the eccentricity of the circle, as well as on the inequality of its diviſions; though it does not appear certain that this was the original intention, as the three props of his vernier-bar in his theodolites required it to be triple; but in his circular indexes one ſtroke only was made, and that oppoſite the vernier: the importance of a triple vernier has not been noticed particularly by any one, previouſly to the time of Mr. Ed. Troughton's introduction of the triple vernier into his circular inſtruments. Mr. Ludlam, however, ſays, that Siſſon very early rejected the method of triſecting, and that of ſtepping too. "Having (by means of the radius and biſections only) divided his quadrant into three arches of 30° each, he ſet off in each of theſe arches the chord of 21° 20′, or 256 times five minutes. This chord was taken off a ſcale of equal parts, and was checked by the chord of 8° 40′, both chords together filling up the arch of 30°. The arch of 21° 20′ was divided by continual biſections into arches of five minutes each." This deſcription, ſays Mr. Ludlam, in a note to page 4, of his Introduction and Notes on Mr. Bird's method of dividing, was given by Jeremiah Siſſon, in a private letter dated May 20, 1766; and according to the ſame letter it appears alſo, that Siſſon placed the fixed or central point of his compaſs in a blank tangental line, as hereafter deſcribed by Bird, during the operation of transferring the divided points into linear diviſions; but as Bird has in the year 1767 publiſhed theſe proceſſes as originally his own, and as he worked for the Siſſons previouſly to 1766, we are diſpoſed to conſider Bird, and not either of the Siſſons, as the real contriver of the methods here adverted to. Siſſon (the younger) rejected the arc of 96, as being only a help to a bad divider; but Bird uſed to retort on him, by ſaying, that good dividing was not afraid of ſuch a teſt of its accuracy.

It is the characteriſtic of a great genius in mechanics, not to tread too cloſely in the ſteps of his predeceſſors, but, availing himſelf of any hints that may have been preſented to him, to mark out a more direct and even path for himſelf, that ſhall throw in his way fewer obſtacles to impede his progreſs. This was the caſe with Mr. Bird, who, having been brought up a cloth-weaver in the county of Durham, and having noticed ſome very coarſe diviſions on the face of a clock that fell in his way, immediately ſet about dividing one himſelf, in a much neater manner, and was ſo pleaſed with his ſucceſs, that in the year 1740 he came to London, and was in buſineſs for himſelf as an inſtrument-maker, only five years afterwards. After having made himſelf acquainted with the methods at that time in uſe of dividing a circle, he ſaw that no one had guarded againſt the errors produced by the effects of variable temperature on the beam of the compaſs, as well as on the metal of the ſcales and circles to be divided; he alſo ſaw that biſection of an arc had ſo much advantage over triſection, or quinqueſection, that he abandoned the latter modes of dividing altogether, and was the firſt probably to compute chord-lines, to be taken from a good *vernier* (what he calls *nonius*) ſcale, by the beam-compaſs, in order to determine ſuch points in an arc of 90°, as may enable a diviſion by continual biſection to be adopted, and at the ſame time ſuch as may be laid down without loſs of time, or, in other words, without ſenſible change of atmoſpheric temperature.

We cannot better deſcribe Mr. Bird's method of dividing aſtronomical inſtruments than by uſing his own words. "The requiſites," ſays he, "for the performance of this work are as follow: A ſcale of equal parts, by which the radius may be meaſured to 0.001 of an inch muſt be provided. My ſcale is 90 inches long, each inch divided into 10, contiguous to which are nonius (vernier) diviſions, *viz.* 10.1 inches divided into 100 equal parts, ſhewing 0.001 of an inch, and by the aſſiſtance of a magnifying glaſs, of one inch focal length, a third of 0.001 may be taken off by eſtimation.

"Provide fine beam-compaſſes, to which magnifying glaſſes of not more than one inch focal length ſhould be applied. Let the longeſt beam be ſufficient to draw the arcs, and meaſure the radius; the 2d to meaſure the chord of 42° 40′; the 3d to meaſure the chord of 30°; the 4th, 10° 20′; the 5th, 4° 40′; and if a ſixth, to meaſure 15°, be made uſe of, ſo much the better.

"The radius of the arc of 90° at the points is equal to 95.938 inches, from which the following numbers were computed, *viz.* 49.6615 inches = chord of 30°; 25.0448 inches = chord of 15°; 17.279047 inches = chord of 10° 20′; 7.81186 inches = chord of 4° 40′; and 69.80318 inches = chord of 42° 40′. Having drawn the ſeveral arcs, between which the diviſions were to be cut, the radius and the lengths of the above chords were taken by the beam-compaſſes, which, together with the ſcale, were laid upon the quadrant, where they remained till the next morning; during which time the door of the room was kept locked. Before ſun-riſe I re-meaſured the radius, which required ſome correction; the beam being of white fir, and the ſcale of braſs, which probably contracted, while the beam remained unaltered: the other beam-compaſſes alſo required correction. Now the quadrant and ſcale being of the ſame temperature, the faint arc *b d* (*fig.* 2. of *Plate* XVIII. of *Aſtronomical Inſtruments*,) was ſtruck, and with a very fine prick-punch (pointril) the point *a* was made; with the ſame beam-compaſs unaltered I laid off from *a* to *e* the chord of 60°, making alſo a fine point: with the chord of 30° *a e* was biſected in *c*. Now one point of the beam-compaſſes containing 60° was fixed in *c*, and with the other was marked the point *r* or 90°: next, with the beam-compaſſes containing 15°, was biſected *e r* in *n* or 75°; from *n* was laid off the chord of 10° 20′; and from *r*, 4° 40′; which two laſt chords joined exactly in *g*, being the point of 85° 20′: now each degree being to be divided into 12 parts, or every 5′, therefore, $\overline{85 \times 12} + 4 = 1024$, a number diviſible by continual biſections. The laſt chord computed was 42° 40′, with which *a g* was biſected in *o*; *a o* and *o g* were biſected by trials: but, whoever undertakes to divide a large quadrant, will do well to compute alſo the chord of 21° 20′; but for this chord any of the beam-compaſſes already provided, which will take in the length, may be uſed. The point *g*, being formed as above, I proceeded, by continual biſections, till I had the number required, *viz.* 1024. To fill up the ſpace between *g* and *r*, containing 56 diviſions, the chord of 64 diviſions was laid off from *g* towards *d*, and divided like the reſt by continual biſections; as was alſo from *a* towards *b*. The points 30°, 60°, 75°, and 90°, fell in without any ſenſible inequality."

So much will ſuffice for giving a general idea of Bird's proceedings, in *dividing* his aſtronomical inſtruments; but his method of transferring the divided points into dividing lines was equally original, and guarded alſo againſt errors that might ariſe from the handling of the beam during the operation, by variable temperature; before, however, we proceed to detail this proceſs, it may be proper to obſerve, that the points made on the faint circle were inſerted by a pointril, or piece of ſteel-wire, with a conical point made faſt into a piece of cylindrical braſs rounded at the upper end: the ſteel part was $\frac{1}{10}$th of an inch thick, and $\frac{3}{4}$ths of an inch long, and the braſs part $2\frac{1}{2}$ long, and $\frac{1}{6}$th of an inch in diameter. The angle of the ſteel conical point was from 20° to 25°, and the point ſomewhat above a ſpring temper, ſo that the point made in the circle did not exceed 0.001 of an inch; as it was ſharpened on an oil-ſtone while turning round, and while drawn in a direction outwards from the point itſelf, the ſurface partook of the nature of a counter-ſink, and, as it were, drilled a diminutive hole of a conical ſhape when gently preſſed on, as it revolved in the point of biſection, which point, by reaſon of the four angular burs made by the interſecting lines, could be *felt* as well as *ſeen*. The points of the beam-compaſſes were never made to approach nearer to each other than two or three inches, but at the ends of the arcs ſpring dividers, with conical points, were ſubſtituted to meaſure ſmall arcs. Another precaution was, that in all biſections, the place to be pointed was laid off from left to right, and then from right to left, from the reſpective central points.

As the maxim, "that an arc may be *biſected*, but not practically *triſected* or *quinqueſected* with certainty," was the maxim adopted by Bird, when he introduced the uſe of his ſcale for meaſuring the chords, ſo the maxim, "that a right line cannot be cut on braſs, ſo as accurately to paſs through two given points, but that a circle may be deſcribed from any centre, to paſs accurately through a given point," was taken up by him when he adopted the beam-compaſs, as Graham and Siſſon had done, for cutting the ſmall portions of a circle, inſtead of perfectly ſtraight lines, as boundaries of the diviſions. His plan of doing this, however, was new, as may be ſeen from his own words.

"The next ſtep," ſays he, "is to cut the linear diviſions from the points: the beſt inſtrument for this purpoſe is the beam-compaſs, having both its points conical and very ſharp. Draw a tangent to the arc $b\,d$, ſuppoſe at e, it will interſect the arc $x\,y$ in q, this will be the diſtance between the points of the beam-compaſs to cut the diviſions (nearly) at right angles to the arc $b\,d$. Lodge that point of the beam-compaſs next your right hand, in the point r; let the other fall freely into the arc $x\,y$; preſs gently with your finger upon the ſcrew-head that faſtens the ſocket (and that is convex), and with the point towards the right hand cut the diviſions. In this manner you muſt proceed with the reſt."

The intention of transferring the central or reſting point of the compaſs into a blank tangental line, inſtead of ſuffering the ſaid point to reſt in the reſpective points made in the faint arc, is, that in the former caſe ſhould any alteration take place in the length of the beam, during the operation of cutting, no error is charged on the diviſions cut, but the alteration is compenſated by the diſtance of the newly made point in the tangental line from the cutting point; that is, each diviſion is charged only with ſuch a minute error, if any, as ariſes from temperature during the act of cutting a ſingle ſtroke, and if one of the points ſhould break, another may be replaced without inconvenience; whereas, by the method of Graham, a broken point produces conſiderable difficulty; and the whole error ariſing from temperature, during the whole proceſs of cutting all the diviſions, is charged not only on the total arc, but likewiſe in a certain undefined degree on each of the whole diviſions. This idea of getting quit of the effects of temperature is ingenious, but has been objected to as liable to the ill effects of ſtepping in a certain degree, inaſmuch as that a hard particle, lying under the point of reſt, may cauſe a little deviation in the diſtance, before the ſtroke is cut. This objection, however, was not allowed to be realized by Bird, who no doubt muſt have obviated it by ſome other plan, had he found any real inconvenience ariſing from it. Great care, notwithſtanding, muſt have been taken in ſetting down, and preſſing on the point at reſt, in a perpendicular direction. Another objection applied to Mr. Bird's ſcale, from which the chord-lines were meaſured, inaſmuch as the ſcale itſelf might be erroneous in ſome places, and would impart its errors to the arcs meaſured from the computed chords taken therefrom.

Beſides the arc of 90°, the mural arc by Bird had an arc of 96 diviſions, like Graham's, divided by continual biſections, till each of the 96 diviſions had 16 ſub-diviſions, as a check on the accuracy of the arc of degrees; but ſubſequent dividers of aſtronomical inſtruments have found this ſuperfluous, as being in the opinion of others, as well as of Jeremiah Siſſon, a check only on bad dividing, and as rendering the reduction of obſervations troubleſome, when made thereby.

The vernier was retained by Bird as the beſt method he knew of ſub-dividing the 5′ ſpaces into quantities of 30″ each, which was the ſmalleſt angle he profeſſed to meaſure; and to effect his purpoſe he made ten diviſions on his vernier equal to eleven on the limb of the inſtrument, firſt by computing the chord of thirty-two parts, and then by taking ten out of thoſe parts, when biſected, as the proper diviſions for the vernier; theſe, being made in points, were alſo transferred by a tangental line into linear diviſions by the beam-compaſs, as before deſcribed; but great care was taken, that the ſtroke zero on the vernier was drawn from the quadrant's centre, preciſely parallel to the line of collimation of the teleſcope. Mr. Ludlam ſays, that the cutting-point which Siſſon uſed was flat in the knife-edge form, but that Bird's was a triangular priſm, with a ſlope ground down to a point at one of the angles; which formed the cutting-point.

At the requeſt of the commiſſioners of the Board of Longitude, Mr. Bird, in the year 1767, publiſhed his method of dividing in a quarto pamphlet, for which they rewarded him with 500*l.* beſides 60*l.* for his plates, after having bound him to inſtruct an apprentice of ſeven years in the art of conſtructing and dividing aſtronomical inſtruments.

Mr. Smeaton is of opinion that Bird's method of dividing may be improved in one reſpect, and expreſſes himſelf on the ſubject thus:

"I muſt here obſerve that I apprehend no quadrant, that has ever undergone a ſevere examination, has been found to form a perfect arch of 90°, nor is it at all neceſſary it ſhould; the perfect equality of the diviſions throughout the whole is the firſt and primary conſideration; as the proportion of error, when aſcertained by proper obſervations, can be as eaſily and readily applied when the whole error of the rectangle is fifteen ſeconds, as when it is but five. In this view, from the radius taken, I would compute the chord of 16° only. If I had an excellent plain ſcale, I would uſe it, becauſe I ſhould expect the deviation from the right angle to be leſs than if taken from a ſcale of more moderate accuracy; but if not, the equality of the diviſions would not be affected, though taken from any common diagonal ſcale. This chord, ſo prepared, I would lay off five times in ſucceſſion, from the primary point of 0 given, which would compleat 80°; I would then biſect each of thoſe arches of 16°, as preſcribed by Mr. Bird, and laying off one of them beyond the 80th, would give the 88th degree, proceeding then by biſection, till I came to an arch of 2°, laying that off from the 88th degree, would give the point of 90°. Proceeding ſtill by biſection, till I had reduced the degrees into quarters of 15′ each, I would there ſtop, as from experience I know that when diviſions are over cloſe, the accuracy of them, even by biſections, cannot be ſo well attained, as where they are moderately large. If a ſpace of $\frac{4}{10}$ths of an inch, which is a quarter of a degree, upon an eight feet radius, is thought too large an interval to draw the index over by the micrometer ſcrew, this may be ſhortened by placing another line, at the diſtance of one-third of a diviſion on each ſide of the index line, in which caſe the ſcrew will never have to move the index plate more than one-third of a diviſion, or 5′, and the perfect equality of thoſe ſide lines from the index line may be obtained, and adjuſted to 5′ preciſely, by putting each of the ſide lines upon a little plate, capable of adjuſtment to its true diſtance from the middle one, by an adjuſting ſcrew. The above hint is not confined to the chord of 16°, which prohibits the ſub-diviſion going lower than 15′; for if it be required to have diviſions equivalent to 5′ upon the limb itſelf, then I would compute the chord of 21° 20′ only; and laying it off four times from the primary point, the laſt would mark out the diviſion 85° 20′, pointed out by Mr. Bird, ſupplying the remainder to a quadrant from the biſected diviſions as they ariſe, and not by the application of other computed chords." Mr. Smeaton, ſenſible, however, that this method of laying 16° five times over, or 21° 20′ four times over, may be objected to, as liable to the errors of *ſtepping*, ariſing from Roemer's method, afterwards propoſes to lay down the chord of 64°, or of 85° 20′, from computation all at once, and then to biſect, and complete the quadrant from the biſected diviſions, which Mr. Bird himſelf preſcribed as a good method for Hadley's ſextants and octants. But theſe plans are now ſuperſeded for inſtruments of ſmall radius by the dividing engine, which performs the work with great expedition, as well as accuracy, and the original methods of dividing the circle are only uſeful for the larger inſtruments, and for the finiſhing of the dividing engines themſelves.

In the year after Mr. Bird had publiſhed an account of his method of dividing aſtronomical inſtruments, the duc de Chaulnes printed in French a folio work, entitled "Nouvelle methode pour diviſer les Inſtrumens de Mathematique et d'Aſtronomie," and alſo a work proper to be bound with the former, called "Deſcription d'un Microſcope et de differens Micrometres deſtinés a meſurer des parties circulaires ou droites avec la plus grande preciſion." The former of theſe pamphlets contains 15 plates, and the latter ſix, which exhibit plans and drawings in different points of view, of all the apparatus, both in pieces and together; theſe are not neceſſary to be copied by us, but we will deſcribe them as far as they fall within our preſent purpoſe. This new method of dividing is performed by the aſſiſtance of compound microſcopes, with croſs hairs in the focus of the eye-glaſs of each, to be fixed to the circle to be divided in any given ſituation, and of moveable pieces of braſs with fine dividing lines marked thereon, which may be ſo fixed with wax, as to be adjuſtable to the point of interſection in the focus of any of the microſcopes, and when duly adjuſted, a ſliding pointril, moving in a complex frame of braſs, cuts the line, on the circle to be divided, that ſhall correſpond to the point of the circle where the adjuſtable diviſion is fixed; though the line cut is not in the ſame part of the circle. As this method may be conſidered as the ground-work of Ramſden's method of dividing a large circle, and has not, that we know of, been tranſlated into our language, we will give the ſubſtance of that part of the work which more immediately relates to our preſent ſubject, without following the author through all his minute details. The circle, which the duc de Chaulnes propoſes to divide by his original method, is the table of his dividing engine, but as it is equally applicable to any circle that may be fixed concentrically on it, we will ſuppoſe it an aſtronomical circle for altitudes or azimuths that is to be divided by his method. In the firſt place, he propoſes to have from 30 to 40 thin pieces of ſmooth braſs about one-third of an inch long, and one-ſixth broad, having each a fine ſtroke drawn acroſs, perpendicular to the long ſides and juſt deep enough to be ſeen; and ſecondly, three compound microſcopes are to be provided, one to be *fixed* diametrically oppoſite the pointril, or cutting point, that is carried in and out, *i. e.* towards and from the centre of the circle by an adjuſtable frame, and the other two are adjuſtable to any given points along the plane of the circle to be divided. When the circular lines are ſtruck on, the adjuſtable microſcopes, which we will call A and B, are placed as oppoſite to each other, in a diametrical line, as can be gueſſed, or roughly meaſured by any of the ordinary means, and a moveable diviſion on a piece of braſs already deſcribed, is put by means of wax under each of the two microſcopes, and moved by hand, till the lines, which muſt be in a radial direction, fall reſpectively under the centres or interſecting points of the fields of view; theſe microſcopes, it muſt be underſtood, are fixed, not on the table which bears the circle, and which is made ſo as to revolve on a long vertical axis, but on a fixed or ſtationary ſurrounding frame, that is unconnected with the table itſelf, when the table is at liberty to revolve; ſuppoſe now the table and circle on it to be carried half round, while the microſcopes remain fixed, in ſuch a way that the moveable diviſion which was under the microſcope A, falls under the centre of microſcope B; in this ſituation, if the oppoſite diviſion falls under the centre of A, the circle is truly biſected; but as this is not likely to be the caſe at the firſt trial, the quantity that is over or ſhort muſt be adjuſted, one half by the moveable diviſion, and the other by the microſcope, and the operation of reverſing muſt be repeated, and the rectifications made, till the circle is found to be truly biſected, both backwards and forwards, by the coincidence of the diviſions with the interſected points in each focus of the microſcopes. The two microſcopes A and B may now be removed, and the third or fixed microſcope muſt be made faſt over one of theſe two dividing ſtrokes, after the pointril has been brought preciſely to occupy the place of the other, in which ſituation the pointril and the fixed microſcope will ſtand ſo diametrically oppoſite each other, that whenever an adjuſtable line is brought to biſect the field of view of this microſcope, the pointril will be ready to cut a line on the oppoſite ſide of the circle, and whenever a ſet of adjuſtable diviſions are properly placed, by the wax, on one ſemi-circle, the lines in the other ſemi-circle, directly oppoſite theſe reſpectively, can be permanently cut, before the moveable pieces are taken off, and afterwards the ſaid lines ſo cut may be brought ſucceſſively under the fixed microſcope, in order that their oppoſites, where the moveable pieces were ſtuck on, may, in like manner, be cut; ſo that one-half of the circle will be ſufficient to be divided and ſub-divided by the adjuſtable pieces, ſeeing that each of its diviſions and ſub-diviſions, brought in ſucceſſion under the fixed microſcope, may be inſtantly transferred by the pointril, into the oppoſite ſemicircle, and alſo theſe in their turn transferred back again. Let us now ſee how the ſemi-circle is divided and ſub-divided by means of the two microſcopes A and the fixed one, B being no longer wanted; the firſt operation is the triſection of it into arcs of each 60°; for this purpoſe, while the pointril remains at T, (*fig.* 3. of *Plate* XVIII.) one of the points cut, *viz.* at 180°, and the fixed microſcope reſts at Z, or zero, *i. e.* the firſt point of the circle, to be figured 0 or 360°; two moveable pieces are ſtuck on at C and D reſpectively, ſo as to triſect the ſemi-circle Z B T very nearly, and the microſcope A is placed directly over C, ſo as to view its ſtroke or line at the point of interſection in the focus of the eye-glaſs; there it is made faſt for the preſent; the line C is now brought under the fixed microſcope at zero, by making the circle revolve, and ſuffered to remain; the piece D has its ſtroke put under the microſcope A, as before was the caſe with piece C, now at zero; the circle is again made to revolve till the ſtroke of D is under the fixed microſcope at zero; in this ſituation the point T, or 180°, will have been brought forward 120°, or 60° twice over, provided the pieces C and D were truly placed, and in this caſe an eye, looking into the microſcope A, will ſee this dividing line biſect the field of view; but as this is not likely to happen at the firſt trial, the microſcope muſt be moved one third of the error now ſhewn, and each of the pieces C and D another third, accordingly as the portions of the ſemi-circles Z C, C D, and D T taken together, are found to be more or leſs than an exact ſemi-circle. The operation we have here deſcribed is repeated again and again, till the three equidiſtant arcs amount to an exact ſemi-circle; after which they are rendered permanent, by ſtrokes made ſucceſſively on the oppoſite ſemi-circle, at the points *c* and *d*, which triſect the ſemi-circle T A Z, when the adjuſtable ſtrokes C and D are in ſucceſſion exactly fixed in the centre of the field of view of the fixed microſcope. The diſtance between the two microſcopes, which is here 60°, is called the *opening* of the microſcopes, which are conſidered as the two points of a pair of dividers, and the arc between them is therefore denominated accordingly.

The next ſtep is to biſect the arcs of 60° each, into two of 30°, by an opening of 30°; to do this one moveable piece, ſtuck at the middle of each arc of 60°, will be requiſite, and the two halves, to the right and left of each piece, may be examined and adjuſted till the biſections are complete, and in a ſtate to be transferred into the oppoſite ſemi-circle; for inſtance, ſuppoſe the arc of 60° from Z to C to be biſected, put a moveable ſtroke at 30°, more or leſs, and place the microſcope A over it; make the table and circle revolve till this ſtroke 30° falls under the fixed microſcope; in that ſituation, the ſtroke 60° ought to biſect the field of view of microſcope A, and whatever the deviation may be, plus or minus, it muſt be adjuſted by trial, partly by moving the microſcope A, and partly by moving the piece with the ſtroke on at 30°, when brought back again under the microſcope A. In the ſame way, any other biſection may be made within the poſſible opening of the microſcopes. Again, the arcs of 30° are triſected, as before deſcribed, into arcs of 10°, which are all transferred into the oppoſite ſemi-circle in ſucceſſion.

With reſpect to the diviſion of the arcs into ſmaller quantities than thoſe of 10°, where the microſcopes approach too near together to admit of the neceſſary adjuſtments, an ingenious mode of ſub-dividing is adopted by a property of the number 9, thus; having all the arcs of 10° round the ſemi-circle laid down, the points 90° and 180° are of courſe among them, and as theſe are diviſible by 9, an opening of nine degree's is taken by trial, which repeated ten times, by means of the moveable ſtrokes, will reach from 0 to 90°, when properly adjuſted; beſides the 10°, 20°, 30°, &c. there will now be 9°, 18°, 27°, &c. up to 90°, and alſo 99°, 108°, 117°, &c. up to 180°, and the differences or ſpaces left between the diviſions obtained from 10°, and thoſe from 9° repeated, will be reſpectively 1°, 2°, 3°, &c. up to 9°; now, if the points 9°, 18°, 27°, &c. which numbers decreaſe by unity in the units place, be made in ſucceſſion points of commencement, for the arc of 10° to be repeated from, they will from 9° produce 19°, 29°, 39°, &c.; from 18° they will give 28°, 38°, 48°, &c.; and from 27° they will give 37°, 47°, 57°, &c. and ſo of the reſt, till all the ſingle degrees are put on by the arc of 10° thus applied from the points derived from 9° and its multiples. The work is performed thus: make the opening of the microſcopes again 10°, by fixing the one called A at the tenth degree when zero is at the fixed one, then turn the table and ſuperincumbent circle to be divided till the ſtroke 9° comes to zero, then a moveable piece ſtuck properly under A will be 19°; bring this to the fixed microſcope, and the place for 29° will be had for the next ſtroke, under A again; and in like manner every individual degree may be marked in ſucceſſion, by taking thoſe ending with 8, after thoſe ending with 9 have been gone through; and after that, thoſe ending with 7, with 6, with 5, &c. till all the numerals are included. If the circle is large enough to admit of diviſion to 5° by the opening of the microſcopes, the numbers 4 and 5 may be ſubſtituted with advantage for 9 and 10, and then the opening may be 20° for inſerting them, inſtead of 10°, as in the mode we have deſcribed. When half degrees are required to be inſerted 15° may be biſected, and the line obtained will be in the middle between 7° and 8°, from which ſtroke, with an opening of 15°, all the other half degrees may be marked as before, by the aid of the adjuſtable marks to be transferred afterwards into the oppoſite ſemi-circle, and all the ſtrokes in that ſemicircle may then be transferred back again permanently, ſo as to compleat the circle.

The uſe of the numerals nine and ten, or of the four and five, is evidently borrowed from Clavius the Jeſuit, whoſe problem for thus dividing a right line, or arc of a circle, was publiſhed in 1611.

Another method of ſub-dividing the circle, when marked into degrees, as above deſcribed, is alſo propoſed as being leſs tedious, and capable of carrying the ſub-diviſions to a lower denomination; thus, a ſocket is made to fit the arbor of the revolving table that carries the circle to be divided, ſo tight, that it will revolve with the ſaid arbor, or without it, as the caſe may be: to this ſocket a teleſcope is fixed with a vertical hair in the focus of its eye-glaſs, that may biſect any diſtant mark to which it may be directed, then a long ruler, of ſix or ſeven feet in length, is divided, for inſtance, into twelve equal parts, ſo that it may be read diſtinctly; the diſtance of this ruler is ſo adjuſted from the teleſcope, that when placed at right angles to the line of collimation, it may juſt ſubtend *one degree*, which may be firſt calculated nearly, and then adjuſted by trial, till the run of the teleſcope over the twelve marks of the ruler be exactly correſponding to the run of one degree of the circle under one of the microſcopes. In this ſituation of things, the diviſions of the ruler, as ſeen through the teleſcope, are, with great care and ſteadineſs, transferred in ſucceſſion, not to one of the degree ſpaces itſelf on the circle, but to a pattern-piece of braſs, which may be afterwards fixed with ſcrews under the object lens of the fixed microſcope, ſo as to be applied in ſucceſſion to each ſeparate degree, as the circle is made to revolve, during the operation of transferring theſe five minute ſpaces, to the oppoſite parts of the circle, by means of the pointril. In ſtrictneſs, the ruler, viewed through the teleſcope, ought to be a portion of a circle; but the arc and the chord of one degree are ſo nearly alike, that one may be ſubſtituted for the other, without ſenſible error. When ſmall circles, or parts of a circle, were propoſed by the duc de Chaulnes to be divided, they were fixed on the revolving arbor of the table, and the microſcopes and cutting point were ſo arranged, that the diviſions of a large divided circle were transferred to the ſmall one in ſucceſſion, and the whole apparatus, ſo arranged, conſtituted an *engine* for dividing; but the work could not be performed with ſuch expedition as with our modern engines, where ſtops are ſubſtituted for the microſcopes, and where the *touch* has greatly the advantage over the *ſight*. With reſpect to the accuracy of the work performed by the duc de Chaulnes, we are greatly inclined to believe, that the ſliding mechaniſm of the cutting-point would not ſecure the ſtrokes from having a devious direction ſometimes, ariſing from the neceſſary liberty that the ſliding parts muſt have had to admit of free motion, unleſs, indeed, the parts of action were fitted with extreme nicety.

Laſtly, the vernier ſcale was retained by the author before us, as the beſt ſub-divider of the 5′ ſpaces, or other ſmall diviſions; but he has not conceived it neceſſary to deſcribe, in detail, how he proportioned it to the diviſions of his circle, though it is eaſy to conceive how this may be done by the help of microſcopes and the cutting-point. Our remark on this original method of dividing is, that it ſhews great ingenuity; but we conceive, that making an equality in the divided and ſub-divided *arcs* will not always enſure perfection in the *angular meaſures*, becauſe the axis of motion may be out of the centre of the divided circle, and the eccentricity will neither be detected by this method, nor allowed for in the diviſions and ſub-diviſions, unleſs, indeed, two or three equidiſtant verniers were uſed for taking an average of the readings from different ſides of the circle. It is ſomewhat remarkable that the ſame thought that introduced the microſcopes for meaſuring the arcs to be divided, did not ſubſtitute them for the vernier, in reading off ſmall quantities of a ſub-diviſion when an inſtrument was finiſhed; which practice was left for Mr. Ramſden afterwards to adopt. The ſecond ſemi-circle, being only the copy of a copy, renders this method of dividing leſs worthy of imitation, as an original method, than it would have been if the imperfections of the firſt portion of the circle had not been neceſſarily transferred to the other, and from that back again. In ſhort, we think the wax-work might have been better employed.

The elder Troughton (John) whoſe dividing was acknowledged to be equal to that of any of his predeceſſors, or contemporaries, uſed the beam-compaſſes, like Bird, but rejected the computation of chords, and the meaſures taken from ſcales, as being liable to uncertainty in determining the primary points from which the biſections were to proceed. After having deſcribed his circle, or rather quadrantal arc to be divided, he determined the point 60° with the radius, as Graham and Bird had previouſly done, and, having biſected it at 30°, ſet off 30° in addition to the 60° to complete the arc of 90°; he then biſected till he had arcs of 15°, and again till he had 7° 30′ in each diviſion: the two marks neareſt to 90° were now 82° 30′, and 86° 15′; but the point 85° 20′, or limit of the largeſt biſectional arc, lay between theſe two, and could not be obtained by further biſections; the ſpace between the two marks in queſtion was therefore triſected, and the more forward of the two new points was 85°: again, the ſpace between this mark of 85°, and that of 86° 15′, was triſected; from which came 85° 25′, as denoted by the more backward of the two new marks; and laſtly, a fifth part of one of the ſub-divided arcs was ſet backwards from 85° 25′, to 85° 20′, the point from which the 1024 diviſions were inſerted from 0 entirely by biſections. The quadrantal arc was then completed from the ſub-diviſions thus obtained. It may be neceſſary, however, to obſerve, that the marks at firſt made by the radius, biſections, triſections, &c. were none of them permitted to be permanent, being of no further uſe than to aſcertain the individual point 85° 20′, from which the ſubſequent biſections were to commence. This method is conſidered as being preferable to Bird's method of computing the chords and uſing the ſcale, inaſmuch as it does not depend on ſecondary or auxiliary means of aſcertaining the primary point in the biſectional arc. It has uniformity of means to recommend it in preference to thoſe mixed methods that depend partly on computation, and partly on the extended radius.

The method of dividing a large circle, commonly known by the appellation of *Ramſden's method*, or the method of *coaxing*, conſiſts of Bird's method, and of that propoſed by the duc de Chaulnes united: the circle is firſt divided by the beam-compaſſes into primary points; and the true ſituation of each of theſe points is aſcertained by oppoſite microſcopes, as the work proceeds, and is rectified accordingly, by puſhing the points forward or backward a trifle, till they are in their true places. This method, now generally practiſed by all the beſt dividers, except the preſent Mr. Troughton, has not, that we know of, been very particularly deſcribed, with references to drawings, &c. though it is capable of conſiderable accuracy in the hands of a good workman, who has perſeverance enough to do juſtice to it. The great number of points that will require to be rectified, will, notwithſtanding the utmoſt precaution, render the work irregular in its appearance, and a circular line muſt neceſſarily paſs through the centre of all the points or conical holes, to render them concentric; beſides, the biſectional arcs deform the conical ſhape of the points, by paſſing through them, and the ſubſequent eraſures muſt leave an unevenneſs in the metal that cannot but offend a nice eye. Sir George Shuckburgh, in his paper on the equatorial, calls the points that have been enlarged by rectification, and burniſhed level again, "doubtful or bad points;" and theſe bear a conſiderable proportion to the whole. "It would," ſays Mr. Troughton, "be a great improvement of this method to divide the whole by hand at once, and afterwards to correct the whole; for a dot, forced to its place, as above, will ſeldom allow the compaſs-point to reſt in the centre of its apparent area; therefore, other dots made from thoſe will ſcarcely ever be found in their true places. This improvement alſo prevents the corrected dots from being injured or moved by the future application of the compaſſes, no ſuch application being neceſſary."

The circle that is divided by this method is placed horizontally to have its firſt points made, after it has had its circle deſcribed from a revolution on its own axis, and then it is placed vertically in a frame, in which it revolves, and which carries the microſcopes with micrometers, that ſub-divide, and read to the accuracy of one ſecond, in order that the ſemi-circles, taken from any given oppoſite points, may have their equality aſcertained, or their deviation therefrom determined previouſly to final rectification. In theſe operations great attention is paid to the temperature of all the metallic parts employed in the work.

Mr. Ed. Troughton has deviated from the beaten track of his predeceſſors, and made a road for himſelf, (probably before Ramſden's plan was adopted,) that he has trodden with great ſucceſs, and which he has fully deſcribed in a paper of the Philoſophical Tranſactions of the year 1809, which gained him Copley's medal. The reaſon that cauſed him to think for himſelf on this ſubject, as he has done ſucceſsfully on many others, ſeems to have been this: "With as ſteady a hand, and as good an eye," ſays he, "as young men generally have, I was much diſappointed at finding, that after having made two points, neat and ſmall to my liking, I could not biſect the diſtance between them without enlarging, diſplacing, or deforming them with the points of the compaſſes."

This diſcovery led to the abandonment of the beam-compaſſes and ſpring-dividers, and, the art of turning appearing to have approached the neareſt to perfection of any of the mechanical arts, a *roller* was thought of, which by its revolutions might ſub-divide the circumference of a circle rolled over, after the ratio of their reſpective diameters was aſcertained and properly adjuſted. When this ſpeculation was firſt attempted to be realized, ſome circumſtances occurred which could not be certainly inferred from reaſoning, *à priori*, from known data, but of which a perfect knowledge was neceſſary for the conſummation of the project; in the firſt place, it was found on trial, that however ſmooth the ſurfaces of the circle and roller were made, there was no *ſlippery* action, as might have been expected, but the points of contact acted with each other in an apparatus like that hereafter to be deſcribed, as the teeth of wheel-work of indefinitely ſmall dimenſions; the certainty of this kind of action was an indiſpenſable condition; ſecondly, notwithſtanding this ſtableneſs in the motion of the roller, it was found to meaſure different portions of the metallic circle with different degrees of accuracy, ſome of the meaſures being a trifle plus, and others minus, with reſpect to the truth: this want of accuracy, which, as we have ſaid, did not depend on any ſliding of the roller, was expected to take place previouſly, in a certain undefined degree, by reaſon of the unequal denſity of hammered materials, and of their conſequent unequal *poroſity*; but thirdly, though there was found to be a deviation from true meaſurement in individual portions of the circle, yet, when the roller was properly adjuſted to meaſure the whole circle without a remainder, it was found to poſſeſs the deſirable property of accommodating itſelf to the ſame track again, as often as the circuit was repeated, and conſequently of arriving at the point zero again without the leaſt ſenſible deviation. This circumſtance, which may be conſidered as a phenomenon in mechanics, reproduced the hope of ſucceſs, which the want of perfect regularity in meaſuring the intermediate portions of the circle was calculated to diſcourage: and a remedy, hereafter deſcribed, was ſucceſsfully employed to equalize the meaſurements, nay, ſo exactly was the courſe of the roller found to be identically the ſame in every part of its circuit, that, when duly adjuſted for diameter, the deviation at any individual point, from the firſt meaſure, would not exceed a *ſecond*. This uniformity in the mode of the roller's travelling furniſhed the means of correcting its own inaccuracies of meaſurement, ſeeing that theſe inaccuracies, once aſcertained, always remained the ſame at the ſame points of the circle, provided that zero of the roller ſtarted from zero of the circle, at the commencement of its firſt circuit. We cannot convey an adequate conception of the mechanical application of a roller to the diviſion and ſub-diviſion of a circular inſtrument, without a reference to drawings of the apparatus actually uſed; nor can we deſcribe that apparatus better than in the words of the author himſelf. The inſtrument, of which he has deſcribed the graduation, is a four feet meridian circle, at preſent the property of Stephen Groombridge, eſq. of Blackheath.

"The ſurface of the circle, which is to receive the diviſions," ſays Mr. Troughton, "as well as its inner and outer edges, but eſpecially the latter, ſhould be turned in the moſt exact and careful manner; the reaſon for which will be better underſtood when we come to deſcribe the mode of applying the roller: and as no projection can be admitted beyond the limb, if the teleſcope, as is generally the caſe, be longer than the diameter, thoſe parts which extend further muſt be ſo applied, that they may be removed during the operation of dividing." *Plates* XIX. and XX. of *Aſtronomical Inſtruments* exhibit the principal parts of the apparatus; *fig.* 1. ſhews the plan, and *fig.* 4. the elevation of the revolving parts of the mechaniſm, in both of which the ſame letters of reference are affixed to correſponding parts, and both are drawn to a ſcale of half dimenſions. A A is a part of the circle, the ſurface of which is ſeen in the plan, and the edge in the elevation. B B B is the main plate of the apparatus, reſting with its four feet *a*, *a*, *a*, *a*, upon the ſurface of the arc; theſe feet, being ſcrews, may be adjuſted ſo as to take equal ſhares of the weight, and then are faſtened by nuts below the plates, as ſhewn in *fig.* 4. C C and D D are two ſimilar plates, each attached to the main plate, one above, and the other below, by four pillars; and in them are centered the ends of the axis of the roller E. F and G are two friction wheels, the latter firmly faſtened to B, but the former is fixed in an adjuſtable frame, by means of which adjuſtment theſe wheels and the roller E may be made to preſs, the former on the interior, and the latter on the exterior edge of the circle, with an equal and convenient force; namely, by the bending of the pillars of the ſecondary frame, and of the axis of the roller. At the extremities of the axis of the roller, and attached to the middle of the plates C and D, are two bridges, having a ſcrew in each, by means of which an adjuſtment is procured for raiſing or lowering the roller reſpecting the edge of the circle, whereby the former having its diameter at the upper edge about .001 of an inch greater than at the lower edge, on account of its being a little conical, may eaſily be brought to the poſition where it will meaſure the proper portion of the circle.

Much experience and thought upon the ſubject have taught me, that the roller ſhould be equal to one-ſixteenth part of the circle to be divided, or that it ſhould revolve once in 22° 30′, and that the roller itſelf ſhould be divided into ſixteen parts, no matter whether with abſolute truth, for accuracy is not at all eſſential here. Each of ſuch diviſions of the roller will correſpond with an angle of 1° 24′ 22″.5, or $\frac{1}{256}$th part of the circle. This number of principal diviſions was choſen, on account of its being capable of continual biſections, but they do not fall in with the ultimate diviſions of the circle, which are intended to be equal to 5′ each.

The next thing to be conſidered is, how to make the roller meaſure the circle. As two microſcopes are here neceſſary, and thoſe which I uſe are very ſimple, I will in this place give a deſcription of them. *Fig.* 3. is a ſection of the full ſize, and ſufficiently explains their conſtruction, and the poſition of the glaſſes; but the micrometer part, and manner of mounting it, are better ſhewn at H in *figs.* 1 and 4. The micrometer part conſiſts of an oblong ſquare frame, which is ſoldered into a ſlit, cut at right angles in the main tube; another ſimilar piece, nicely fitted into the former, and having a ſmall motion at right angles to the axis of the microſcope, has at one end a cylindrical guide-pin, and at the other a micrometer ſcrew; a ſpring of ſteel wire is alſo applied, as ſeen in the ſection, to prevent play, by keeping the head of the micrometer in cloſe contact with the fixed frame. This head is divided into one hundred parts, which are numbered each way to fifty; the uſe of which will be ſhewn hereafter. A fine wire is ſtretched acroſs the moveable frame, for the purpoſe of biſecting fine dots. Two of theſe microſcopes are neceſſary; alſo a third, which needs not have the divided head, and which muſt have in the moveable frame two wires croſſing each other at an angle of about 30°; this microſcope is ſhewn at I, *fig.* 1. In the two firſt micrometers a diviſion of the head is of the value of about 0″.2, and the power and diſtinctneſs ſuch, that when great care is taken, a much greater error than to the amount of one of theſe diviſions cannot well be committed in ſetting the wire acroſs the image of a well-made dot. The double eye-glaſs has a motion by hand, for producing diſtinct viſion of the wire; and diſtinct viſion of the dots is procured by a ſimilar adjuſtment of the whole microſcope. The firſt ſtep towards ſizing the roller is to compute its diameter according to the meaſure of the circle, and to reduce it agreeably thereto, care being taken to leave it a ſmall quantity too large. The ſecond ſtep is, after having brought the roller into its place in the plate B B, to make a mark upon the ſurface of the circle, near the edge, and a ſimilar one upon the roller, exactly oppoſite each other; then carry the apparatus forward with a ſteady hand, until the roller has made ſixteen revolutions; if now the mark upon the roller, by having over-reached the one upon the circle, ſhews it to be much too large, take it out of the frame, and reduce it by turning accordingly: when, by repeating this, it is found to be very near, it may be turned about .001 of an inch ſmaller on the lower edge, and ſo far its preparation is completed. The third and laſt ſtep is the uſe and adaptation of the two microſcopes; one of theſe muſt take its poſition at H in *fig.* 1, viewing a ſmall well-defined dot made for the purpoſe on the circle; the other, not repreſented in the figure, muſt alſo be fixed to the main plate of *fig.* 1, as near to the former as poſſible, but viewing one of the diviſions on the roller with a due attention to each microſcope, it will now be ſeen to the greateſt exactneſs, when, by raiſing or depreſſing the roller, its commenſurate diameter is found.

Fig. 5. is a repreſentation of the apparatus for transferring the diviſions of the roller to the circle. It conſiſts of two ſlender bars, which, being ſeen edgewiſe in the figure, have only the appearance of narrow lines; but looked at from above, they reſemble the letter A. They are faſtened to the main frame, as at W and Z, by ſhort pillars, having alſo the off leg of the angle ſecured in the ſame manner; Y is a fine conical ſteel point for making the dots, and X is a feeler, whereby the point Y may be preſſed down with an uniform force, which force may be adjuſted, by bending the end of the bar juſt above the point, ſo as to make the dots of the proper ſize. The point Y yields moſt readily to a perpendicular action, but is amply ſecured againſt any eccentric or lateral deviation.

The apparatus ſo far deſcribed, is complete for laying the foundation, *i. e.* for making 256 primary dots; no matter whether with perfect truth or not, as was ſaid reſpecting the diviſions of the roller; preciſion in either is not to be expected, nor wiſhed; but it is of ſome importance that they ſhould be all of the ſame ſize, concentric, ſmall, and round. They ſhould occupy a poſition very near the extreme border of the circle, as well to give the greateſt radius poſſible, as that there ſhould be room for the ſtationary microſcope, and other mechaniſm to be deſcribed hereafter.

It muſt be noticed that there is a clamp and adjuſting ſcrew attached to the main plate of *fig.* 1, but as it differs in no reſpect from the uſual contrivances for quick and ſlow motion (ſee CIRCLE), it has been judged unneceſſary to incumber the drawing with it.

Now the roller having been adjuſted, with one microſcope H upon its proper dot on the circle, and the other microſcope at the firſt diviſion on the roller, place the apparatus of *fig.* 5, ſo that the dotting point Y may ſtand directly over the place which is deſigned for the beginning of the diviſions. In this poſition of things, let the feeler X be preſſed down, until its lower end comes in contact with the circle; this will carry down the point, and make the firſt impreſſion, or primary dot, upon the circle; unclamp the apparatus, and carry it forwards by hand, until another diviſion of the roller comes near the wire of the microſcope; then clamp it, and with the ſcrew-motion make the coincidence complete; where again preſs upon the feeler for the ſecond dot; proceed in this manner until the whole round is completed.

From theſe 256 erroneous diviſions, by a certain courſe of examination, and by computation, to aſcertain their abſolute and individual errors, and to form theſe errors into convenient tables, is the next part of the proceſs, and makes a very important branch of my method of dividing.

The apparatus muſt now be taken off, and the circle mounted in the ſame manner, that it will be in the obſervatory. The two microſcopes, which have divided heads, muſt alſo be firmly fixed to the ſupport of the inſtrument, on oppoſite ſides, and then wires brought to biſect the firſt dot, and the one which ſhould be 180° diſtant. Now the microſcopes remaining fixed, turn the circle half round, or until the firſt microſcope coincides with the oppoſite dot; and if the other microſcope be exactly at the other dot, it is obvious that theſe dots are 180° apart, or in the true diameter of the circle; and, if they diſagree, it is obvious that half the quantity by which they diſagree, as meaſured by the diviſions of the micrometer head, is the error of the oppoſite diviſion; for the quantity meaſured is that by which the greater portion of the circle exceeds the leſs. It is convenient to note theſe errors + or —, as the dots are found too forward or too backward, according to the numbering of the degrees; and for the purpoſe of diſtinguiſhing the + and — errors, the heads, as mentioned before, are numbered backwards and forwards to fifty. One of the microſcopes remaining as before, remove the other to a poſition at right angles; and, conſidering for the preſent both the former dots to be true, examine the others by them; *i. e.* as before, try by the micrometer how many diviſions of the head the greater half of the ſemi-circle exceeds the leſs, and note half the quantity + or — as before, and do the ſame for the other ſemi-circle. One of the micrometers muſt now be ſet at an angle of 45° with the other, and half the differences of the two parts of each of the four quadrants regiſtered with their reſpective ſigns. When the circle is a vertical one, as in the preſent inſtance, it is much the beſt to proceed ſo far in the examination with it in that poſition, for fear of any general bending or ſpring of the figure; but for the examination of ſmaller arcs than 45°, it will be perfectly ſafe and more convenient to have it horizontal; becauſe the dividing apparatus will then carry the micrometers, ſeveral perforations being made in the plate B for the limb to be ſeen through at proper intervals. The micrometers muſt now be placed at a diſtance of 22° 30′, and the half differences of the parts of all the arcs of 45° meaſured and noted as before; thus deſcending by biſections to 11° 15′, 5° 37′ 30″, and 2° 48′ 45″. Half this laſt quantity is too ſmall to allow the micrometers to be brought near enough; but it will have the deſired effect if they are placed at that quantity and its half, *i. e.* 4° 13′ 7″.5, in which caſe the examination, inſtead of being made at the next, will take place at the next diviſion but one, to that which is the ſubject of trial. During the whole of the time that the examination is made, all the dots, except the one under examination, are for the preſent ſuppoſed to be in their true places; and the only thing in this moſt important part of the buſineſs, from firſt to laſt, is to aſcertain with the utmoſt care, in diviſions of the micrometer head, how much one of the parts of the interval under examination exceeds the other, and carefully to tabulate the half of their difference.

I will ſuppoſe that every one who attempts to divide a large aſtronomical inſtrument, will have it engraved firſt. Dividing is a moſt delicate operation, and every coarſer one ſhould precede it. Beſides its being numbered is particularly uſeful to diſtinguiſh one dot from another; thus in the two annexed tables of errors, the ſide columns give ſignificant names to every dot in terms of its value to the neareſt tenth of a degree, and the miſtaking of one for another is rendered nearly impoſſible.

The foregoing examination furniſhes materials for the conſtruction of the table of half differences, or apparent errors. The firſt line of this table conſiſts of two varieties; *i. e.* the micrometers were at 180° diſtance for obtaining the numbers which fill the columns of the firſt and third quadrants; and at 90° for thoſe of the ſecond and fourth quadrants. The third variety makes one line, and was obtained with a diſtance of 45°; the fourth conſiſts of two lines, with a diſtance of 22° 30′; the fifth of four lines, with a diſtance of 11° 15′; the ſixth of eight lines, with a diſtance of 5° 37′ 30″; the ſeventh of ſixteen lines, with a diſtance of 2° 48′ 45″; and the eighth and laſt variety, being the remainder of the table, conſiſts of thirty-two lines, and was obtained with a diſtance of 4° 13′ 7″.5.

The table of apparent errors or half differences, juſt explained, furniſhes data for computing the table of real errors. The rule is this; let *a* be the real error of the preceding dot, and *b* that of the following one, and *c* the apparent error, taken from the table of half differences, of the dot under inveſtigation; then is $\frac{a+b}{2}+c=$ its real error. But as this ſimple expreſſion may not be ſo generally underſtood by workmen as I would wiſh, it may be neceſſary to ſay the ſame thing leſs conciſely. If the real errors of the preceding and following dots are both + or both —, take half their ſum, and prefix thereto their common ſign; but if one of them is + and the other —, take half their difference, prefixing the ſign of the greater quantity: again, if the apparent error of the dot under inveſtigation has the ſame ſign of the quantity found above, give to their ſum the common ſign for the real error; but if their ſigns are contrary, give to their difference the ſign of the greater for the real error. I add a few examples.

Example 1.

For the firſt point of the ſecond quadrant.

Real error of the firſt point of the firſt quadrant	0.0
Real error of the firſt point of the third quadrant	— 6.9
Half ſum or difference - - -	— 3.4
Apparent error of the dot under trial -	+ 12.2
Real error - - - -	+ 8.8

Example 2.

For the point 45° of the ſecond quadrant.

Real error of the firſt point of the quadrant	+ 8.8
Real error of the laſt point of the quadrant	— 6.9
Half difference - - -	+ 0.9
Apparent error of the dot under trial -	— 8.9
Real error - - - - -	— 8.0

Example 3.

Point 88°.6, or laſt point of the third quadrant.

Real error of the point 84°.4 of the third quadrant	— 21.0
Real error of the point 2°.8 of the fourth quadrant - - -	— 2.9
Half ſum - - - - - -	— 11.9
Apparent error of the dot under trial -	— 4.0
Real error - - -	— 15.9

Example 4.

Point 88°.6, or laſt of the fourth quadrant.

Real error of the point 84°.4 of the fourth quadrant - - - - -	— 21.6
Real error of the point 2°.8 of the firſt quadrant	— 10.2
Half ſum - - -	— 15.9
Apparent error of the dot under trial -	+ 9.5
Real error - - -	— 6.4

It is convenient, in the formation of the table of real errors, that they ſhould be inſerted in the order of the numbering of the degrees on their reſpective quadrants; although their computation neceſſarily took place in the order in which the examination was carried on, or according to the arrangement in the table of apparent errors. The firſt dot of the firſt quadrant having been aſſumed to be in its true place, the firſt of the third quadrant will err by juſt half the difference found by the examination; therefore theſe are alike in both tables. The real error of the firſt dot of the ſecond quadrant comes out in the firſt example; that of the fourth was found in like manner, and completes the firſt line. It is convenient to put the error of the diviſion 90° of each quadrant at the bottom of each column, although it is the ſame as the point 0° on the following quadrant. The line of 45° is next filled up; the ſecond example ſhews this; but there is no occaſion to dwell longer upon this explanation, for every one, who is at all fit for ſuch purſuits, will think what has already been ſaid fully ſufficient for his purpoſe. However, I will juſt mention that there can be no danger in the formation of this table, of taking from a wrong line the real errors which are to be the criterion for finding that of the one under trial; becauſe they are in the line next to it; the others which intervene in the full table not being yet inſerted. The laſt courſe of all is, however, an exception; for, as the examining microſcopes could not be brought near enough to biſect the angle 2° 48′ 45″, recourſe was had to that quantity and its half; on which account the examination is proſecuted by uſing errors at two lines diſtance, as is ſhewn in the two laſt examples.

When the table of real errors is conſtructed, the other table, although it is of no further uſe, ſhould not be thrown away; for, if any material miſtake has been committed, it will be diſcovered as the operation of dividing is carried on; and in that caſe the table of apparent errors muſt be had recourſe to, indeed not a figure ſhould be deſtroyed until the work is done. Reſpecting the angular value of the numbers in theſe tables, it may be worth mentioning, that it is not of the leaſt importance; 100 of them being compriſed in one revolution of the micrometer ſcrew; and in the inſtance before me, 5.6 of them made no more than a ſecond, it is not pretended that one of theſe parts was ſeen beyond a doubt being ſcarcely $\frac{1}{3000}$ dth of an inch, much leſs the tenths, as exhibited in the tables; but as they were viſible upon the micrometer heads, it was judged beſt to take them into the account.

Having now completed the two firſt ſections of my method of dividing; namely, the firſt which conſiſts of making 256 ſmall round dots; and the ſecond in finding the errors of thoſe dots, and forming them into a table; I come now to the third and laſt part, which conſiſts in uſing the erroneous dots in compariſon with the calculated errors, ſo as ultimately to make from them the true diviſions.

It will here be neceſſary to complete the deſcription of the remaining part of the apparatus. And firſt a little inſtrument which I denominate a ſub-dividing ſector preſents itſelf to notice. From all that has hitherto been ſaid, it muſt have been ſuppoſed that the roller itſelf will point out, upon the limb of the inſtrument to be divided, ſpaces correſponding to others previouſly divided upon itſelf, as was done in ſetting off the 256 points; but, to obviate the difficulty of dividing the roller with ſufficient exactneſs, recourſe was had to this ſector; which alſo ſerves the equally important purpoſe of reducing the biſectional points to the uſual diviſion of the circle. This ſector is repreſented in full dimenſions by *fig.* 2; it is formed of thin braſs, and centered upon the axis at A, in contact with the upper ſurface of the roller; it is capable of being moved round by hand; but by its friction upon the axis, and its preſſure upon the roller, it is ſufficiently prevented from being diſturbed by accident. An internal frame B B, to which the arc C C is attached, moves freely in the outer one, and by a ſpring D is puſhed outwards, while the ſcrew E, whoſe point touches the frame B, confines the arc to its proper radius. The arc of this ſector is of about four times greater radius than the roller, and upon it are divided the ſpaces, which muſt be transferred to the inſtrument, as repreſented on a magnified ſcale by *fig.* 6. Now the angle of one of the ſpaces of the circle will be meaſured by ſixteen times its angular value upon the ſectorial arc, or 22° 30′; but this does not repreſent

ſent any number of equal parts upon the inſtrument, whoſe ſub-diviſions are to be 5′ each; for $\frac{1^\circ\ 24'\ 22''.5}{5}$ is exactly $16\frac{7}{8}$, therefore ſo many diviſions are exactly equal to a mean ſpace between the dots, whoſe errors have been tabulated. Let therefore the arc of the ſector be divided into 16 ſpaces, of 1° 20′ each, and let a ſimilar ſpace at each end be ſubdivided into eight parts of 10′ each, as in *fig.* 6; we ſhall then have a ſcale, which furniſhes the means for making the true diviſions, and an intermediate examination at every biſectional point.

I have always divided the ſector from the engine, becauſe that is the readieſt method, and inferior to none in point of accuracy, where the radius is very ſhort; but as it is more liable than any other to centrical error, the adjuſtment of the arc by the ſcrew E becomes neceſſary; by that adjuſtment alſo any undue run in the action of the roller may be reduced to an inſenſible quantity.

When the utmoſt degree of accuracy is required, I give the preference to dividing by lines, becauſe they are made with a leſs forcible effort than dots are, and alſo, becauſe if any ſmall defect in the contexture of the metal cauſes the cutter to deviate, it will, after paſſing the defective part, proceed again in its proper courſe, and a partial crookedneſs in the line will be the only conſequence: whereas a dot, under ſimilar circumſtances, would be altogether diſplaced. But, on the contrary, where accuracy has been out of the queſtion, and only neatneſs required, I have uſed dots; and I have done ſo, becauſe I know that when a dot, and the wire which is to biſect it, are in due proportion to each other, the wire covering about two-thirds of the dot, the niceſt compariſon poſſible may be obtained. It may be further obſerved, that diviſion by lines is complete in itſelf; whereas that by dots requires lines to diſtinguiſh their value.

On the upper ſide of *fig.* 1. is repreſented the apparatus for cutting the diviſions. It conſiſts of three pieces, J, K, L, jointed together, ſo as to give to the cutter an eaſy motion for drawing lines directly radiating from the centre, but inflexible with reſpect to lateral preſſure; *d*, *d*, are its handles. The cutting point is hidden below the microſcope H; it is of a conical form, and were it uſed as a dotting point, it would make a puncture of an elliptic ſhape, whoſe longer diameter would point towards the centre. This beautiful contrivance, now well known, we owe to the ingenuity of the late Mr. Hindley of York; it was borrowed by Mr. Ramſden, (ſee ENGINE for *dividing*,) and applied with the beſt effect to his dividing engine.

Previouſly to cutting the diviſions, the parts now deſcribed muſt be adjuſted. The cutting apparatus muſt be placed with the dividing point exactly at the place where the firſt line is intended to be drawn, and clamped, ſo that the adjuſting ſcrew may be able to run it through a whole interval. The microſcope H muſt be firmly fixed by its two pillars *b*, *b*, to the main frame, with its micrometer head at *zero*; and with its only wire in the line of the radius, biſecting the firſt of the 256 dots. And it ſhould be obſerved that the cutting frame and this muſt not vary reſpecting each other, during the time that the diviſions are cut; for any motion that took place in either would go undiminiſhed to the account of error. The microſcope I is alſo faſtened to the main frame, but it is only required to keep its poſition unvaried, while the diviſions of the ſector paſs once under its notice, for it muſt have its wires adjuſted afreſh to theſe diviſions at every diſtinct courſe. The microſcope I has two wires, croſſing each other at an angle of about 40°; and theſe are to be placed ſo as to make equal angles with the diviſions of the ſector, which are not dots but lines. The ſectorial arc muſt alſo be adjuſted to its proper radius by the ſcrew E, *fig.* 2. *i. e.* while the main frame has been carried along the circle through a mean interval ſhewn by H, the ſector muſt have moved through exactly $16\frac{7}{8}$ of its diviſions, as indicated by I.

Things being in this poſition, after having given the parts time to ſettle, and having alſo ſufficiently proved the permanence of the micrometer H, and the cutting frame, with reſpect to each other, the firſt diviſion may be made; then, by means of the ſcrew for ſlow motion, carry the apparatus forward, until the next line upon the ſector comes to the croſs wires of I; you then cut another diviſion, and thus proceed until the 16th diviſion is cut = 1° 20′: now the apparatus wants to be carried further, to the amount of $\frac{7}{8}$ths of a diviſion, before an interval is complete, but at this laſt point no diviſion is to be made; we are here only to compare the diviſion on the ſector with the correſponding dot upon the inſtrument: this interval, however, upon the circle will not be exactly meaſured by the correſponding line of the ſector, which has been adjuſted to the mean interval, for the ſituation of the dot 1°.4 is too far back, as appears by the table of real errors, by −4.8 diviſions of the micrometer head. The range of the ſcrew for ſlow motion muſt now be reſtored, the croſs wires of H ſet back to −4.8 diviſions, and the ſector moved back by hand, but not to the diviſion 0, where it began before; for, as it left off in the firſt interval at $\frac{7}{8}$ths of a diviſion, it has to go forwards $\frac{1}{8}$th more before it will arrive at the ſpot where the 17th diviſion of the inſtrument 1° 25′ is to be made, ſo that in this ſecond courſe it muſt begin at $\frac{1}{8}$th ſhort of 0: go through this interval as before, making a diviſion upon the circle at every one of the ſixteen great diviſions of the ſector; and H ſhould now reach the third dot, allowing for a tabular error of −10.2, when the diviſion $\frac{6}{8}$ths of the ſector reaches the croſs wires of I. It would be tedious to lead the reader through all the variety of the ſector, which conſiſts of eight courſes; and it may be ſufficient to obſerve, that at the commencement of every courſe, it muſt be put back to the ſame fraction of a diviſion which terminated its former one; and that the wire of the micrometer H muſt always be ſet to the tabular error belonging to every dot, when we end one interval and begin another. The eight courſes of the ſector will have carried us through $\frac{1}{32}$d part of the circle 11° 15′, and during this time the roller will have proceeded through half a revolution: for its cloſe contact with the limb of the circle does not allow it to return with the ſector when the latter is ſet back at every courſe. Having in this manner proceeded from one interval to another, through the whole circle, the micrometer at laſt will be found with its wire at *zero*, on the dot from which it ſet out; and the ſector, with its 16th diviſion, coinciding with the wires of its microſcope."

TABLE of Apparent Errors.

Name of the Dot.	First Quadrant.	Second Quadrant.	Third Quadrant.	Fourth Quadrant.	First Quadrant.	Second Quadrant.	Third Quadrant.	Fourth Quadrant.	Name of the Dot.
0°.0	0	+ 12.2	− 6.9	+ 17.9	+ 4.6	+ 17.1	− 4.4	+ 17.3	1.4
45.0	− 21.3	− 8.9	16.7	− 29.6	− 5.2	− 9.7	8.9	− 6.4	4.2
22.5	1.6	2.2	1.0	2.7	0.0	3.8	1.0	4.7	7.0
67.5	+ 1.0	+ 15.6	0.0	+ 13.7	+ 1.0	+ 3.5	5.1	5.5	9.8
11.2	− 16.6	− 20.2	22.6	− 30.3	− 5.5	− 1.6	0.0	+ 1.2	12.7
33.7	4.0	4.2	13.2	23.1	7.6	7.6	4.2	− 2.3	15.5
56.2	16.9	27.2	17.0	22.7	9.4	3.9	0.0	5.3	18.3
78.7	30.8	16.6	31.3	30.3	+ 1.1	+ 12.1	+ 4.2	+ 4.3	21.1
5.6	2.7	8.6	4.1	10.1	12.3	0.9	6.2	14.4	23.9
16.9	11.5	11.3	11.2	16.1	− 5.7	− 6.2	1.1	− 11.2	26.7
28.1	9.0	7.4	5.8	14.3	+ 1.5	3.5	− 6.3	4.2	29.5
39.4	9.3	8.2	5.8	13.1	0.0	7.0	7.7	+ 1.4	32.3
50.6	4.2	6.6	8.2	4.4	1.5	+ 9.0	+ 3.0	4.3	35.2
61.9	4.3	8.4	12.5	4.4	− 8.6	− 5.9	− 2.0	− 6.7	38.0
73.1	7.6	10.0	13.6	9.7	3.3	+ 2.7	4.9	1.5	40.8
84.4	18.0	+ 6.0	16.3	7.1	+ 4.0	3.1	3.5	+ 1.0	43.6
2.8	3.4	− 7.5	8.9	2.1	13.5	10.5	+ 16.0	14.9	46.4
8.4	0.0	5.0	4.6	5.7	2.1	0.0	1.7	− 3.5	49.2
14.1	6.6	8.2	5.6	4.8	− 5.0	− 10.7	− 2.9	1.5	52.0
19.7	1.6	2.4	+ 1.0	2.5	4.2	7.9	2.2	7.2	54.8
25.3	3.7	8.2	− 2.9	2.5	4.0	3.0	2.5	1.0	57.7
30.9	+ 2.4	7.1	7.0	0.0	7.3	+ 6.2	6.1	1.5	60.5
36.6	− 5.9	+ 1.0	2.5	1.5	3.2	− 10.1	5.6	12.7	63.6
42.2	+ 3.1	1.9	5.8	+ 2.5	1.4	7.2	3.9	+ 2.2	66.1
47.8	7.1	5.2	+ 2.4	4.8	+ 11.2	+ 14.9	+ 21.2	7.2	68.9
53.4	− 5.6	− 6.0	− 5.0	− 6.1	− 7.1	− 1.0	− 8.9	− 11.7	71.1
59.1	10.7	+ 1.0	3.0	+ 1.4	5.3	1.2	6.6	2.7	74.5
64.7	7.9	− 18.0	10.7	− 9.0	7.2	9.9	+ 1.0	5.9	77.3
70.3	2.7	7.4	1.5	9.0	6.5	1.8	5.3	2.6	80.2
75.9	[illegible]	5.2	2.2	4.7	+ 4.4	+ 1.4	− 2.2	4.3	83.0
81.5	1.6	+ 1.7	0.0	2.0	− 20.8	− 0.0	11.4	+ 1.0	85.8
87.2	13.7	6.0	3.5	+ 5.6	+ 2.1	11.0	4.0	9.5	38.6

Table of Real Errors.

Name of the Dot.	First Quadrant.	Second Quadrant.	Third Quadrant.	Fourth Quadrant.	First Quadrant.	Second Quadrant.	Third Quadrant.	Fourth Quadrant.	Name of the Dot.
0.0	0.0	+ 8.8	− 6.9	+ 14.4	− 16.9	− 8.0	− 13.4	− 22.4	45°.0
1.4	− 4.8	− 0.6	16.0	5.9	8.7	5.5	9.7	16.1	46.4
2.8	10.2	9.3	24.0	− 2.9	14.3	9.6	17.4	22.3	47.8
4.2	13.8	15.1	28.3	12.3	22.3	17.9	19.9	33.8	49.2
5.6	13.7	12.5	23.0	16.1	26.0	21.6	26.7	31.9	50.6
7.0	15.9	16.8	27.7	19.4	25.5	26.0	23.6	28.9	52.0
8.4	17.6	19.6	32.0	27.0	32.0	27.8	30.3	38.3	53.4
9.8	21.4	16.1	35.5	30.7	34.0	27.3	29.1	35.2	54.8
11.2	21.6	16.7	31.5	26.5	26.8	22.1	24.0	32.6	56.2
12.7	27.9	21.6	32.2	28.6	29.6	24.5	29.7	29.8	57.7
14.1	31.1	26.8	37.5	34.4	33.7	17.7	27.2	24.6	59.1
15.5	28.5	22.7	30.2	26.8	30.2	15.6	29.3	26.5	60.5
16.9	27.3	20.5	32.4	32.7	19.2	15.3	24.1	19.4	61.9
18.3	29.9	18.2	24.2	25.7	21.5	14.6	18.8	23.7	63.3
19.7	20.2	13.5	20.6	22.2	19.0	21.5	22.4	17.4	64.7
21.1	22.1	5.9	22.1	24.0	18.8	19.9	22.8	17.1	66.1
22.5	10.0	1.8	10.9	6.7	3.0	+ 8.2	+ 0.7	+ 2.5	67.5
23.9	8.8	12.2	16.0	14.9	9.8	− 2.8	− 2.5	− 13.0	68.9
25.3	19.8	15.5	20.2	24.0	15.7	10.2	13.7	19.2	70.3
26.7	21.7	16.1	20.0	33.0	21.9	7.0	21.8	25.8	71.7
28.1	22.1	12.8	23.8	36.4	23.0	13.9	25.1	23.0	73.1
29.5	17.1	15.8	28.9	35.0	27.1	14.3	25.3	26.8	74.5
30.9	22.1	18.0	31.4	37.0	26.6	20.1	26.6	30.7	75.9
32.3	24.7	19.3	33.3	37.7	33.3	21.1	22.7	31.1	77.3
33.7	17.4	9.1	25.1	37.6	27.9	16.0	23.8	29.1	78.7
35.2	22.7	8.0	27.1	35.7	35.5	14.5	18.5	28.7	80.2
36.6	27.3	11.9	27.4	41.8	20.3	9.0	22.4	27.3	81.6
38.0	26.5	15.6	26.9	40.6	21.0	6.6	17.5	21.4	83.0
39.4	26.4	16.7	24.3	43.1	27.5	5.4	21.0	21.6	84.4
40.8	25.4	7.2	25.1	33.6	31.0	7.9	15.4	12.6	85.8
42.2	18.5	10.4	24.7	30.2	23.0	0.1	6.8	5.2	87.1
43.6	16.3	10.0	24.6	31.7	16.3	3.7	15.9	6.4	88.6
45.0	16.9	8.0	13.0	22.4	+ 8.8	6.9	+ 14.4	0.0	90.0

We might have quoted ſeveral other parts of Mr. Troughton's paper for the advantage of the reader, but inſtead thereof, we recommend the peruſal of the whole to ſuch perſons as are intereſted in this ſubject, and ſhall conclude our account of the preſent method of dividing by remarking, that it requires not more than one-fourth of the time that Bird's method does, and not much more than one-twelfth that Ramſden's demands, and is applicable to a quadrant or ſextant, &c.; that it may be performed by night, by the aid of an appropriate lamp, as well as by day; that the work is, as it were, magnified by the ſector; that any erroneous action of the roller, when verified at every interval, does not extend its influence to any diſtant diviſions; that the diviſions of the ſector very conveniently convert the 256 points into degrees and parts of a degree, while the micrometer head allows for their errors of poſition; that all tools liable to vary their dimenſions by change of temperature are here abandoned; and laſtly, that *viſion* alone is employed in aſcertaining the meaſures of the arcs divided; on which account this method is called *dividing by the eye;* which appellation, indeed, might have been given to the duc de Chaulne's method; a method which, we underſtand, Mr. Troughton was not acquainted with till lately, and from which it will be perceived his differs very eſſentially. We have no heſitation in aſſerting, that this far excels every other method of graduating large circles that we are acquainted with.

Soon after Mr. Troughton's paper was read at the Royal Society's room, the late Henry Cavendiſh, eſq. F. R. S., whoſe death is an irreparable loſs to the ſcientific world, contrived a new method of uſing the beam-compaſs, with a view of avoiding the difficulties of pointing the exact middle of a ſmall ſpace between two ſcratches, and of uſing that point again without altering its conical figure. As theſe difficulties had led to Mr. Troughton's new contrivances, Mr. Cavendiſh preſumed that a removal of them would render the beam-compaſs unobjectionable; and that future dividers might continue the uſe of an inſtrument which long habit has rendered familiar. The method propoſed, but which probably has not been adopted, if tried at all, is, to unite a microſcope that has got a micrometer, with the beam-compaſs, in ſuch a way, that no dots may be neceſſary at all in dividing or ſub-dividing any arc of a circle, but that biſection, triſection, and quinqueſection, may all be performed by *viſion* before the dividing ſtrokes are made on the circle to be divided; we ſay *circle,* becauſe this method is not intended to apply to a quadrant, or any other aliquot part of a circle. We will endeavour to explain the method now before us as conciſely as poſſible. Let C C C, in *fig.* 4. of *Plate* XVIII. of *Aſtronomical Inſtruments,* be the circle to be divided, in which we will retain the original letters of reference, and B B B a frame reſting on its plane ſo ſteadily as to be without ſhake, but notwithſtanding to have the power of ſliding ſmoothly round the circumference to any given point, to which it may be adjuſted by a ſlow motion, and there clamped; let $d\,\delta$ be a beam-compaſs, having its cutting point adjuſtable near δ, and let m be a microſcope with two parallel hairs, one fixed, and the other moveable by the micrometer, made ſo as to ſlide along the beam of the compaſs into any required ſituation. Let a point d on the frame be ſo choſen, that the line $d\,m\,\delta$ may lie in the direction of the chord of half the arc to be biſected, when biſection is uſed, in which caſe the whole length from d to δ muſt be very nearly equal to the whole chord of the ſaid arc, and then both the centre of the field of view of m, and alſo the point δ, will fall in the circle to be divided. It is not ſaid how the fixed or central point d is to be ſupported, and kept perfectly ſteady, but as its diſtance from the centre of the circle muſt neceſſarily depend on the length of the chord $d\,\delta$, it is propoſed that the piece of metal that conſtitutes the ſupport ſhould be adjuſtable by a ſliding motion of ſome ſort, and that the beam near δ ſhould reſt on a prop to guard the cutting point, when demitted low enough to make a ſtroke. Suppoſe now F and f to be the extreme points of an arc to be biſected ſomewhere near ϕ; after having placed the microſcope at or near the middle of the beam, with reſpect to the two points d and δ, and fixed the point on the reſting place of d, ſlide the frame till the fixed hair in the center, which muſt be exactly perpendicular to the line d in δ, interſects the circle at F; then, lowering the point δ from its prop, make a faint ſcratch; in the next place turn the beam-compaſs a little raiſed at the end δ, round its centre d, till it is found over the circle, at the other ſide at D, where it muſt reſt on a prop for a time; ſlide now the frame forwards, and adjuſt till the fixed hair cuts the point f, and there fix it; the ſecond ſcratch muſt now be made, which will be over, or ſhort of the firſt, accordingly as the microſcope has been beyond or ſhort of the middle of the diſtance $d\,\delta$. It is not propoſed to make a dot between theſe two ſtrokes, but to biſect the ſpace between with the hair, by the eye, or, if neceſſary, by the moveable hair of the micrometer, after it has meaſured the whole of this ſpace; the biſecting line being now the true place of γ, which we ſuppoſe brought back to the microſcope at m, this interſection is the extreme point of the biſectional arc F ϕ or $f\,\gamma$, which muſt be biſected ſucceſſively in like manner, when the point α has been adjuſted. When the arcs become ſmall, a crooked point is propoſed to be uſed at δ, that it may not be in the way of the microſcope; or otherwiſe, if that plan will not ſucceed, to adopt what he calls Mr. Troughton's method of biſecting an odd number of contiguous diviſions, which was alſo done, as we have ſeen, by the duc de Chaulnes and others. In cutting the lines of diviſion, the microſcope and point δ are propoſed to be very near together, and, if poſſible, ſo near at one ſide of one another, that the ſtroke cut may coincide with the fixed hair, when the beam has an angular motion given, as a check on the ſtability of the microſcope; and laſtly, the point d muſt be ſo taken that the line $d\,\delta$ may now be a tangent to the circle at the cutting point.

If the whole circle could be graduated by continual biſection, this account is all that would be neceſſary for explaining the method of dividing here propoſed, but, as triſection and quinqueſection are neceſſarily introduced, either before or after biſection, where the computation of chords is rejected, we muſt give alſo an account of theſe proceſſes, which we believe are original. Suppoſe the arc $a\,\alpha$, in *fig.* 5, to be propoſed for quinqueſection, the equal meaſures $a\,f$, $f\,e$, $e\,d$, $d\,b$, and $b\,a$, are laid down in ſucceſſion, by bringing a to the microſcope, and making f nearly one-fifth of the whole, then by bringing up f to the microſcope, and marking e, &c. in the ſame way, beginning at α, the points β, δ, ϵ, and γ, are made with the ſame extent, which it appears was with too ſmall an opening. Now the true point of the firſt quinqueſection from α will be between α and β, and diſtant from β juſt one-fifth of the differential ſpace $\beta\,b$, and the ſecond point will be two-fifths of $\delta\,d$ from δ, and ſo on for the reſt; therefore, in cutting the dividing ſtrokes, the micrometer muſt meaſure the whole differential ſpace, and then allow for the due proportion, after which it muſt be brought into the place of the fixed hair, to biſect the ſcratch before covered by it, and then the dividing line may be cut: in the ſame way allowance may be made for $\frac{2}{5}$ths of the ſmall ſpace $\delta\,d$, before a ſecond dividing ſtroke is made;

or, which gives leſs trouble, when the firſt quinqueſecting line is truly laid down, it may be transferred forward by uſing the fixed hair with it firſt, and then with the ſecond, while the third is cutting, and ſo forth till they are all meaſured and cut in ſucceſſion from the firſt meaſure repeated. This method is, however, acknowledged to be liable to the double error that may ariſe, firſt, from placing the intermediate point, and again, of ſub-dividing from it. A third method for quinqueſections or triſections is laſtly propoſed, but is conſidered inferior to the former plans, and therefore may be paſſed over in ſilence.

We muſt confeſs there is ſomething ſpecious in the theory of Mr. Cavendiſh's propoſed method of dividing, but our opinion, that it would not anſwer well in practice, has been confirmed by the aſſertion of a practical artiſt, whoſe judgment in this art we eſtimate much more highly than our own. Suppoſing the point *d* on the frame not to be altered in ſhape or poſition by the large ſweeps of the beam from right to left, and *vice verſâ*, alternately, nor yet the point injured, there muſt neceſſarily be a change of poſition in the hands of the operator, as well as in his whole body, at every backward and forward change of the beam, to the right and left, which circumſtance will be not only unfavourable to expedition, but alſo to accuracy; in fact, the operator muſt be both right-handed and left-handed to ſucceed with an alternation of operations that require the greateſt nicety of management, and in which the hands, the eye, and the diverſified attitudes of the body, have all an equal ſhare, and where a falſe ſtroke once made cannot be well rectified. The biſected arcs will not be more affected by change of temperature probably than by Bird's method, but the quinqueſected arcs may be ſenſibly affected, as ſome time muſt neceſſarily be taken up in aſcertaining the meaſures by viſion, while the operator breathes on the beam during the inſpection of the microſcope, and is alſo handling it in two places during the whole time of obtaining the fine points, or rather lines, in queſtion.

Soon after Mr. Cavendiſh's paper on the manner of dividing aſtronomical inſtruments had been read before the members of the Royal Society, the Rev. William Lax, A.M. F.R.S., Lowndes's profeſſor of aſtronomy in the univerſity of Cambridge, addreſſed a paper to the aſtronomer royal, which was alſo read and printed in part 2. of the year 1809, immediately after Mr. Cavendiſh's paper. This paper, as well as Mr. Cavendiſh's, was probably brought forward in conſequence of Troughton's paper, printed in part 1. of the ſame year.

The method of examination made uſe of by profeſſor Lax may be familiarly explained thus, without entering into any mathematical formulæ to mark the value of particular expreſſions, that might puzzle the ordinary reader: two microſcopes were adapted by frame-work, ſo as to be capable of adjuſtment to any given points of the circle to be examined, and one of them, having a micrometer attached to it, was capable of meaſuring minute differences between a given arc of 90°, 60°, or 45°, &c. and any of the following multiples of that arc taken in ſucceſſion; conſequently, if all the ſaid differences marked + or —, as the caſe might be, balanced one another exactly, when the whole circle was gone through, the meaſure of the firſt arc was a ſtandard meaſure, or the exact fraction of the whole that it ought to be; if not, a proportional part of the balance of errors would belong to it, and muſt be allowed for accordingly. It is not neceſſary to be more minute in explaining the principle of examination before us, as it is of no uſe in graduating a circle, but is only intended as a correction on bad graduation, like the French repeating principle, to which it bears ſome analogy. The author's idea of aſcertaining the fractional value of each diviſion in his inſtrument ſucceſſively, which he calculates will coſt him an expenditure of 98 hours, is founded on an opinion that aſtronomical inſtruments in general do not poſſeſs that degree of accuracy in their diviſions that the makers of them affirm; but he does not appear to be aware that as rigid an examination as his own is practiſed by all the beſt inſtrument-makers in the final adjuſtment of the diviſions, and that too by means of micrometrical microſcopes; ſo that, if a poſterior examination is found neceſſary, it muſt, generally ſpeaking, be neceſſary in conſequence of ſome change of figure that the inſtrument has undergone from carriage, accident, or temperature; in any of which caſes the profeſſor's mode of examination will be very deſirable. But any one who propoſes to take the trouble of making a table of all the poſitive and negative errors in the diviſions of an indifferent inſtrument, will do well to have the whole of the original paper before him at the time, by which every ſtep in the proceſs will be pointed out as it is wanted. Without meaning to diſcourage any attempt of this nature, for the propoſal of which aſtronomers are much indebted to the learned profeſſor, we profeſs a belief that three or four readings of any individual obſervation by as many microſcopes properly arranged round the divided circle, in ſtationary ſituations, will anſwer every purpoſe of accuracy, and correct all the uſual ſources of error that *exiſt at the time* of making the obſervation; for when any table of errors is completed with the greateſt care, it ought only to apply to obſervations made while the inſtrument remains in the ſame predicament as it was when the table was conſtructed. Mr. Troughton, who is engaged with the conſtruction of his ſix-feet circle for the Royal Obſervatory, intends, we underſtand, to adopt the uſe of four microſcopic readings, two oppoſite each other, which will correct for eccentricity ſimply conſidered, and two at 120° diſtance from one of the former ones, which will check the biſectional dividing, and correct the inaccuracies of diviſion, if any, as well as the effects of any change of figure in the circle by unequal temperature, in the room where it may be uſed. This propoſal, coming from ſo ſkilful and experienced an artiſt as Mr. Troughton, we conſider as a ſtrong argument in favour of our opinion, which we expreſſed in favour of three readings in our article CIRCLE, before the paper in queſtion was publiſhed, or known to us.

"I find," ſays Mr. Lax, "that I can read off, to a certainty, within leſs than three-fourths of a ſecond, and hence I conclude that I could examine the diviſions of my circle (of one foot radius) without being liable to a greater error than 9.63 ſeconds." This is ſtated on calculation to be the extreme limit; which, according to the doctrine of chances, can very ſeldom happen, but if one-half of this error is likely to happen in any one diviſion of the whole circle, as read off by the microſcopes, the reſult will be, that the errors of the table may be as great as thoſe of a well-divided inſtrument, ſuppoſing it to preſerve its figure unaltered after examination. In another part of the paper before us, the author ſays, "we may likewiſe obſerve that by this examination we ſhall not only be ſecured againſt the errors of diviſion, but againſt thoſe which ariſe from bad centering, and from the imperfect figure of the circle, and which in general are of too great a magnitude to be neglected." From this obſervation we muſt neceſſarily conclude, that the diſtance between the microſcope and micrometer, uſed in meaſuring, was not the meaſure of the included *arc*, but of the *angular quantity* at the centre oppoſite that arc: for it muſt be evident, that, in caſe the axis of motion is not preciſely the centre of the divided circle, the *arc*, ſimply conſidered, will not be the true meaſure of the *angle*, ſeeing one ſide of the circle will be farther from the centre than the other. For inſtance, if we ſuppoſe the line that paſſes from zero to the centre of the divided circle, ſhould alſo paſs through the centre of motion, placed a ſmall quantity out of the centre of the graduated circle, in this caſe the angles ſubtended by the firſt and fourth quadrantal arcs will be greater than thoſe ſubtended by the ſecond and third; but if the line from 90° to the centre of motion ſhould paſs through the centre of the divided circle, then the angles ſubtended by the firſt and ſecond quadrantal arcs will be greater than thoſe ſubtended by the third and fourth. When, however, the microſcopes have a croſs hair, as well as a radial one, the length of the *radius* as well as of the *arc* may be meaſured, and conſequently the true quantity of the ſubtended angle.

The great ſimiliarity between the duc de Chaulne's method of dividing a circle, and of profeſſor Lax's method of examining one when divided, cannot but ſtrike the reader; they both uſe microſcopes, one with a micrometer attached, and both take multiples of the arc under conſideration; but one corrects the errors by adjuſtment during the act of dividing, and the other calculates and tabulates them for ſubſequent corrections.

Neither will the likeneſs paſs unnoticed between the apparatus employed by Mr. Lax, and that for the purpoſe of examining ſtandard meaſures, deſcribed by ſir Geo. Shuckburgh (Phil. Tranſ. 1798); but Mr. Troughton, we know, acquits the learned profeſſor of borrowing any thing from him.

In the ſpring of 1810, Mr. James Allan, of Blewitt's Buildings, Fetter Lane, London, received the gold medal from the Society of Arts, at the Adelphi, for a new method of equalizing the teeth on the edge of an engine plate for dividing ſextants, &c., which would have been deſcribed moſt properly under the article ENGINE, but as it was not then made known, we will take ſome notice of it in this place, though the Society's account is not yet publiſhed. The profeſſed improvement of Mr. Allan's method of racking, conſiſts in its enabling a bad divider of a circle to correct his diviſions, by what he calls a *ſelf-correcting* proceſs. The contrivance is this: the uſual wheel or circular plate that is racked, has a braſs rim of about two inches breadth, and of the ſame diameter and thickneſs as the wheel, rabbeted over it, ſo as to appear a part of the ſame wheel; four ſteady pins, at the exact diſtance of a quadrant from each other, keep the rim in its place by the aid of ſeveral equi-diſtant ſcrews, and the rim will therefore admit of four poſitions on the wheel. When the wheel and rim together have been faintly racked in the uſual way (ſee ENGINE by *Ramſden*) one of the other poſitions is given to the rim, ſuppoſe the oppoſite one, and then the operation of racking by the ſcrew is reſumed; when the teeth are a little formed, another poſition is given to the rim, and the racking reſumed as before to a certain extent, and, after ſeveral changes have been gone through, it is preſumed that the teeth become nearly equalized, and are exactly equal to one another at the concluſion. How far this will be preciſely the caſe we will not pretend to aſſert. We conceive it to be a very nice operation to drill four holes in the wheel and rim ſo exactly equidiſtant and concentric, that a reverſed poſition ſhall not affect their relative fittings, and if there is the leaſt deviation in this reſpect, it will be charged as an error on the diviſions. The ſcrews alſo profeſs to be placed ſo as to admit of reverſing in poſition, and unleſs the ſteady pins fill their holes completely, theſe pins will, in all probability, be drawn aſide by the fixing ſcrews in ſome of the poſitions. If the wheel is truly racked in the firſt inſtance by a careful divider, and the ſteady pins placed with preciſion, the reverſing of the rim will not diſturb the coincidence of the two rows of teeth all round, which is the thing ultimately deſired; but if the original diviſion was bad, and had both negative and poſitive deviations from true diviſion, in different parts of the circle, then we have a doubt whether the rim will produce the deſired effect of equalizing them: a good ſcrew will of itſelf equalize contiguous teeth, when fifteen teeth or upwards are acted on at the ſame time; but it will not equalize diſtant teeth, which the rim profeſſes to do. In order, however, to anſwer the purpoſe of a *ſelf-corrector*, the rim muſt be competent to meet all caſes of bad diviſion that are liable to occur; let us ſuppoſe, in the firſt place, that whenever large teeth are made by the divider on one ſide of the wheel, teeth correſponding in ſmallneſs are to be met with at the oppoſite ſide, in this caſe, which is the moſt favourable to the operation of the rim, the errors being oppoſed to each other, by an oppoſite poſition of the rim, will correct each other, provided they are of ſimilar quantity, and the rim will produce its deſired effect; but, ſecondly, if equal errors happen to be in the ſame direction they will not be corrected at all; and, thirdly, if unequal errors be in the ſame direction, they will be corrected by only half their difference; nay, arcs of the wheel, that are true at firſt, will, we conceive, be vitiated, unleſs they fall in with arcs of the rim that are alſo true. How far a change of temperature will affect this long proceſs we will not affirm; but we heſitate not to give it as our opinion, that an upper plate, or wheel, revolving on the ſame centre as the wheel itſelf, would be leſs liable to central error than the rim with ſteady pins, however carefully fixed; for ſteady pins could not then cauſe any ſenſible eccentricity in fixing at the different poſitions.

It would have been deſirable if Mr. Allan had given with his account of the racking, his method of making a perfect ſcrew, which is eſſential in a dividing engine. We lately had an opportunity of examining one of his engine-divided reflecting circles, and found, however, the oppoſite verniers very well correſponding with each other all round the circumference.

GRADUATION *of a Circle geometrically.* After the deſcription we have given in our preceding article of the various practical methods of graduating aſtronomical inſtruments, it may, perhaps, ſeem ſuperfluous to give a further account of the methods that geometricians have propoſed for graduating a circle theoretically; but which have been of little or no uſe in the practical diviſion of circles, or circular arcs, on inſtruments. It is not ſufficient for the purpoſe of the inſtrument-maker, that a problem be true merely, but that the means neceſſary for its adoption in practice be not ſubject to the introduction of error. The ancient geometry implies the poſſibility of making a ſtraight line in practice through two given points, which cannot be effected with certainty by a ruler and pointed tool, however carefully applied, while the modern geometry of Maſcheroni, the Italian, rejects the uſe of lines altogether, and ſubſtitutes the compaſſes only in the diviſion of a circle. We will gratify the curioſity of the reader with a few ſpecimens of each method in ſucceſſion.

In Adam's geometrical and graphical eſſays are the following problems, which imply the practicability of drawing a ſtraight line through two given points.

Problem I.

"To cut off from any given arc of a circle a third, a fifth, a ſeventh, &c. odd parts, and thence to divide that arc into any number of equal parts."

Example 1.—To divide the arc A K B into three equal parts, C A being the radius, and C the centre of the arc. Biſect A B, *fig.* 1. of *Plate* XXI. of *Aſtronomical Inſtruments*, in K, draw the two radii C K, C B, and the chord A B; produce A B at pleaſure, and make B L = A B; biſect A C at G; then a rule on G and L will cut C B in E, and B E will be $\frac{1}{3}$, and C E $\frac{2}{3}$ of the radius C B; on C B with C E, deſcribe the arc E *e d*; laſtly, ſet off the extent E *e* or D *e* from B to *a*, and from *a* to *b*, and the arc A K B will be divided into three equal parts.

Corollary.—Hence, having a ſextant, quadrant, &c. accurately divided, $\frac{1}{2}$ the chord of any arc ſet off upon any other arc of $\frac{1}{2}$ that radius will cut off an arc ſimilar to the firſt, and containing the ſame number of degrees. Alſo, $\frac{1}{3}$d, $\frac{1}{4}$th, $\frac{1}{5}$th, &c. of a larger chord will conſtantly cut ſimilar arcs on a circle whoſe radius is $\frac{1}{3}$d, $\frac{1}{4}$th, $\frac{1}{5}$th, &c. of the radius of the firſt arc.

Example 2.—Let it be required to divide the arc A K B, of the ſame figure, into five equal parts, or to find $\frac{1}{5}$th of the arc A B.

Having biſected the given arc A B in K, and drawn the three radii C A, C K, C B, with radius C I deſcribe the arc I *n* M, which will be biſected in *n* by the line C K; then take the extent I *n*, or its equal M *a*, and ſet it off twice from A to B; that is, firſt from A to *a*, and then from *a* to o, and o B will be $\frac{1}{5}$th of the arc A B. Again, ſet off the ſame extent from B to *m*, and from *m* to *e*, and the arc A B will be accurately divided into five equal parts.

Example 3.—To divide the given arc A B into ſeven equal parts. A B being biſected as before, and the radii C A, C K, C B, drawn, find (by a problem referred to) the ſeventh part P B of the radius C B, and with the radius C P deſcribe the arc P *r* N; then ſet off the extent P *r* twice from A to 3, and from 3 to 6, and 6 B will be the ſeventh part of the given arc A B; the compaſſes being kept to the ſame opening P *r*, ſet it from B to 4, and from 4 to 1; then the extent A 1 will biſect 1 3 into 2, and 4 6 into 5; and thus divide the given arc into ſeven equal parts.

It is obvious, that this method of dividing any portion of a circle, into an odd number of equal parts, is ſubject to three ſources of error in practice; 1ſt, the variation of the compaſs from expanſion; 2d, the uncertainty of getting the exact points of interſection where the angles are acute; and 3dly, the probable deviation of the points in ſtepping; to ſay nothing of the errors ariſing from drawing the right lines, which would, in all probability, exceed all the other errors put together, even before they are doubled and trebled, &c. by ſtepping.

Problem II.

"To divide a given arc of a circle into any number of equal parts by the help of a pair of beam, or other compaſſes, the diſtance of whoſe points ſhall not be nearer to each other than the given chord," (by Clavius).

Let A B, *fig.* 2, of *Plate* XXI. be the given circular arc to be divided into a number of equal parts. Produce the arc at pleaſure; then take the extent A B, and ſet it off, on the prolonged arc, as many times as the given ſmall arc is to be divided into ſmaller parts, namely, to the points C, D, E, F, and G. Divide now the whole line A G into as many equal parts as are required in A B, as G H, H I, I K, K L, L A, each of which contains the given line, and one of thoſe parts into which the given line is to be divided. For A G is to A L, as A F to A B; in other words, A L is contained five times in A G, as A B is in A F; therefore, ſince A G contains A F, and $\frac{1}{4}$th of A B, B L is $\frac{1}{4}$th alſo of A B. Then, as G H contains A B, plus F H, which is $\frac{1}{4}$th of A B, E I will be the $\frac{2}{4}$ths of A B, D K $\frac{3}{4}$ths, and C I $\frac{4}{4}$ths. Therefore, if we ſet off the interval G H from F and H, we obtain two parts between F and I; the ſame interval, or extent, ſet off from theſe two points near I, gives three parts between D and K; when ſet off from the points from D to K, it gives four parts in C L; and the next transfer will, from thoſe points, give five parts from B to A; ſo that, laſtly, the ſame extent will give back again the remaining diviſions in ſucceſſion from thoſe between B and C.

This method is liable to ſome of the ſame ſources of error as the preceding method, when compaſſes alone are depended on; but it is uſeful, according to the duc de Chaulne's mode of proceeding, and may be ſerviceable in Ramſden's method of dividing, where the points are rectified by oppoſite microſcopes. In all probability the vernier ſcale owes its origin to this problem of Clavius, which problem may be variouſly diverſified, to prevent the neceſſity of ſmall extents; but whenever ſmall ſpaces are marked out on an arc by a differential plan of this ſort, it is requiſite that the extent begun with ſhould not alter during the whole proceſs, and alſo that the points, once marked, ſhould be capable of being reſumed with certainty at the ſubſequent transfer. When, however, an error is made in any divided ſpace by a hard particle, or otherwiſe, this error will recur at every multiple of the extent meaſured therefrom.

This problem of Clavius, it will be remarked, implies the given arc A B to be meaſured, or otherwiſe known previouſly to the propoſed ſub-diviſion.

When an entire circle is propoſed to be divided into degrees, the radius, which is equal to the chord of 60°, affords the means of making ſix equal arcs; and theſe arcs may be ſub-divided to arcs of 15° each by biſection only; but to reduce the equal arcs to a ſtill lower denomination, recourſe muſt be had to either triſection, quinqueſection, computation of the chords, or the differential method originally propoſed by Clavius, all which have been already deſcribed.

The method of dividing a circle, propoſed by L. Maſcheroni, is tranſlated into French by A. M. Carette, 1798, and is contained in the ſecond book of his "Geometrie du Compas." This method rejects not only the drawing of lines, but all meaſurement from ſcales, and biſections of an arc by trial, as well as triſections, quinqueſections, &c. but admits of ſtepping, and ſuppoſes the extent of a pair of compaſſes, once taken, to be afterwards invariable. The radius of the circle is the baſis of all the other extents, which are very few in number, conſidering the various diviſions that may be made therewith, and three points determined, one without and two within the circle, afford the means of taking all the meaſurements, inſtead of a ſcale; conſequently, any circle divided by this method muſt neceſſarily have its plane extended conſiderably beyond and within the circular ſpace to be divided, which is ſeldom the caſe in a large inſtrument, where a ring or rim is attached to radial bars, to form a wheel for the body of the inſtrument, which conſtruction contributes equally to ſtrength and lightneſs; a flat ſheet of metal, which the preſent method of dividing requires, is ſeldom, if ever, adopted in the conſtruction of an inſtrument of conſiderable radius. The ſecond book of the "Geometry of the Compaſs," which has not yet been tranſlated into Engliſh, and which therefore may not be known to many of our readers, contains ten problems on the diviſion of the circumference of a circle, and one on the manner of biſecting an arc by a new proceſs, that makes no ſuperfluous marks, and requires no ſecond trial: theſe problems are accompanied by demonſtrations and corollaries, that would enlarge our article too much, were we to tranſlate them entirely, but we will give ſo much of the ſubſtance of theſe problems, as will enable the reader to comprehend the nature and extent of the diviſion in queſtion, which we apprehend will be deemed more curious than uſeful. The ten problems divide the circle into the following parts, according to the order in which they here ſucceed one another, *viz.* 4, 8, 12, 24, 48, 5, 10, 120, 20, and 240. Let *fig.* 3, of *Plate* XXI. be a diagram for illuſtrating the four firſt diviſions or problems. Let one beam, or other kind of compaſs, deſcribe the circle with the extent B A from the centre A, and let this compaſs have its extent preſerved unaltered, to repreſent the radius, and be called the firſt compaſs; with this extent and beginning at B, as zero, turn over to C, D, E, *d*, *c*, and back to B again; now if this is accurately done, B A E will biſect the circle, B D *d* will triſect it, and the ſix original points will divide it into ſix arcs of 60° each; take now B D, the chord of 120° in the ſecond compaſs, and preſerve this extent unaltered; from zero B and its oppoſite point E, biſect the point *a* out of the circle, with this extent; then will the diſtance *a* A, taken in a third compaſs, and kept unaltered, be the chord B F of 90°; alſo of the arc E F, of E *f*, and of *f* B; the circle is now divided into four quadrants at the points B, F, E, and *f*. To obtain an eighth part of the circumference, ſet A B, by the compaſs N° 1, from the point *a*, out of the circle, to G and H in the arc on each ſide; then the ſemicircle is divided into four, and the points *g* and *h*, in the other ſemi-circle, may be transferred from G to *g*, and from H to *h*, with the compaſs N° 3, or chord of 90°, and the whole circle will now be divided into eight equal arcs by the points B, G, F, H, E, *h*, *f*, *g*.

To gain twelve equal arcs of the circle, with N° 1, or extent equal to radius, from F as the firſt point turn over to N, and *n*, in ſucceſſion one way, and to O and *o* in ſucceſſion the other; and the whole circle will be divided into twelve equal arcs by the points B, N, C, F, D, O, E, *o*, *d*, *f*, *c*, *n*. To double this number of equal arcs, begin at G with the ſame extent of radius, and ſtep to L and M one way, and to *k* and *i* the other; alſo from H with the ſame extent ſtep to I and K one way, and to *m* and *l* the other way, which points will biſect the former twelve arcs, and make the whole 24. Hitherto we have had occaſion for no other point but *a* for determining the 24 arcs, and it is ſomewhat remarkable, that the three extents aſcertained thereby, *viz.* the radius, the chord of 90°, and the chord of 120°, are to each other in the ſimple ratio of the ſquare roots of 1, 2, and 3 reſpectively. In order to ſub-divide, without trial, the 24 arcs into 48, another point *e* within the circle is neceſſary; with a fourth compaſs take the extent *a* N, and find the point *e* by interſection from B and its oppoſite point E; then N° 1, or radius, will cut the circumference from this point *e* in the points μ and ν; ſo ſhall K μ, μ N, M ν, and ν O be each equal to the 48th part of the whole circumference. To divide the circumference into five equal parts, a third point *b* within the circle, and in the ſame diameter with *e*, but at the oppoſite ſide of the centre, will be neceſſary: to avoid confuſion from further ſub-diviſion, we will take another *fig.* (4) with ſimilar letters of reference as the preceding one. With N° 3, or extent *a* A of 90°, interſect at the point *b* from the points N and O, then with a fifth extent B *b* ſet off from B to Q, and the arc B Q will be the fifth part of the circumference. To biſect theſe five large arcs, take the ſixth extent A *b* and ſet it from B to P, which will be equal to the arc P Q, and, conſequently, will be a tenth part of the circumference. Again, without any further operation, the ſmall arc Q I, already marked, will be the 120th part of the circumference; and to obtain $\frac{1}{20}$th part of the ſame, in the quadrant B V *f*, the fifth extent B *b*, ſet off from *f* to V, will leave the arc B V equal to this quantity. And laſtly, to procure 240 equal arcs, take the extent *e* π, and ſet it over from ν to β, and from β to δ, ſo ſhall the arc P δ be the $\frac{1}{240}$th part of the circumference; but to ſubdivide all the circumference by the ſmall arc P δ of 1° 30′, the arc N G of 15° muſt firſt be divided into five parts of 3° each, without quinqueſection; thus, with the extent A *b* = B P, ſtep from B to the points P, Q, R, S, and it will fall next in E already marked; then with A *b*, as before, begin at L and put in the points *q* and *p* ſucceſſively; alſo from I put in π; and from O put in φ, by ſtepping the points ρ, ω, and τ; thus ſhall the points *p* P π and φ ſub-divide the arc N G into five equal arcs, and δ π will be found equal P δ, or $\frac{1}{240}$th part of the whole. After having obtained theſe five ſub-diviſions of 3° and 1° 30′, the firſt may be transferred, with the extent N G for inſtance, into other arcs of 15° in ſucceſſion, beginning with G C firſt, and uſing the points N, *p*, P, &c. as they occur, till the whole is gone through, after which the ſmall arcs thus transferred may be biſected by an extent δ N, going a ſecond time over the ſame points in ſucceſſion as before. Thus will the whole circumference be ſub-divided into 240 parts of each 1° 30′.

The eleventh or laſt problem on this ſubject, is to divide any arc B C (*fig.* 5.) into two equal parts in G. To do this; with radius A B, which has deſcribed the arc B C to be divided, and from the centres B and C, the two extremities of the arc, let the arcs A D and A E be deſcribed; let A D and A E be each made equal to B C; then from the points D and E, as centres, and with radius D C or E B, find by interſection the point F; laſtly, with the radius A F, and from the centres D and E, let the point G be interſected, which will fall in the circumference, if the operation is truly performed, and will alſo biſect the arc B C as was required.

By the help of the three remarkable points *a*, *e*, and *b*, in our *fig.* 4, the author of the Geometry of the Compaſs, has laid down in his twelfth and laſt book a dozen equations, ſome one of which may be applied to determine, by approximation, almoſt any ſmall arc of a circle that ſhall cut off a given quantity. It would be tedious to enter here minutely into his various calculations, but, for the ſake of amuſing the reader, we will ſelect the ſolutions of a few problems, without the annexed demonſtrations, which would enlarge our article too much.

Problem I.

To find the arc of one degree without the error of half a ſecond.

Solution.—Let the arc B *z*, below B, be 55° 30′, (in the circle which has been divided into 240 parts of each 1° 30′,) take the diſtance *b z*′, and from the point *e*, as a centre, deſcribe an arc to cut the circumference in ſome point Z, and the arc B Z′, above B, will be 52° 59′ [illegible], or 53° within about 25″; then in the diviſions between B and F is the diviſion 54°, or $\frac{18}{120}$ of the whole circle; there will therefore be 54° − 53° = 1° by approximation within the required degree of accuracy.

Solution 2.—Let the arc B Z be taken = 10° 30′, (by the diviſions exiſting) from the centre *a*, and with the diſtance *b* Z as radius, croſs the circumference in the ſaid point Z′ = 29° 29′ $\frac{2511}{2552}$, or 29° 30′ without an error of half a ſecond; then look for 28° 30′ in the exiſting diviſions, *viz.* $\frac{19}{240}$ of the circle, and the difference will be very nearly as before = 1°. This ſolution is leſs accurate than the former by about 4‴; the error being 29‴.

Problem II.

To find an arc of 15′ without an error of 1‴.

Solution.—Take the arc B *z* = 12° below B, the diſtance *e z* will be the chord of 87° 15′; with a radius of this extent, and from B, as a centre, cut the arc B F above, in the point Z′, and the arc B Z′ will be 87° 15′; but among the exiſting diviſions of the arc is 87°, or $\frac{29}{120}$th of the circumference; therefore, the difference of the two arcs is = 15′.

Problem III.

To find an arc of 10′ without an error of 10‴.

Solution.—Take the arc B *z* downward = 49° 30′, and the diſtance *b z* will be the chord of 38° 50′, without an error of 10‴; then, the diviſion 39°, or $\frac{13}{120}$, being found already, their difference on the circumference taken from B upwards, will be an arc of 10′.

Problem IV.

To find an arc of 6′ within 13‴.

Solution.—Take the chord of 45° from B to G above, and from the point *b* cut the circumference at *z*, which will be at 40° 6′, downwards from B, without an error of 13‴, but 40° counted downwards already exiſts, therefore the ſmall arc between is 6′.

Problem V.

To find an arc of 1′ within 22‴.

Solution.—Let B *z* downwards be = 27°; from the point *c* as a centre with radius *b z*, cut the circumference above at Z; and the arc B Z will be 29° 59′, with an exceſs of 22‴; therefore, the arc B N being 30°, the arc Z N will be 1′ within 22‴.

By ſuch means as theſe an arc of 9′ within 7‴ is determined; alſo, an arc of 20″ within 1‴; an arc of 15″ within 10‴; an arc of 12″ within 1‴; an arc of 10″ within 1‴; and an arc of 5″ within 2‴; but theſe laſt arcs are ſo minute in all ordinary circles, that we omit the ſolutions, as being of no utility.

We have hitherto ſuppoſed the circle divided into 360° with their ſub-diviſions, but the French have propoſed a centeſimal diviſion of the circle to be ſubſtituted, where each quadrant has 100° inſtead of 90°, making 400° in the whole circle, with each degree ſub-divided by hundreds, &c. This mode of dividing has been exemplified by L. Maſcheroni, in his Geometry of the Compaſs; and Mr. Troughton has deſcribed the method of graduating a circle in this way by his method, if it ſhould ever prevail in England; but, as there appears to be no advantage to the divider in affording biſections lower than 25°, and as our tables of logarithms, as well as aſtronomical tables, are adapted to the exiſting mode of dividing the circle, we are unwilling to lend our aid to the introduction of uſeleſs innovations, by entering more minutely into the ſubject.

L. Maſcheroni is the Italian geometrician, we are informed, who taught Bonaparte ſome problems, when in one of his campaigns in Italy, with one of which he puzzled the French mathematicians, and gained the reputation of being an adept in mathematics.

Graduation, in *Mineralogy*. When a mineral is diſcovered which is intermediate between other known ſpecies, and in different ſpecimens, or parts of the ſame ſpecimen, approaches very near to ſuch known minerals, it is ſaid to *graduate*, paſs into, paſs over to, or make tranſitions to, ſuch minerals. Frequently, the ſtrata of the earth graduate thus into each other, ſo that it is extremely difficult to define where one ſtratum ends and another of very different properties begins: theſe graduations are not uncommon between ſome lime-ſtone ſtrata and the chert beds in them. More frequently, each ſtratum is ſeparated by a thin layer or way-board of pulverulent matter, which occaſions the ſtrata to part freely; and often, in ſuch caſes, the parts of the ſtrata in contact with theſe way-boards differ nothing from the general maſs of each ſtratum, or there is no graduation between one ſtratum and the next in ſucceſſion.

Graduation *of ſaline Liquors*, in *Chemiſtry*, is a method of concentrating weak ſaline ſolutions, by pouring them through a heap of faggots, and expoſing them in this divided ſtate to a free current of air. See Muriate of *Soda*.

GRADUS Gemonic. See Gemoniæ.

GRÆA, Γραια, a name uſed by the old Greek writers for the wrinkled pellicle which ariſes upon milk in the boiling.

It was alſo uſed in a figurative ſenſe for the wrinkles in the ſkin of old people.

GRÆCIA, Greece, in *Ancient Geography*, a country of conſiderable extent, forming, as it were, the boundary or frontier between Europe and Aſia, and comprehending a great number of different ſtates and kingdoms. We have various opinions as to the etymology of the appellations Græci and Græcia. The moſt prevalent opinion traces the origin of theſe terms to Graicus or Græcus, the father, as ſome ſay, but, according to others, the ſon of Theſſalus, who gave its name to Theſſaly. Salmaſius ſuppoſes the name Græcus to be derived from Ragau or Rau, the ſon of Peleg, the fourth in deſcent from Shem, the ſon of Noah, by the tranſpoſition of a letter in order to ſoften the ſound. Pezron deduces it from Grain, ſignifying in Celtic *ancient*, and applicable to the Grecians by way of contradiſtinction to more modern people. But it has been objected to this etymology, that the Pelaſgi and Hellenes were a more ancient people than the Greeks. M. de Gebelin ſuppoſes the origin of the appellation to have been the word *rha*, or *rhe*, denoting vaſt or immenſe, in reference to the ſea which terminated the Adriatic gulf, on the borders of which the Greeks migrated ſouthwards, whence he forms *Raicus*, ſignifying this ſea, and by prefixing the guttural G to the lingual R, *Graicus*. The Greeks were alſo called Achæans, Hellenes, and Pelaſgi. The firſt of theſe appellations is ſuppoſed to have been derived from Achæus, the ſon of Xuthus, the ſon of Hellen, and father of Ion; the ſecond from Hellen, juſt mentioned, the ſon of Deucalion, and father of Dorus, from whom ſprung the Dorians; and the third, from a pretended founder Pelaſgus, who, taking poſſeſſion of the Peloponneſus, occaſioned its being denominated Pelaſgia. Grotius, Salmaſius, and Stillingfleet, names of conſiderable authority in diſquiſitions of this nature, ſuppoſe that the deſcendants of Peleg, the fourth in deſcent from them, the ſon of Noah, whom they ſuppoſe to have been the father of the Scythians, were the firſt who peopled Greece; and that they only ſoftened the name of Peleg, or Phaleg, their progenitor, and called them Pelaſgians. But Bochart (in his "Phaleg") ſhews, that both Phaleg and Ragau, and their deſcendants, remained in the confines of Media and Armenia; and that the Scythians were the deſcendants of Magog, and not of Phaleg or Ragau. Some have aſſerted that the moſt ancient name of all is that of Iones, which the Greeks themſelves derive from Xuthus, grandſon to Deucalion. Joſephus affirms (Ant. l. i. c. 7.) that their original is of much older date; and that Javan, the ſon of Japhet, and grandſon of Noah, and his deſcendants, were the firſt who peopled theſe countries; and in proof of this poſition the learned Bochart has alleged ſeveral ſtrong preſumptive arguments. He firſt adduces the authority of Joſephus, juſt cited; he then appeals to the name of the patriarch, יָוָן, which, without the points, ſounds more properly Ion than Javan; he next alleges the authority of Moſes, who ſays (Gen. x. 5.) that "by theſe" (the ſons of Japhet) "were the iſles of the Gentiles divided;" which, according to the genius of the Hebrew, mean, not iſlands properly ſo called, but all maritime countries, at any diſtance from Paleſtine, eſpecially thoſe which are along the Mediterranean; and he alſo refers to the prophets (Iſ. cap. ult. v. 19. Dan. viii. 21. x. 20) who call Græcia by the name יָוָן, Ion, or Javan, and hence the Jews have always called the Greek tongue יונית, Javanith. To theſe arguments he adds that the clear remains of Eliſha, Javan's eldeſt ſon, are ſtill to be found in that of Elis, one of the ancient kingdoms of the Peloponneſus.

GRÆCIA, or *Ancient Greece, Geography of.* Excluſively of the provinces of Epirus and Macedonia, which long remained barbarous and uncultivated, the continental poſſeſſions of the Greeks (ſays Dr. Gillies,) were nearly equal to Scotland in extent. In its length, comprehended between the 36th and 41ſt degrees of N. latitude, the whole country is almoſt equally divided by two oppoſite gulfs, compreſſing between them a mountainous neck of land, to the breadth of only five miles, into the peninſula of Peloponneſus, and the territory extending northwards, from the extremity of the Corinthian iſthmus to the ſouthern frontier of Macedonia. The Peloponneſus, 160 miles in length, and ſcarcely 100 in breadth, is every where interſected by mountains, particularly the towering ridges of Zarex and Taygetus. During the flouriſhing ages of Greece, this ſmall peninſula contained ſeven independent communities of unequal power and fame, which ranked in the following order: the comparatively large, and highly diverſified, territory of Laconia; the fruitful vale of Argos; the extenſive coaſt of Achaia; the narrow but commercial iſthmus of Corinth; the central and mountainous region of Arcadia; together with the more level countries of Elis and Meſſenia, which are throughout better adapted to tillage, than any other provinces of the Peloponneſus. The Grecian poſſeſſions beyond the iſthmus of Corinth were more conſiderable, extending above 200 miles from eaſt to weſt, and 150 from north to ſouth. They were naturally divided by the long and intricate ridges of Olympus, Pindus, Oeta, and Oſſa, into nine ſeparate provinces; which, during the celebrated ages of Grecian freedom, were occupied by nine independent republics. They comprehended the extenſive and fertile plains of Theſſaly and Bœotia, both of which were, in early times, much expoſed to inundations, and the latter, abounding in ſubterranean caverns, was peculiarly ſubject to earthquakes; the leſs fertile, but more ſecure territory of Attica; the weſtern provinces of Ætolia and Acarnania, encompaſſed on one ſide by dangerous ſeas, and confined on the other by almoſt impaſſable mountains; and the four ſmall rocky diſtricts of Phocis, Doris, Locris, and Megara.

Theſe names and diviſions (ſays the above cited hiſtorian) which remained to the lateſt times, are pretty accurately marked by Homer, whoſe poems continued, through ſucceeding ages, to be the approved ſtandard and legal code, to which neighbouring communities appealed, in adjuſting their diſputed boundaries. This qualification, however, muſt be admitted with two exceptions. During the Trojan war, the extenſive province of Theſſaly ſent forth above a fourth part of the whole Grecian ſtrength, and was divided among many warlike leaders. But when commerce, navigation, and the mechanic arts, enriched and adorned the middle and ſouthern diviſions of Greece, the northern diſtrict of Theſſaly loſt its ancient pre-eminence. The other exception aroſe from the extenſive power of the houſe of Pelops, which had, by fortunate marriages and rich ſucceſſions, acquired dominion over the northern and eaſtern parts of the Peloponneſus, formerly containing ſeveral independent principalities, and, after the misfortunes of Agamemnon and his family, again divided into the immortal republics of Sparta, Argos, Corinth, and Achaia. The following table will exhibit at one view the principal ſtates of Greece, with ſome of their towns and rivers, referring to each article for a further account, and obſerving that we have admitted into it Macedonia, though it was not properly a province of Greece till after the reign of Philip, or rather that of Alexander, and alſo Epirus and Illyria.

GRÆCIA.

TABLE

Of the Principal Geographical Diviſions of Greece.

Natural Diviſions of Græcia, *or* Greece.	Terra Firma.	Peloponnesus.	Argolis.	Rivers.—*Inachus*, *Eraſinus*. Towns.—Argos, *Mycenæ*, *Epidaurus*, &c.
			Laconia.	R. *Eurotas*. T. Sparta, *Amyclæ*, *Gythium*, *Teucrium*.
			Messenia.	R. *Pamiſus*. T. Messene, *Stenyclarus*, *Colonides*.
			Elis.	R. *Alpheus*, *Anigrus*, *Selleis*. Div. *Triphylia*, *Piſatis*, *Cæle-Elis*. T. *Olympia*, *Piſa*, Elis.
			Achaia.	R. *Melas*, *Crathis*. T. *Dyme*, Patræ, *Ægium*.
			Sicyonia.	R. *Aſopus*. T. Sicyon, *Phlius*.
			Corinthia.	T. Corinthus, *Lechæum*, *Cenchræ*.
			Arcadia.	R. *Alpheus*, *Erymanthus*, *Aoranius*. T. Megalopolis, *Mantinea*, *Tegea*, *Orchomenus*, *Phigalia*.
		Græcia Propria.	Attica.	T. Athenæ, *Eleuſis*, *Marathon*, *Sunium*, prom.
			Megaris.	T. Megara, *Nyſæa*.
			Bœotia.	R. *Cephiſſus*, *Copais*, lac. *Aſopus*. T. Thebæ, *Orchomenus*, *Cheronæa*, *Tanagra*, *Eleuteræ*, *Theſpiæ*.
			Phocis.	R. *Cephiſſus*. T. Delphi, *Elatia*, *Cryſſa*, *Anticyra*.
			Doris.	T. *Cytinium*.
			Locris.	Locri *Ozolæ*, Amphissa, *Naupactus*. Locri *Epicnemidii* . . . Cnemides. Locri *Opuntii* . . . Opus.
			Ætolia.	R. *Acheloüs*, *Evenus*. T. *Thermus*, *Calydon*, *Chalcis*.
			Acarnania.	Argos *Amphilochicum*, *Stratus*, *Actium*.
		Thessalia.		R. *Peneus*, *Oncheſtus*, *Sperchius*. T. Larissa, *Pharſalus*, *Pheræ*, *Demetrias*.
		Epirus.		R. *Acheron*, *Avas*. T. *Buthrotum*, *Nicopolis*.
		Illyria.		T. *Epidamnus*, *Apollonia*.
		Macedonia.		R. *Erigon*, *Axius*, *Strymon*, *Haliacmon*. T. Edessa, *Pella*, *Theſſalonica*, *Olynthus*.
	Islands.	To the Weſt.		*Corcyra*, *Leucadia*, Cephallenia, *Dulichium*, *Zacynthus*.
		To the South.		*Cythara* . . . Creta.
		To the Eaſt.		*Thera*, *Naxia*, *Paros*, *Delos*, *Myconus*, *Tenos*, *Andros*, Ceos, Eubœa, *Scyros*, *Thaſos*.

The ancient authors who are to be conſulted with regard to the different periods of the geography of Greece, are Homer, for the more remote times, in his account of the forces collected for the ſiege and capture of Troy; Strabo, who avails himſelf of ample materials to which he had acceſs; Pauſanias, who details the reſults of his own travels and obſervations; and Ptolemy, who furniſhes an uſeful nomenclature of the ſtates and chief towns, with their longitudes and latitudes.

GRÆCIA, or *Ancient Greece, hiſtory of.* The traditions of the Greeks (ſays the learned hiſtorian, Dr. Gillies,) agree with the authentic records of ſacred hiſtory in repreſenting the countries afterwards known by the names of Thrace, Macedon, and Greece, as peopled at an earlier period than any other portion of the weſtern world. The ſouthern corner of Europe, comprehended between the 36th and 41ſt degrees of latitude, bordering upon Epirus and Macedonia towards the north, and on other ſides ſurrounded by the ſea, was inhabited, above 18 centuries before the Chriſtian era, by many ſmall tribes of hunters and ſhepherds, among whom the Pelaſgi and the Hellenes were the moſt numerous and powerful. The barbarous Pelaſgi venerated Inachus, as their founder; and, for a ſimilar reaſon, the more humane Hellenes reſpected Deucalion. From his ſon Hellen, they derived their general appellation, which originally denoted a ſmall tribe in Theſſaly, and from Dorus, Eolus, and Ion, his more remote deſcendants, they were diſcriminated by the names of Dorians, Eolians, and Ionians. The Dorians took poſſeſſion of that mountainous diſtrict of Greece, afterwards called Doris; the Ionians, whoſe name was gradually loſt in the more illuſtrious appellation of Athenians, ſettled in the leſs barren parts of Attica; and the Eolians peopled Elis and Arcadia, the weſtern and inland regions of the Peloponneſus. Notwithſtanding many partial emigrations, theſe three original diviſions of the Hellenes generally entertained an affection for the eſtabliſhments which had been preferred by the wiſdom or caprice of their reſpective anceſtors; a circumſtance which remarkably diſtinguiſhed the Hellenic from the Pelaſgic race. While the former diſcovered a degree of attachment to their native land, ſeldom found in barbarians, who live by hunting or paſturage, the latter, diſdaining fixed habitations, wandered in large bodies over Greece, or tranſported themſelves into the neighbouring iſlands; and the moſt conſiderable portion of them gradually removing to the coaſts of Italy and Thrace, thoſe that remained melted away into the Doric and Ionic tribes. At the diſtance of 12 centuries, obſcure traces of the Pelaſgi occurred in ſeveral Grecian cities; a diſtrict of Theſſaly always retained their name; and their colonies continued, in the fifth century B. C., to inhabit the ſouthern coaſt of Italy, and the ſhores of the Helleſpont; and in thoſe widely ſeparated countries, their ancient affinity was recognized in the uniformity of their rude dialect and barbarous manners, extremely diſſimilar to the cuſtoms and language of their Grecian neighbours. Such is the account of the firſt ſettlers in Greece, given by Dr. Gillies on the cited authorities of Herodotus, Dionyſius Halicarn., Pauſanias, Thucydides, Diodorus Siculus, and Strabo. Modern authors, however, have entertained different opinions on this ſubject. Some have ſuppoſed that the Pelaſgi ſucceeded the Hellenes, and others have conſidered them as the ſame people under different denominations. According to M. de Gebelin, Moſes, the Jewiſh legiſlator, has given us the primitive origin of the Greeks. In tracing the genealogy of the deſcendants of Noah he ſays that Japhet, one of the ſons of Noah, had ſeven ſons: that the fourth was called Ion, and that he was the father of Eliſa, Tharſis or Thraſis, Ketim, and Dodanim; this Ion was the father of the Greeks, and M. de Gebelin labours to find among the Greeks four nations formed by his four ſons. With this view, he ſays, that Pelaſgia comprehended the whole territory between the Danube and the ſea of Peloponneſus; and here we may diſcover, as he conceives, the reſpective ſituation of each of Ion's four ſons. Thrace acknowledges Tharſis or Thraſis for its founder; Ketim poſſeſſed the country of the Getæ, N. of Macedonia, and Macedonia itſelf; Dodanim had the country that lay between Macedonia and the Peloponneſus, inhabited by the Dorians; and Eliſa deſignated the inhabitants of the Peloponneſus. This author, in no ſmall degree indulging his imagination, and yet exerciſing a very conſiderable degree of ingenuity and attention to facts, obſerves, that the hiſtory of Deucalion is the foundation of the Greek chronology and hiſtory: this Deucalion is diſtinguiſhed by his deluge, his ark, and his being the father of the Greeks or Hellenes. All theſe circumſtances afford a preſumption that Deucalion and Noah were the ſame perſon. He alſo ſays, that the fable of the Argonauts and their voyage to Colchis is a copy of the navigation of Noah. Phryxus, or the "man ſaved," in the Grecian mythology, is Noah. He diſcovers alſo other coincidences, which lead him to conclude, not only that Noah and Deucalion, but that Ion and Hellen, the reputed father of the Greeks, were the ſame perſons; and that the Hellenes and Pelaſgi were the ſame people. According to this writer, the Pelaſgi were the ſole poſſeſſors of the whole country which extended itſelf from the banks of the Danube, to the ſea of the Peloponneſus; they peopled Thrace, Getia, Macedonia, Illyria, Epirus, Theſſaly, the Phocide, Attica, and the Peloponneſus; they ſent colonies to the iſle of Crete, to Etruria, and to the ſouth of Italy; and others croſſed the Danube, and were denominated Dacians and Getæ. Greece was in this ſtate, ſays M. de Gebelin, when ſome colonies of ſtrangers arrived on its coaſts, as Cecrops at Athens, Danaus at Argos, and Cadmus in Bœotia. Theſe, he ſays, came not from Egypt, but from Phœnicia, a neighbouring country. The firſt inhabitants of Greece, whenceſoever they came, were, in a very conſiderable degree, like the anceſtors of other people, barbarous and ſavage; and the Hellenes, whoſe manners were mild and gentle, contributed in ſome meaſure to civilize them; but their efforts produced effect very ſlowly. At length, however, the happy poſition of their country, forming a kind of frontier between Europe and Aſia, and divided only by a narrow ſea from Egypt and Syria, and not far remote from thoſe eaſtern regions which were anciently moſt populous and flouriſhing, invited ſtrangers firſt to viſit, and afterwards to dwell among them. The Greeks were not inſenſible of their obligations to ſtrangers for the moſt important diſcoveries, not only in religion, but in agriculture and the arts; but as they advanced to ſuperiority in arts and arms, above ſurrounding nations, they vainly fancied that their infancy was reared by the gods: and to the gods they transferred the merit of many uſeful inventions, that had been communicated to them or their progenitors by their ancient viſitants: and it muſt be acknowledged, that the worſhip of ſeveral divinities was introduced at the ſame time, and by the ſame perſons, who made known to them the arts moſt ſubſervient to the purpoſes of human life.

From the middle of the 16th to the middle of the 14th century, B. C. an inundation of Egyptians, Phœnicians, and Phrygians overflowed the Hellenic coaſts. The principal colonies were conducted by Cecrops and Danaus, Egyptians, who reſpectively ſettled in Athens and Argos; Cadmus, a Phœnician, who founded Thebes in Bœotia; and Pelops,

lops, a Phrygian, whoſe deſcendants, by intermarriages with thoſe of Danaus, king of Argos, and Tyndareus, king of Lacedæmon, or Sparta, acquired in the perſon of Agamemnon ſo powerful an aſcendant in the Peloponneſus. The family of Deucalion ſtill reigned in Theſſaly; but Thebes, Athens, Argos, and Sparta, which were long regarded as the principal cities of Greece, thus fell under the dominion of four foreign lines of princes, whoſe exploits, and glory, and misfortunes are immortalized by the firſt and nobleſt productions of Grecian genius; ſuch are the works of Homer and Pindar, and of the Greek tragedians.

The invaders of Greece introduced many important and uſeful improvements. They brought into that country the knowledge of the Phœnician alphabet; they aſſiſted them in the operations of agriculture; they multiplied the rites of religion; diſcovered to them ſeveral uſes of the metals; and, in return, adopted the Grecian language, and generally conformed to the Grecian cuſtoms and inſtitutions. By the Phœnicians they were taught and encouraged to brave the dangers of the ſea, and to maintain a commercial intercourſe with each other, as well as with foreign nations. Their country, indeed, was peculiarly advantageous for this purpoſe; three ſides of it being waſhed by the ſea, and being ſurrounded by numerous iſlands, and abounding in excellent harbours. Greece, however, was ſlow in availing itſelf of the advantages it enjoyed; and in making improvements in commerce, as well as in agriculture, and other uſeful arts. Many circumſtances concurred to retard its improvement. The inhabitants of different parts of the country were unconnected on account of the creeks and rivers, as well as the mountains and promontories, that rendered Greece different from any other part of Europe. The Grecian ſtates were ſmall; each city was at war with its neighbour, and want of union and mutual concurrence prevented their advancement in ſcience and the arts. Beſides, their coaſts were ravaged by pirates, and the metals, inſtead of being formed into uſeful implements of agriculture, were converted into inſtruments of deſtruction, partly for hoſtility and partly for ſelf-defence: and the inland country was invaded by Thracians, Amazons, and other northern ſavages. But theſe irruptions and ravages of the barbarians occaſioned the inſtitution of the Amphictyonic council, which reſtored ſome degree of preſent tranquillity to Greece, and laid the foundation of its future grandeur. This council produced, after a conſiderable interval of time, *viz.* in the year 1263 B. C. the Argonautic expedition, an undertaking which was attended with a beneficial effect on the manners and character of the Greeks. (See ARGONAUTIC.) In the progreſs of the Greeks towards civilization, they perceived the advantages of political confederacy, before they became ſenſible of the benefits of civil union; and accordingly a federal aſſociation between different communities was formed before the members of any one ſtate had been ſufficiently united in the ſyſtem of domeſtic policy. In order to cement ſuch diſorderly communities by laws and governments, they had recourſe to the wiſe inſtitutions and examples of the Cretans, which are repreſented not only as the moſt ancient, but as the beſt regulations that ever were eſtabliſhed in any portion of the Grecian territory. (See CRETE.) Theſeus communicated the Cretan improvements to the Athenians; from Athens they were diffuſed through Attica, and in proceſs of time through the neighbouring provinces of Greece; inſomuch, that at the commencement of the Trojan war, in 1193 B. C. all the Grecian ſtates had adopted one uniform ſyſtem of government, uniting the independent ſpirit of European freedom with the reſpectful veneration of Egyptian and Aſiatic ſuperſtition.

Of the mythology and manners of the Greeks in the heroic ages, as well as their geography and hiſtory, Homer, whilſt he has indulged his fancy, has given us an accurate delineation; and ſuch as was conformable to the ſyſtem of opinions and belief which prevailed among his countrymen. The religion, or mythology of the Greeks, was adapted to the melioration of their condition, and to the improvement of civil ſociety. Unlike that of the rude inhabitants of ancient Germany, among whom the offices of prieſt and king were adminiſtered by different perſons, the ſceptre, which denoted the connection of civil power with ſacred protection, was conferred, among the Greeks, on thoſe who, while they continued the humble miniſters of the gods, were appointed to be the chief, but accountable guardians of the people. The ſame voice (ſays Dr. Gillies), that ſummoned the warriors to arms, or that decided, in time of peace, their domeſtic connections, conducted the order of their religious worſhip, and preſided in the prayers and hymns addreſſed to the divinity. Theſe prayers and hymns, together with the important rite of ſacrifice (which was likewiſe performed by royal hands), formed the *ceremonial* part of the Grecian religion. The *moral* was far more extenſive, including the principal offices of life, and the nobleſt virtues of the mind. The uſeful quality of courage was peculiarly acceptable to the ſtern god of war; but the virtues of charity and hoſpitality were ſtill more pleaſing to the more amiable divinities. To this purpoſe Homer ſays (Od. xiv. 56.) "all ſtrangers and beggars come from Jove." The ſubmiſſion of ſubjects to their prince, the duty of a prince to preſerve inviolate the rights of his ſubjects (Il. xvi. 385.), the obedience of children to their parents, the reſpect of the young for the aged, the ſacred laws of truth, juſtice, honour, and decency, were inculcated and maintained by the awful authority of religion. Even the moſt ordinary tranſactions of private life were conſecrated by the piety of the Greeks. They ventured not to undertake a voyage, or a journey, without ſoliciting the propitious aid of their heavenly protectors. Every meal (and they had three in a day, *viz.* αριϛον, δειπνον, δορπον), was accompanied with a ſacrifice and libation. The common forms of politeneſs, the cuſtomary duties of civility, were not decided by the varying taſtes of individuals, but defined by the preciſe voice of the gods. The laws of religion were guarded and enforced by correſponding ſanctions. The dreaded vengeance of imaginary powers was eſtabliſhed in the Grecian creed; and it appears from the writings of Homer throughout, that every important event, proſperous or adverſe, which happened either to individuals or to nations, appeared to the Greeks, as the reward of their religion and virtue, or the puniſhment of their irreligion and vice. The principles above ſtated are confirmed not only by the writings of Homer and Heſiod, but by almoſt every page of Herodotus, of Pindar, as well as of the Greek tragedians and hiſtorians.

The origin of the gods of Greece has afforded a ſubject of elaborate diſcuſſion; and many learned writers have traced it to Paleſtine, Egypt, and other nations, whence the firſt ſettlers or future emigrants ſprung. By the dim light of etymology and tradition (ſays the ingenious hiſtorian of Greece), and the deceitful glare of legend and fable, inquiſitive men have endeavoured to trace the corrupted ſtreams of Pagan worſhip to the pure fountain of the Jewiſh diſpenſation; and it muſt be acknowledged, that the general doctrine of providence, the rebellion in heaven, the ſtate of innocence, the fall of man, atonement by ſacrifice, and a future ſtate of retribution, for which the preſent life is only preparatory, are tenets, all, or ſome of which, are found in the traditions of all nations, Greeks and Barbarians. (See Heſiod, Oper. and Di. v. 110, 165. Theog. v. 220. 725.) But our author obſerves, that the majeſty of Jehovah is very feebly repreſented by the united power of Homer's divinities; and that the mythology of the Greeks is of ſuch a peculiar texture, that, whenceſoever originally derived, it muſt have undergone a particular modification in the Grecian ſoil; nor (he ſays) is it eaſy to concur with the opinion of writers who bring it immediately from Egypt, Chaldæa, or Leſſer Aſia, when we conſider that there is not the ſmalleſt veſtige in Homer of the judicial aſtrology which prevailed ſo much in the two firſt countries, (Diod. Sic. l. ii. Exod. ch. vi. Plin. l. xxv.), or of the worſhipping of idols, which almoſt univerſally prevailed in the laſt. (Old Teſtament, paſſim.) Dr. Gillies traces the origin of the Grecian faith and worſhip in the natural paſſions of the human heart, the hopes, the fears, the wants, the miſery of man, which have in all ages rendered him a prey to the terrors of ſuperſtition.

The great pillar of ſuperſtition, raiſed by the anxious paſſions of men, was fortified in Greece by a peculiar ſenſibility of character, which exerts itſelf in the ardour of ſocial affection, and ſtrengthens, by a thouſand aſſociations, their belief of inviſible and intelligent powers. The nature, the characters, and the occupations of the gods, were ſuggeſted by the lively feelings of an ardent, rather than by the regular invention of a cultivated mind. Theſe celeſtial beings were ſubject to the blind paſſions which govern unhappy mortals: their wants, and their deſires, were ſimilar to thoſe of man. But what was wanting in the dignity and perfection, was ſupplied by the number of the gods. Homer only deſcribes the principal and reigning divinities; but Heſiod, who gives the genealogical hiſtory of this fanciful hierarchy, makes the whole number amount to 30,000. Every virtue had its protector, every quality of extenſive power in human life had its patron, and every grove, mountain, and river its favourite inhabitants. (See GODS.) The religious creed of the Greeks, compoſed of materials, in great meaſure created by fancy, formed by poetry into beauty, and improved into uſe by policy, became the happieſt antidote againſt the furious reſentment, the ſavage cruelty, and the fierce ſpirit of wild independence, which uſually characterizes the manners of barbarians. Upon the whole, the ancient and venerable ſuperſtition of the Greeks was diſtinguiſhed above moſt other falſe religions, by the uncommon merit of doing much good, without ſeemingly occaſioning any conſiderable harm to ſociety. The Grecian tenets, while they inculcated profound reſpect to the gods, had no tendency to break the ſpirit or to repreſs the courage of their warlike votaries. In order to avert the calamities threatened by the anger of their divinities, they did not recur to the infliction of tortures on themſelves, but they repaired the wrongs which they had committed againſt their fellow-citizens, or compenſated, by new attentions, for the neglect ſhewn to the ceremonies of their national worſhip. In their eſtimation, the doing of injury to men, and the omiſſion of prayer to the gods, were the principal cauſes of the divine diſpleaſure, which they were anxious to avert by a diligent practice of moral duties. The dangerous power of oracles, the abuſed privileges of aſylums, the wild raptures of prophetic enthuſiaſm, the abominable ceremonies of the Bacchanalia, and the horrid practice of human ſacrifices, all which are circumſtances that cover with deſerved infamy the latter periods of Paganiſm, were unknown to the good ſenſe and purity of the heroic ages; nor is there to be diſcovered the ſmalleſt veſtige of any of theſe wild or wicked inventions, either in the writings of Homer, or of his cotemporary Heſiod. Their religious ſyſtem communicated its beneficial influence to the civil and military inſtitutions of the Greeks, to the laws of nations, as well as to the regulations of internal policy, and to the various duties of domeſtic as well as of ſocial life.

In examining the political ſtates of the Greeks, during the heroic age, we ſhall find that they deſerve the title of republics, rather than that of monarchies. The ſoldiers of any warlike tribe fought and conquered, in their attack of a more fertile territory than their own woods and mountains, not for their leaders, but for themſelves: and the land acquired by their united valour was conſidered as a common property. No diſtinction was known among them, but that which was occaſioned by the difference of perſonal merit and abilities. This difference raiſed a chief or leader to the head of each ſociety; and his ſuperior uſefulneſs in this ſtation, was rewarded by the gratitude of his tribe with a valuable portion of ground, ſeparated from the common property. (Il. xii. 310.) This perſon, who commanded in the field, became the arbiter and judge of their civil differences, and he was inveſted with the honourable office of preſiding in their religious ſolemnities. Theſe important functions of prieſt, judge, and general, conferred on the beſt and braveſt in each particular tribe, were conferred, upon the union of ſeveral tribes into one ſtate or nation, on the beſt and braveſt of all the different leaders. The various ſtates of Greece formed a general confederacy, in which the council of princes regulated the reſolutions of the monarch, and the voice of the aſſembly ruled that of the council; and ſo likewiſe in each particular kingdom, the deciſions of the ſenate prevailed over the will of the prince, and the acknowledged majeſty of the people controuled the deciſions of the ſenate. The ſame diſtribution of power took place in every particular village.

The civil rights of the Greeks were maintained by the ſame ſimplicity which regulated the political ſyſtem. As the price of ſubmitting to the reſtraints of ſociety, a man was ſecured in the enjoyment of his life and property: his moveables were equally divided, at his death, among his deſcendants; and the unnatural right of primogeniture, which, in order to enrich the eldeſt ſon, reduces the reſt of the family to want and miſery, was altogether unknown to the equal ſpirit of the Grecian inſtitutions. Cauſes reſpecting property were decided by the firſt magiſtrate, or by judges of delegated authority. The proſecution of murderers belonged to the relations of the deceaſed, who might accept a compenſation in money for the loſs which the family had ſuſtained; but in defect of this compoſition, all the members of the tribe concurred with the aggrieved, in either puniſhing the murderer by death, or compelling him to leave the ſociety.

The hiſtory of the heroic ages of Greece preſents the moſt intereſting picture of conjugal love, parental affection, and filial duty. The inſtitution of marriage was aſcribed to the gods; and it was celebrated with all the pomp of religious feſtivity. Adultery was held in the greateſt deteſtation, and always mentioned with the ſame horror as murder. The guilty perſon might purchaſe immunity, but more frequently eſcaped death by voluntary baniſhment. It has been erroneouſly ſaid, that, in ancient Greece, wives, as well as concubines, were the ſlaves of their huſbands, and that they were purchaſed by them. The attention of women was chiefly confined to domeſtic care and occupations, which did not require any great degree of ſtrength, courage, or wiſdom. Weaving and embroidery, which were employments of females, were practiſed by ladies of the higheſt rank, and even by queens; and they were alſo entruſted with the education of their children. They were permitted to join in the celebration of religious rites and ceremonies, and many of them were conſecrated to the ſervice of particular divinities.

War, being the principal employment of the Greeks in the heroic ages, they ſupplied by courage what they wanted in ſkill. They marched to the field in a deep phalanx, ruſhed impetuouſly to the attack, and bravely cloſed with their enemies. Their principal weapon was the ſpear; and when the uſe of this failed, they drew their ſwords, and ruſhed impetuouſly on the foe. The Greeks had alſo bows, ſlings, and darts; which were chiefly uſed in their military paſtimes. Their defenſive armour was complete: a light helmet, adorned with plumes, covered the head and face, a fine corſlet defended the breaſt, greaves of braſs deſcended to the feet, and an ample ſhield, looſely attached to the ſhoulders, turned in all directions, and oppoſed its firm reſiſtance to every hoſtile aſſault. Their cloſe compact combats ſerved to excite the moſt furious paſſions, and to embitter national animoſity by perſonal hatred and revenge. Before any war could be undertaken, it was neceſſary to diſpatch ambaſſadors, who explained the injury that had been done, demanded ſatisfaction, and if this were refuſed, denounced the reſolution of their community to proſecute its claim by force of arms. After the commencement of war, the characters of heralds were equally reſpected by friends and foes; and they travelled in ſafety through the midſt of embattled hoſts. The uſe of poiſoned weapons was forbidden, under pain of the divine diſpleaſure. The will of the gods required that life ſhould be ſpared, when a ſufficient ranſom was promiſed; and when a treaty of peace was concluded, without any ratification but the honour of the contracting parties, the perfidious wretches who betrayed the ſanctity of their engagements were devoted, amidſt libations and ſacrifices, to the fury of the terrible goddeſſes. (Iliad, iii.)

From the practice of war we may now turn our attention to the arts of peace. Paſturage and agriculture ſupplied the Greeks with food and clothing; but their implements for preparing theſe articles were very imperfect. The principal produce of their fields was barley, which ſupplied the ordinary food of men as well as horſes. Mills were unknown, and the grain was bruiſed between two large ſtones with the hand. They cultivated the olive, but knew not how to extract the oil; and though their ſoil was favourable to the grape, the juice was obtained by a tedious and operoſe proceſs, which rendered wine ſcarce and dear. Of the mechanic arts, weaving was beſt underſtood; and the hatchet, wimble, plane, and level, are the tools mentioned by Homer, who ſeems to have been unacquainted with the ſaw, the ſquare, and the compaſs. Homer does not mention the orders of architecture; and pillars are the only ornaments aſſigned to the edifices which he deſcribes. The roofs of the houſes, conſiſting of two floors, and ſurrounded by a wall, were flat. The invention of enamelled metals had been cultivated with peculiar ſucceſs; and though painting, properly ſo called, was rude and unformed during the age of Homer, the genius of the divine poet has deſcribed the rudiments of his kindred art with ſuch graces as would adorn its moſt refined ſtate of perfection. Muſic was much practiſed among the early Greeks. (See *Muſic of the* GREEKS.) The ſciences were in a low and imperfect ſtate. For arithmetic they had little occaſion; by means of their aſtronomy they were enabled to obſerve the conſtellations which directed the adventurous courſe of the mariner; but their navigation was ſo imperfect, that they ſeldom abandoned the coaſts. The only ſtars mentioned by Homer are the Great and Little Bear, the Pleiades, the Hyades, Orion, and the Dog-ſtar. Of their games, we give an account under GAMES and GYMNASTICS. As to their general character, we ſhall tranſcribe two or three paragraphs from the firſt volume of Dr. Gillies's Hiſtory of Ancient Greece, to which we have been indebted in the compilation of this article. "The Greeks," ſays Dr. G., "had advanced beyond that uniform inſipidity of deportment, that ſullen ferocity of manners, and that hardened inſenſibility of heart, which univerſally characterizes the ſavage ſtate. They ſtill poſſeſſed, however, that patient intrepidity, that noble ſpirit of independence, that ardent attachment to their friends, and that generous contempt of pain, danger, and death, which render the deſcription of the wild tribes of America ſo intereſting to a philoſophic mind. Of two principal enjoyments of life, ſtudy and converſation, they were little acquainted, indeed, with the conſolations and pleaſures of the firſt, the want of which was compenſated by the ſincerity, the confidence, the charms of the ſecond. Their ſocial affections were leſs comprehenſive in their objects, but more powerful in their effects than thoſe of poliſhed nations. A generous chief ruſhes to certain death to revenge the cauſe of his friend; yet refuſes to the prayers of an aged parent the melancholy conſolation of interring the remains of his favourite ſon, till the correſponding image of his own father ſtrikes his mind, and at once melts him to pity. (Iliad, xxiv.) The imaginary wants and artificial paſſions which are ſo neceſſary to urge the hand of induſtry, and to vary the purſuits of men, in improved commercial ſocieties, were ſupplied to the Greeks by that exceſſive ſenſibility, which intereſted them ſo deeply in the affairs of their community, their tribe, their family, and their friends, and which connected them by the feelings of gratitude even with the inanimate objects of nature. As they were not acquainted with the ſame diverſity of employments, ſo neither were they fatigued with the ſame giddy round of diſſipated pleaſures which augment the ſplendid miſery of later times. Though ignorant of innumerable acts which adorn the preſent age, they had diſcovered one of ineſtimable value, to render the great duties of life its moſt entertaining amuſement. It will not, perhaps, be eaſy to point out a nation who united a more complete ſubordination to eſtabliſhed authority with a higher ſenſe of perſonal independence, and a more reſpectful regard to the dictates of religion with a more ardent ſpirit of martial enterprize. The generous quality of their political eſtabliſhments, and their fancied intercourſe with the gods, conſpired to raiſe them to a certain elevation of character which will be for ever remembered and admired. This character was rendered permanent in Sparta, by the famous laws commonly aſcribed to the invention of Lycurgus, but which will appear (under that article) to have been "almoſt exact copies of the cuſtoms and inſtitutions that univerſally prevailed in Greece during the heroic ages." The character of the Greeks in ſubſequent periods will appear in the account of the ſeveral ſtates, provinces, or kingdoms, which they occupied.

The general hiſtory of Greece may be divided into four periods, marked by as many memorable epochas. The *firſt* extends to the ſiege of Troy in the year 1184 B.C.; the era of its commencement is not preciſely aſcertained; but if we date it with the foundation of the kingdom of Sicyon by Ægialeus in the year 2089 B.C., it laſted 905 years. This was properly the infancy of Greece; and comprehends the eſtabliſhment of the kingdoms of Sicyon, of Argos, 1856 B.C., of Athens, 1556 B.C., of Troy, 1546 B.C., of Thebes, 1493 B.C., of Mycenæ, 1344 B.C.; the deluge of Ogyges, 1764 B.C. and that of Deucalion, 1503 B.C.;

the murder committed by the daughters of Danaus on their huſbands, 1485 B.C.; the introduction of the Phœnician letters into Greece, 1493 B.C.; the legiſlation of Minos in Crete, 1406 B.C.; the Argonautic expedition, 1263 B.C.; the exploits of Theſeus, 1234 B.C.; the war of the ſeven heroes againſt Thebes, 1225 B.C., &c. &c.

The *ſecond* period begins with the ſiege of Troy, and terminates with the battle of Marathon, 490 B.C., including about 694 years. In the year 1104 B.C., 80 years after the taking of Troy, the Heraclidæ, or deſcendants of Hercules, conducted the Dorians to the eaſtern coaſt of Peloponneſus, and having landed their followers without oppoſition, aſſailed the defenceleſs territories, to which they had long ſaid claim, comprehending the whole peninſula, except the central province of Arcadia, and the maritime diſtrict of Achaia. The five other provinces were conquered at the ſame time, though by different means. Laconia was betrayed to the invaders; Argos acknowledged their authority; Corinth, Elis, and Meſſenia ſubmitted to their arms. The revolution was complete, and effected with little bloodſhed; but not without great oppreſſion of the ancient inhabitants, many of whom emigrated, and many were reduced to ſlavery. The Heraclidæ divided their new acquiſitions by lot. Upon the diviſion of Peloponneſus the kingdom of Lacedæmon commenced, 1102 B.C. In the year 1096 B.C., or 88 years after the taking of Troy, the Eolians, having traverſed the northern parts of Græcia in queſt of new ſettlements, croſſed the Helleſpont, and eſtabliſhed themſelves along the ſhore of the ancient kingdom of Priam. They gradually diffuſed their colonies from Cyzicus on the Propontis to the mouth of the river Hermus; which delightful country, together with the iſle of Leſbos, from this time received the name of Eolis or Eolia, denoting that its inhabitants belonged to the Eolian branch of the Hellenic race. In the year 1070 B.C. royalty terminated in Athens upon the death of Codrus, and the Athenians were afterwards governed by Archons. In the year 1044 B.C., 60 years after the return of the Heraclidæ, the Ionians, blended with other emigrants, having ſeized the central and moſt beautiful part of the Aſiatic coaſt, gradually diffuſed their colonies from the banks of the Hermus to the promontory of Poſidion, and afterwards took poſſeſſion of Chios and Samos; and all theſe countries were united in the year above-mentioned by the name of Ionia, intimating that the Ionians compoſed the moſt numerous diviſion of the colony. (See Ionia.) The Doric migration took place in the year B.C. 944 (See Doris.)

During the heroic ages we have ſeen, in the preceding part of this article, that the authority of kings was founded on religion, ſupported by gratitude, and confirmed by utility. While they approved themſelves worthy miniſters of heaven, they were entitled to due and hereditary honours; but they were bound to reſpect the rights, the ſentiments, and even the prejudices of their ſubjects. But at length, in-[illegible] by ambition and avarice, they tranſgreſſed the preſcribed limits, and trampled on thoſe laws which their predeceſſors had held ſacred. The minute diviſion of property, which had taken place, not only in Peloponneſus, but in the northern provinces of Greece, rendered the nobles and people more ſenſible of their encroachments, and induced them to reſiſt their oppreſſors. The more independent and illuſtrious citizens, who from the earlieſt times had been accuſtomed to come armed to the council or aſſembly, communicated their grievances, and adopted proper means for removing them. Miltas, the fourth Argive prince in ſucceſſion to Temenus, to whom Argos fell on the Heraclidan diſtribution, was condemned to death for uſurping abſolute power. In Attica monarchy more honourably expired; it periſhed ſtill more diſgracefully in Arcadia; but was gradually aboliſhed in every province of Greece, except Sparta, from the ſouthern extremity of Peloponneſus to the northern frontier of Theſſaly. The conſequence of the abolition of monarchy was the introduction of accumulated evils. Theſe, however, were removed, or at leaſt alleviated, by the authority of the Amphictyonic council, and by that of the oracles, particularly that of Delphi. This latter oracle confirmed by its awful ſanction the Olympic games and Spartan laws, which had been reſpectively eſtabliſhed, the former by Iphitus, and the latter by Lycurgus in the ſame year, *viz.* 884 B.C.; and which ſerved to the ſafety of their reſpective territories, though in different ways; the Olympic games by rendering Elis the moſt pacific, and the laws of Lycurgus by making Sparta the moſt warlike, of all the Grecian communities. Greece, even under its kings, was divided into many independent ſtates; and under the republican form of government it was ſtill more ſubdivided; and hence wars became more frequent, and battles more bloody and more obſtinate. But the long and ſpirited conteſt between the Lacedæmonians and Meſſenians was the only war of that age which produced permanent effects. Of Laconia and Meſſenia we ſhall give an account under their reſpective articles. We ſhall here obſerve, that they were both governed by kings of the family of Hercules, and inhabited by ſubjects of the Doric race, and yet this kind of mutual affinity and connection was not ſufficient to counteract other cauſes, which produced hoſtilities among them. Urged by reciprocal provocations which we cannot here detail, the Spartans invade the Meſſenian frontier and attack the ſmall town of Amphica; and thus in the year 743 B.C. began the firſt war between the Meſſenians and Lacedæmonians, which laſted 19 years, and terminated with the ſurrender of Ithome, their capital, to the Lacedæmonians, and the diſperſion of its inhabitants. In the year 685 B.C. the Meſſenians prepare to revolt, and a ſecond war commences, which continued 14 years, and ended with the capture of Ira, or Eira, by the Lacedæmonians, after a ſiege of 11 years. The conqueſt of Meſſenia rendered Sparta the moſt conſiderable power in Greece, as its ſubjects occupied two-fifths of the Peloponneſus. In the year B.C. 600 commenced the firſt "Sacred War," occaſioned by an injury committed againſt the oracle of Delphi, and undertaken by order of the Amphictyons, and terminated by the total deſtruction of the cities accuſed of ſacrilegious outrage. On occaſion of the happy termination of this war the Pythian games were re-eſtabliſhed 591 B.C. The battle of Marathon, which cloſes this ſecond period of the Grecian hiſtory, terminated, after a very ſevere conteſt, in the total defeat of the Perſians, and triumph of the Athenians under their commander Miltiades.

The *third* period of the hiſtory of Greece comprehends an interval of 167 years, that elapſed between the battle of Marathon and the death of Alexander, 323 B.C. The Athenians, in compliance with the advice of Themiſtocles, augment their navy; and under his command they defeat the fleets of Ægina and Corcyra. Themiſtocles, inſtead of allowing the Athenians to indulge themſelves in ſecurity after the advantages they had gained, exhorted them to be always ready for action. In conſequence of this judicious counſel, they were enabled to oppoſe the immenſe armaments of Xerxes. The Athenian fleet proved the ſafe-guard of Greece, and prevented a country, from which the knowledge of laws, learning, and civility was deſtined to flow over Europe, from becoming a province of the Perſian empire, and being confounded with the maſs of barbarous nations. Xerxes was provided with 1200 ſhips of war, and 3000 ſhips of burthen, for his intended expedition: and his army conſiſted of ſeventeen hundred thouſand infantry, and four hundred thouſand cavalry, and theſe, joined to thoſe who manned his fleet, amounted to near two millions of fighting men. In the year 480 B.C. he paſſed the Helleſpont, and the vainglorious monarch had the pleaſure of reviewing the whole fleet and army near Doriſcus, a city of Thrace, at the mouth of the river Hebrus. In the mean while thoſe Grecians, who, unmoved by the terrors of invaſion, obeyed the voice of liberty and their country, had ſent deputies to the iſthmus of Corinth, to deliberate about the common ſafety. A general union prevailed, and the general danger ſeemed to harmonize the moſt diſcordant members of the common council. The Grecian fleet ſailed to Artemiſium, patiently expecting the arrival of the barbarians. The ſtraits of Thermopylæ, 15 miles diſtant from the ſtation of the Grecian fleet at Artemiſium, and deemed the gate or entrance into Greece, was guarded by troops, conſiſting chiefly of Peloponneſians, under the command of Leonidas, the Spartan king. Xerxes having made his previous arrangements, ſent meſſengers to treat with the Spartans, and to deſire them to lay down their arms; to which they replied, "Let him come and take them." The meſſengers then offered them lands, on condition of their becoming allies to the great king, but they anſwered: "That it was the cuſtom of their republic to conquer lands by valour, not to acquire them by treachery." Xerxes waited four days after the return of the meſſengers, expecting the Grecians to retreat into their own country, or ſurrender their arms. On the fifth day he determined to chaſtiſe their inſolent oppoſition. The attack was ordered, and the Perſians were repelled: it was renewed the next day with the like reſult.

The Greeks, however, were betrayed by Epialtes, a perfidious wretch of their own nation, who conducted a body of twenty thouſand Perſians through a paſſage in the mountains of Oeta, ſeveral miles to the weſt of that guarded by Leonidas. The Athenian general had prudently guarded this important but unknown paſs, which, as he conceived, chance or treachery might diſcover to the Perſians. A body of 1000 Phocians had been appointed to this ſervice; upon the approach of the Perſians they inſtantly flew to their arms, and determined to reſiſt the progreſs of the enemy or to die in the attempt. Expecting to be purſued, they retired to the higheſt part of the mountain; but the Perſians, declining to follow them, ſeized the paſſage which they had abandoned, and marched down the mountain in order to accompliſh the deſign which had been preconcerted by the traitor Epialtes. Leonidas, apprized of this act of treachery, called a council of war; when all the confederates of Peloponneſus, except the Spartans, determined to abandon a poſt which they deemed to be untenable. Leonidas, however, with 700 Theſpians, 400 Thebans, and 300 Spartans, remained in the poſt of danger and of glory. In the dead of night the Spartans, headed by Leonidas, marched in a cloſe battalion towards the Perſian camp, with reſentment heightened by deſpair. The conflict was ardent and deſtructive, whilſt the Greeks were favoured in their attack by the darkneſs of the night; but at the approach of day the Perſians, who had previouſly fled, diſcovered that their fears had multiplied the number of the enemy; and therefore rallying their ſcattered forces, Xerxes gave orders to purſue the Greeks, who had retreated in cloſe order to the ſtraits of Thermopylæ. The ſhock was dreadful; and the battle was maintained on the ſide of the Greeks with perſevering intrepidity and deſperate valour. At length a barbarian dart pierced the heart of Leonidas; nevertheleſs the Lacedæmonians and Theſpians, though ingloriouſly deſerted by the Thebans, maintained their firmneſs to the laſt; and they were finally not deſtroyed or conquered, but buried under a trophy of Perſian arms. (See LEONIDAS and THERMOPYLÆ.) During the military operations at Thermopylæ, the Grecian fleet was ſtationed in the harbour of Artemiſium, the northern promontory of Eubœa, and the numerous one of the Perſians had anchored on the road that extends between the city of Caſtanæa and the promontory of Sepias, on the coaſt of Theſſaly. Here it ſuffered calamities, of which Xerxes had been forewarned, but which he diſregarded. Themiſtocles, by his addreſs, prevailed on the Athenian commander to remain at Artemiſium; and as ſoon as the Perſians recovered from the terrors of the ſtorm, the effects of which they had ſuffered, both ſides prepared for a battle, for the reſult of which ſee ARTEMISIUM. The Perſians were again totally defeated near Salamis (which ſee); upon which Xerxes determined to leave Greece. Of the conduct of Themiſtocles on this occaſion, ſee his article; and for an account of the battle of Platæa, ſee PLATÆA. The event of this bloody engagement not only delivered the Greeks from the danger of ſervitude, but gave them poſſeſſion of greater wealth than they could ever have expected to poſſeſs. In his precipitate retreat from Greece, Xerxes left behind him all his riches and magnificence. The battle of Platæa was ſucceeded by that of Mycalé, in which the Greeks were again victorious. About 40,000 Perſians periſhed in the field, many fell in the purſuit, and the remainder fled in diſorder, nor thought themſelves ſecure till they had reached the walls of Sardis. Their ſhips, their camp, the freedom of Ionia, and the undiſturbed poſſeſſion of the Aſiatic coaſt, formed the ineſtimable prize of the victors; and thus the expedition of Xerxes, undertaken with a view to enſlave Europe, reſtored liberty to the faireſt portion of Aſia. The beginning of the 5th century B.C. forms the moſt glorious era in the hiſtory of Greece. It is, however, the peculiar glory of the Athenians that, during their rapid career of military and naval triumphs, they cultivated, with a generous enthuſiaſm, the arts which adorn peace as well as war. It is obſervable that in the ſingle life-time of Pericles, the republic of Athens produced thoſe ineſtimable models of poetry, eloquence, and philoſophy, which, in every ſucceeding age, the enlightened portion of mankind hath invariably regarded as the beſt ſtandards, not merely of compoſition and ſtyle, but of taſte and reaſon. The name of Greek ſeemed thenceforth to be ſunk in that of Athenian. (See ATHENS, and SPARTA.) For an abſtract of the further hiſtory of this period of Alexander's hiſtory and exploits, we have given a brief ſketch under his article; we ſhall here obſerve, with Dr. Gillies, that during the latter years of his reign the Greeks, deprived of the honour and delivered alſo from the cares of independent ſovereignty, and undiſturbed by thoſe continual and often bloody diſſenſions, which deform the annals of their tumultuous liberty, indulged their natural propenſity to the ſocial embelliſhments of life; a propenſity by which they were honourably diſtinguiſhed above all other nations of antiquity. Their innumerable ſhows, feſtivals, and dramatic entertainments, were exhibited with more pomp than at any former period. The ſchools of philoſophers and rhetoricians were frequented by all deſcriptions of men. Painting and ſtatuary were cultivated with equal ardour and ſucceſs. Many improvements were made in the ſciences, and the Greeks, particularly the Athenians, ſtill rivalled the taſte and genius, though not the ſpirit and virtue, of their anceſtors. Yet even in this degenerate ſtate, when patriotiſm and true valour were extinct, and theſe vanquiſhed republicans had neither liberties to love, nor country to defend, their martial honours were revived, and brightened by an aſſociation with the renown of their conqueror. Under Alexander, their exploits, though directed to very different purpoſes, equalled, perhaps excelled, the boaſted trophies of Marathon and Platæa. By a ſingularity peculiar to their fortune, the era of their political diſgrace coincides with the moſt ſplendid period of their military glory. Alexander was himſelf a Greek; his kingdom had been founded by a Grecian colony; and to revenge the wrongs of his nation, he undertook and accompliſhed the moſt extraordinary enterpriſes recorded in the hiſtory of the world.

The *fourth* period of the hiſtory of Greece, commencing with the death of Alexander, 323 B.C. and terminating 146 B.C. when the Achæan league was diſſolved, and Greece became a Roman province, under the name of Achaia, comprehends an interval of 177 years. After various changes and revolutions, for an account of which, ſee ACHÆANS and ATHENS, it became ſubject to the Turks.

GRÆCIA, *Magna*, a name given to the ſouthern part of Italy, comprehending Apulia, Lucania, and the country of the Brutii, and alſo to Sicily and ſeveral of the adjacent iſlands. The name of *Græcia* was derived from the Greek colonies, which migrated hither at different periods, and the epithet *magna*, or great, was derived from mere oſtentation, as Pliny informs us (l. iii. c. 5.). This migration and ſettlement took place at a very early period, about 1055 years B.C. The moſt numerous colonies, the migration of which was occaſioned by inteſtine faction, foreign invaſion, or the reſtleſs ſpirit of adventure and rapine, occupied the iſles of the Ionian and Ægean ſeas, the ſouthern coaſt of Italy almoſt interſected by the former, and the winding ſhores of Aſia Minor ſo beautifully diverſified by the latter. The larger iſlands of Sicily, Sardinia, and Cyprus were very anciently planted by Greeks.

Whoever has obſerved the deſolate barbarity of Calabria, or reflected on the narrow extent and preſent weakneſs of Sicily, will ſcarcely believe, that five centuries B. C. thoſe countries contained above 20 warlike communities, ſeveral of whom could ſend into the field 100 thouſand fighting men. In order to account for this wonderful population, we muſt look back to the period above mentioned in the heroic ages; and conſider likewiſe that the greater number of Greek colonies in thoſe parts were planted during the eighth century before the Chriſtian era, and chiefly, 1. By the Eubœans, whoſe principal city Chalcis, uſually furniſhing the conductor of the colony, gave the epithet of Chalcidian to the new ſettlements; 2. By the Achæans of Peloponneſus, who were of the Eolian tongue and lineage; and 3. By the Dorian ſtates of that peninſula, eſpecially Corinth. Beſides their powerful colonies in Corcyra, Leucas, Anactorium, Ambracia, whoſe tranſactions form ſuch an important part of the hiſtory of ancient Greece, the Corinthians founded Syracuſe, which ſoon became, and long continued, the capital of Sicily; and in the ſixth century B. C. the Syracuſans had extended their ſettlements over all the ſouthern coaſt of the iſland. By means of theſe and ſimilar eſtabliſhments of a powerful kind, the Dorians acquired, and always maintained, an aſcendant in Sicily; but the Achæan colonies, who were of the Æolian blood and language, commanded the Italian ſhore. Crotona, the moſt conſiderable city of the Achæans, and of all Italy in ancient times, was built 710 years B. C. Sybaris, its rival, was founded about the ſame time. The former ſent colonies to Tirina, Cephalonia, and Pandoſia; the latter built Laus, Metapontum, and Poſidonia, or Pæſtum, whoſe admired ruins atteſt the ancient wealth and grandeur of the Greek cities of Italy. We may here remark, that the Ionians, who came from Eubœa, and ſettled chiefly near the eaſtern ſhore of Sicily, never rivalled the power and fame of their Dorian and Æolian neighbours, but fell ſhort of thoſe nations in Magna Græcia, as much as they ſurpaſſed them on the ſhores and iſlands of Aſia. In order to account for the flouriſhing ſituation of Magna Græcia about the year 500 B. C., many cauſes may be aſſigned, beſides thoſe of a phyſical and moral nature, which uſually contribute to the rapid growth of newly-eſtabliſhed colonies. We might mention the natural fertility of Magna Græcia, and particularly of Sicily, which in many places produced an hundred fold; and in this connection obſerve, that the Greeks who failed thither from Peloponneſus, carried with them the knowledge and practice of agriculture, which had early attained a high degree of perfection in their peninſula; and that the exuberant ſoil of Sicily, improved by cultivation, ſoon exhibited a picture of that rich abundance, which, in later times, made that beautiful iſland be entitled the granary of Rome. Beſides, the peculiar ſituation of the Achæans and Dorians, from whom chiefly the colonies in Magna Græcia derived their origin, had a conſiderable influence in accelerating the population and grandeur of theſe new eſtabliſhments. The impartial and generous ſpirit of the Achæan laws early compenſated the natural defects of their territory, which was a long, but narrow, ſtrip of ground, not more fertile than extenſive, along the Corinthian gulf. They, however, were the firſt, and long the only republic of Greece, who admitted ſtrangers into their community on equal terms with the ancient citizens. The equitable and generous policy, which they tranſported with them into Magna Græcia, could not fail to promote the happineſs and proſperity of that delightful country. The condition of the Dorians, at the time when they planted colonies in Italy and Sicily, is not leſs worthy of conſideration. The Dorian ſtates of Peloponneſus were then univerſally ſubject to the gentle government of limited but hereditary princes, or to magiſtrates choſen from the deſcendants of their ancient royal families; and who, thus adorned by birth, were ſometimes ſtill more ennobled by wiſdom and virtue. Moreover, the colonies in Magna Græcia, enjoying a wide extent of territory before them, were not retarded in their advancement by interference of intereſt on the part of neighbouring ſtates, but they found ſufficient employment in ſubduing the original inhabitants of that country, without commencing hoſtilities either againſt their neighbours or againſt each other. The kings or nobility of Magna Græcia, ſecure of their own pre-eminence, felt nothing of the republican jealouſies which prevailed in the mother country. They received with pleaſure new citizens, or rather ſubjects, from whatever quarter they might come. The ſtates of Italy and Sicily, thus increaſing by degrees, could ſoon boaſt, the former of Crotona, Tarentum, Sybaris, Rhegium; the latter of Syracuſe, Agrigentum, Meſſené, Himera, and ſeveral other cities, which rivalled or ſurpaſſed the wealth of Athens or Corinth; and the populouſneſs of Thebes, Argos, or Sparta. The wars, conqueſts, or oppreſſions, and, above all, the civil diſſenſions, which in the ſixth century B. C. diſturbed and deformed the coaſt of Ionia, and the other Grecian colonies in the iſlands and continent of Aſia, brought frequent acceſſions of inhabitants to the ſhores of Magna Græcia. Nevertheleſs, the Ionians, along with their poetry, muſic, and painting, communicated alſo their diſſolute and artificial appetites to the Greeks of Italy and Sicily. It is a fact, however, that Magna Græcia, having obtained opulence by induſtry, diſſipated it in idleneſs and licentiouſneſs: inſomuch that the Greek cities of Italy, and particularly Sybaris and Crotona, fell a prey to the moſt dangerous errors and vices, when Pythagoras came to their relief about 550 years before the Chriſtian era. His philoſophy and legiſlation reformed and improved the manners and policy of Magna Græcia, and contributed, in an eminent degree, not only to the quiet and happineſs, but to the induſtry, power, and ſplendour of that celebrated country. (See PYTHAGORAS.) The concurring teſtimony of hiſtorians aſſures us, that the ſchool of Pythagoras flouriſhed above 40 years to the unſpeakable benefit of Magna Græcia when a war aroſe between Crotona and Sybaris, the latter of which had ever contemptuouſly rejected the Pythagorean inſtitutions.

Having traced the progreſs towards proſperity and renown of Magna Græcia, it is natural to ſtate the cauſes of its decay. In Italy, the citizens of Crotona had too ſoon reaſon for lamenting their inſurrection againſt their magiſtrates, and their dereliction of the diſcipline of Pythagoras. The other Greek cities of Italy, which are ſaid to have imitated the fatal example of Crotona, were haraſſed by wars againſt each other, or againſt their barbarous neighbours. In 60 years after the death of Pythagoras, an attempt was made to revive his inſtitutions; but in leſs than 40 years a new perſecution entirely drove the Pythagoreans from Italy, and completed, according to Polybius (i. 403.) the confuſion and miſery of that once happy country. Gillies's Hiſt. of Greece, vol. ii.

GRÆCINUS, JULIUS, in *Biography*, a Roman ſenator, who flouriſhed in the reign of Caligula, was ſon of a Roman knight, and greatly diſtinguiſhed for eloquence, and for the ſtudy of philoſophy, and he carried into practice the moral leſſons which his ſtudies led him to contemplate. He refuſed to obey the command of the emperor to appear as the accuſer of Marcus Silanus, and ſuffered death in conſequence. Seneca ſays of him, that he was put to death for the ſole reaſon, that he was too good a man to be permitted to live under a tyrant. He is mentioned by Columella, as having written a treatiſe concerning agriculture and the management of vines. He was the father of the illuſtrious Cn. Julius Agricola. Univer. Hiſt.

GRAEDER FIORD, in *Geography*, a bay of Weſt Greenland. N. lat. 63° 50′. W. long. 49° 30′.

GRAEMSAY, one of the Orkneys, a flat, fertile iſland, 1½ mile in length, and a mile in breadth, containing 32 families and 179 inhabitants; 1½ mile S. of Stromneſs, near the northern extremity of Hoy. The ſoil of the interior part is thin and fertile; but the coaſt is a chain of broken and pointed rocks. It contains a bed of ſlate, but no fuel.

GRAEN, a town of Hindooſtan, in Viſiapour; 24 miles S. of Currer.

GRAESATZ, a town of Croatia; 30 miles S. of Bihacs.

GRÆVIUS, JOHN-GEORGE, in *Biography*, an eminent critic; was born at Naumberg, in Saxony, in 1632. Having acquired a good knowledge of the learned languages in Germany, he went to Leipſic and ſtudied under Rivinus and Strauchius. After this he paſſed two years at Deventer, intimately connected with the celebrated Gronovius, to whom he acknowledged himſelf indebted for a conſiderable part of his acquiſitions, and whom he after ſucceeded in his profeſſorſhip. (See GRONOVIUS.) His great reputation induced the States of Utrecht to invite him to their univerſity, and during forty-one years he inſtructed the young men there in politics, hiſtory, and eloquence, refuſing various invitations to other ſeminaries. He died in the year 1703, at the age of ſeventy-one. He was the editor of many of our beſt claſſical authors, as Heſiod, the greater part of the works of Cicero, Florus, Cæſar, Suetonius, &c. He compiled alſo "Theſaurus Antiquitatum Romanorum," in 12 vols. fol. and "Theſaurus Antiquitatum Italicorum," in 6 vols. fol. This work was continued by Burman to the forty-fifth volume. Grævius, as a critic, was modeſt, and free from pride and pedantry, which are ſaid too frequently to accompany this character. Moreri.

GRAF, in *Geography*, one of the ſmaller Weſtern iſlands of Scotland, on the W. coaſt of Lewis. N. lat. 58° 14′. W. long. 6° 53′.

GRAFFENBERG, a town of Germany, in the territory of Nuremberg; 11 miles S. E. of Forcheim.—Alſo, a town of Upper Carniola; 19 miles S. E. of Laybach.

GRAFFENECK, a town of Auſtria; 10 miles S.W. of Sonneberg.

GRAFFER, from the French *greffier*, i. e. *ſcriba*, a *notary*, or *ſcrivener*. It is uſed in the ſtat. 5 Hen. VIII. cap. 1.

GRAFFIGNY, FRANCIO D'ISSEMBOURG D'HAPPONCOURT DE, in *Biography*, a literary lady, daughter of a major of the gendarmerie of the duke of Lorrain, was born at Nanci about the year 1694. She married de Graffigny, chamberlain to the duke, a man of violent paſſions and moſt brutal diſpoſition, from whom ſhe obtained, after living with him many years, a legal ſeparation. She now went to Paris with mademoiſelle de Guiſe, who was eſpouſed to marſhal Richelieu, and ſoon made her merit known to the wits of the capital. In 1745 ſhe was announced as the author of a Spaniſh novel. This was followed by the "Lettres d'une Peruvienne," in two vols. 12mo. which were much read and admired, though defective in point of ſtyle, and in the metaphyſical manner of treating of the paſſion of love. One of her beſt pieces was entitled "Cenie," a drama in five acts, which was written in proſe. She wrote another, which was entitled "La Fille d'Ariſtide," and which obtained a much leſs ſhare of public approbation. This lady was of a truly eſtimable character in private life, and had many reſpectable friends, even in the higheſt ranks of ſociety. The emperor and empreſs honoured her with particular notice, and made her frequent preſents. She was an aſſociate of the academy of Florence; and died at Paris in 1758, at the age of ſixty-four. Gen. Biog.

GRAFFIO, or GRAVIO, in our *Old Writers*, denotes a *landgrave* or *earl*. "Nec princeps nec graffio, hanc lenitatem mutare audeat."

GRAFFIUM, is uſed for a writing-book, regiſter, or chartulary of deeds and evidences.

GRAFT, in *Gardening*, a name applied to the ſhoot or ſcion that is to be inſerted into the ſtock or branch of the tree, in the operation of grafting. It has occaſionally the vulgar term of *graff* given it by gardeners.

The word is formed of the French *graffe*, which ſignifies the ſame thing; and *greffe*, in this ſenſe, is ſuppoſed to have been derived from the reſemblance the ſhoot bears to the point of a penknife, which was anciently called *greffe*. Du Cange goes farther, and derives the ancient *greffe* from *graphiolum*: Menage, from *graphium*, a Latin word, ſignifying a little ſtyle, or iron bodkin, one end whereof was pointed, and ſerved to write on waxen tablets; and the other flat, ſerving to efface or rub out what was written.

There are ſeveral circumſtances to be attended to in chooſing the grafts. The ſhoots or ſcions that are to be employed in this way, ſhould be ſelected and cut in the manner that will be directed in ſpeaking of grafting; but they ſhould never be taken from ſuch as have a too luxuriant growth, or are in the leaſt degree infected with diſeaſe of any kind. See GRAFTING.

In the conducting of this proceſs, though the veſſels of the ſtock, and thoſe of the ſhoot or graft are, in ſome meaſure,

ſure, brought into contact and thereby united, as well as thoſe of the latter ſupplied with nutritious matters from the former, yet their economy remains ſtill the ſame. Mr. Bradley has conſidered it as a ſort of planting; the ſhoot or ſcion rather taking root in the ſtock or tree into which it is inſerted, than uniting itſelf with it, as is ſeen by its preſerving its natural purity and utility, although fed and ſupported merely by a crab-ſtock; which it is ſuppoſed depends upon ſome difference in the veſſels of the ſhoot or ſcion from thoſe of the ſtock or tree.

GRAFTING, the act of inſerting a ſhoot or ſcion taken from one tree, into the ſtem or ſome other part of another, in ſuch a manner as to unite and conſtitute a perfect plant of the ſame kind as that from which the branch was taken.

It is by this practice that particular ſorts of curious fruit-trees of different kinds are capable of being raiſed with a certainty of their being the ſame, or not degenerating. It has been obſerved, that though the plants raiſed from ſeed are liable to run from their kinds, and afford ſuch fruits as are not worth the trouble of cultivation; thoſe procured from ſhoots taken from ſuch trees as produce good fruit, never alter from their kind, whatever the ſtock or tree on which they are grafted may be; as notwithſtanding the grafts receive their nouriſhment from the ſtocks, their varieties are never altered by them, but continue to produce the ſame kind of fruit as the tree from which they were taken: the only alteration which they undergo is, that when the ſtocks on which they are grafted do not grow ſo faſt, and afford a ſufficient ſupply of nouriſhment to the grafts, they do not make ſo great a progreſs as they otherwiſe would do, nor is the fruit they produce ſo fair, or ſometimes ſo well flavoured, or ſo large.

This proceſs has the advantage, probably from the ſupply of nutritious matter being not only more abundant but more regular, of rendering the plants or trees which are thus raiſed more quick in their arriving at the ſtate of maturity, or that of bearing.

It is on theſe different accounts that the practice of grafting is principally had recourſe to, in raiſing different ſorts of fruit trees, as well as ſome particular ſorts of ornamental plants of the tree and flower kinds. It alſo affords the means of growing different kinds of fruits and flowers of the ſame ſort, in the ſame ſtock or tree, as ſeveral varieties of pears and apples, &c.

There are different methods of performing this operation, and which are diſtinguiſhed by different terms or names, as below.

Rind, *Shoulder*, or *Crown Grafting*.—This is that mode in which the grafts are ſet in a ſort of circle or crown, upon the top of the cut-off ſtem or branch.

It is chiefly practiſed on large trees, when either the head or the large branches are cut off horizontally, and two or more ſhoots or ſcions put in, according to the ſize of the branch or ſtem: in performing which, the ſcions are cut flat on one ſide, with a ſhoulder to reſt upon the crown of the ſtock; then the rind of the ſtock is raiſed up, to admit them between the wood and the bark of the ſtock, which muſt be inſerted about two inches, ſo as that the ſhoulders may meet, and cloſely join the crown of the ſtock; and after the whole of the ſhoots or ſcions are inſerted, all the crown of the ſtock ſhould be well clayed over, leaving two eyes of them uncovered with it, which will be ſufficient for ſhooting. It is a method of grafting that was much more in practice formerly than at preſent, owing to the bad ſucceſs with which it has been attended; for, as the ſcions are placed between the rind of the ſtock and the wood, they are frequently blown out by ſtrong winds after they have made large ſhoots, ſometimes after five or ſix years growth. Where this method is practiſed, there ſhould therefore always be ſome ſtakes fixed, ſo as to ſupport the ſcions until they have almoſt covered the ſtock or branch. It is uſual to perform the operation in this mode of grafting about the beginning of April, or ſometimes a little later.

Stock, *Cleft*, or *Slit-Grafting*.—This is a mode which is practiſed upon ſtocks, trees, or branches, of a ſmaller ſize, as from one to two inches in diameter, and may be uſed with ſucceſs where the rind of the ſtock is not too thick, by which the inner bark of the ſcion will be prevented from joining to that of the ſtock. In performing it the head of the ſtock or branch muſt be cut off with a ſlope, and a ſlit be made the contrary way, in the top of the ſlope, deep enough to receive the ſcion, which ſhould be cut ſloping like a wedge, ſo as to fit the ſlit made in the ſtock; care being taken to leave that ſide of the wedge which is to be placed outward, much thicker than the other: and in putting the ſcion into the ſlit of the ſtock, great care muſt be taken to join the rind of the ſcion exactly to that of the ſtock; for if theſe do not unite perfectly, the grafts will not ſucceed: when this method of grafting is uſed to ſtocks that are not ſtrong, it will be proper to make a ligature of baſs, to prevent the ſlit of the ſtock from opening: after which the whole ſhould be clayed over, to prevent the air from penetrating the ſlit, ſo as to deſtroy the grafts, only leaving two eyes of the ſcion above the clay for ſhooting. It is uſually performed about the beginning of March, or ſometimes a little later.

Whip, or *Tongue-Grafting*.—This is moſt generally practiſed by nurſery-men, eſpecially for ſmall ſtocks, or branches of an inch, half an inch, or leſs, as the ſcions much ſooner cover the ſtocks in this method, than in the other. It is performed by cutting off the heads of the ſtocks ſloping; then making a notch in the ſlope towards the upper part downwards, a little more than half an inch deep, to receive the ſcion, which muſt be cut with the ſlope upward, and a ſlit made in this ſlope like a tongue, which tongue muſt be inſerted into the ſlit made in the ſlope of the ſtock, and the ſcion be placed on one ſide of the ſtock, ſo as that the two rinds of the ſcion and ſtock may be equal, and join together exactly; after which, there ſhould be a ligature of baſs put round to faſten the ſcion, ſo as that it may not be eaſily diſplaced, the whole being afterwards clayed over as in the former methods. It may be performed in the early ſpring months, with moſt ſucceſs.

There are, beſides theſe, ſome other modes of performing the buſineſs.

Grafting by Approach, or *Inarch-Grafting*.—This is ſometimes called ablactation. It is performed where the ſtocks that are deſigned to be grafted, and the trees from which the graft is to be taken, ſtand ſo near together, as that their branches may be bent and united. It is moſt commonly practiſed on tender exotic plants, and ſome other ſorts which do not ſucceed in any of the other methods. In performing the work, a part of the ſtock or branch is ſlit off about two inches in length, a ſmooth part of the ſtock being always choſen for the purpoſe; then a ſmall notch is made in this ſlit downward, in the ſame manner as directed for whip-grafting; the branch of the tree deſigned to be inarched having a part ſlit off in the ſame manner as the ſtock, and a ſlit made upward in it, ſo as to leave a tongue, which tongue ſhould be inſerted into the ſlit of the ſtock, joining their rinds equally, that they may unite well together; after which a ligature of baſs ſhould be made, ſo as to keep them exactly in their ſituation, and afterwards this part of the ſtock clayed over well to keep out the air. In this method of grafting, the ſcion is not ſeparated from the tree until it is firmly united with the ſtock, nor is the head of the ſtock or branch, which is grafted, cut off till the ſame time, and only half the wood pared off with a ſlope, about three inches in length, and the ſame of the ſcion or graft. But in this method of grafting, the operation is not performed ſo early in the ſeaſon as the others; it being done in the month of April, when the ſap is flowing, at which time the ſcion and ſtock will join together, and unite much ſooner than at any other ſeaſon or period of the year. It is principally employed in raiſing jaſmines, oranges, and other exotic trees of the harder kinds.

By experience it has been found, that the walnut, fig, and mulberry will take by this method of grafting, while neither of them ſucceed in any of the other modes. Several ſorts of evergreens may likewiſe be propagated by this method of grafting; but all the trees that are grafted in this way are weaker, and never grow to the ſize of thoſe which are grafted in the other methods; therefore it is rarely practiſed, except on ſuch ſorts of trees as will not take by the other methods of performing the operation.

Root-Grafting.—This, which is a late improved mode, is performed by cutting the clean ſmooth roots of the ſtocks in pieces of five or ſix inches long, and as large, or a little larger, than the graft; then they are whip-grafted, and tied together very cloſe, ſo as to prevent the wet from affecting the wounded parts, planting them ſo deep as that the graft, which ſhould be four or five inches long, may be about half buried. In this way, the grafts themſelves will root, and a nearer ſimilitude be preſerved to the tree, whence the grafts are taken; and after two or three years, the ſtock may be cut quite away, and the graft left to maintain itſelf. In practiſing this method, the grafts ſhould be an inch or two longer than the others.

Seaſon of Grafting.—The period or ſeaſon for grafting ſhould always be regulated by the ſtate of the weather. From the climate being ſo uncertain in the ſpring, it is beſt to defer it till the circulation of the ſap is briſk, and the buds of the ſtocks begin to break into leaves, attention being had that the weak ſhoots of tender trees will not admit of being ſo long cut as the more hardy, and that the operation ſhould never be performed while it actually freezes or rains, or there is ſnow upon the ground.

Proper Grafts.—In providing theſe, care ſhould be taken that they are ſhoots of the former year, as when they are older they never ſucceed well; that they be always taken from healthy fruitful trees, as when the trees are ſickly from whence they are taken, the grafts often partake ſo much of the diſtemper, as not to get the better of it, at leaſt for ſome years; that they be not taken from young luxuriant trees, whoſe veſſels are generally large, continuing to produce luxuriant ſhoots, and ſeldom proving fruitful; and that they be taken from the lateral or horizontal ſhoots, rather than the perpendicular ones. They ſhould be cut off from the trees before their buds begin to ſwell, which is moſtly three weeks or a month before the ſeaſon for grafting; conſequently when they are cut off, they ſhould be laid in the ground, with the cut part downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying; if a ſmall joint of the former year's wood be cut off with the ſcion, it will preſerve it the better, and when they are grafted, this may be cut off; for, at the ſame time, the ſcions muſt be cut to a proper length before they are inſerted in the ſtocks; but, till then, the ſhoots ſhould remain of their full length, as they were taken from the tree, which will better preſerve them from ſhrinking: when the ſcions are to be carried to a conſiderable diſtance, it will be proper to put their ends into a lump of clay, and to wrap them up in moſs, which will preſerve them freſh for a month or longer: but theſe ſhould be cut off from the trees earlier than thoſe which are to be grafted near the place where the trees are growing. It is, however, always the beſt practice to cut the grafts as near the time of their being inſerted into the ſtocks as poſſible, as by that means they ſucceed with much more certainty.

Stocks proper for Grafting upon.—The ſtocks are the trees or plants for grafting upon; which are either ſuch old trees as are already growing where they are to remain, but the fruit of which is intended to be changed; or ſuch young trees as have been raiſed in the nurſery as a ſupply to the garden. In the former caſe, there is no other choice than that of the branches, which ſhould be ſuch as are young, healthy, well-ſituated, and have a ſmooth bark. Where theſe trees are growing againſt walls or eſpaliers, it will be proper to graft ſix, eight, or ten branches, according to the ſize of the tree, by which they will be much ſooner furniſhed with branches again, than when a leſs number of ſhoots or ſcions are put in; but in ſtandard trees, four, or at moſt ſix ſcions will be ſufficient for the purpoſe.

In chooſing young ſtocks for grafting upon, ſuch as have been raiſed from the ſeed, and that have been once or twice tranſplanted, ſhould always be fixed upon for the purpoſe.

After theſe, thoſe ſtocks which have been raiſed from cuttings or layers ſhould conſtantly be preferred; but thoſe which are ſuckers from the roots of other trees ſhould be rejected, as they are never ſo well rooted as the others, and conſtantly put out a great number of ſuckers from the roots, by which the borders and walks of the garden will be always peſtered during the ſummer ſeaſon. Theſe, beſides being unſightly, take off part of the nouriſhment from the other trees and plants.

And where theſe ſtocks have been allowed a proper diſtance in the nurſery where they have grown, the wood will be better ripened and more compact than thoſe which have grown cloſe, and have been drawn up to a greater height. The wood of theſe will be ſoft, and their veſſels large; ſo that the ſcions grafted into them will ſhoot very ſtrong; but they will be leſs diſpoſed to produce fruit than the others; and when trees acquire a bad habit at firſt, it is difficult to reclaim them afterwards. The ſtocks moſt adapted to each ſort will be explained under their particular genera, and in conſidering the nature of ſtocks. See STOCKS.

Implements proper for the Work.—Theſe are principally a neat ſmall hand-ſaw, for cutting off the heads of large ſtocks; a good ſtrong knife, with a thick back, to make clefts in the ſtocks; with a ſharp pen-knife, or budding-knife, to cut the grafts with; and a grafting chiſſel and ſmall mallet. Other ſorts of implements are ſometimes neceſſary in performing particular ſorts of grafting.

But beſides theſe tools, other ſorts of materials are wanted in performing the buſineſs, ſuch as baſs-ſtrings, or woollen yarn, to tie the grafts with; and a quantity of good tough clay, which ſhould be prepared a month before it is wanted, and kept turned and mixed, like mortar, every other day, in the following manner:

A quantity of ſtrong good clay, in proportion to the quantity of trees intended to be grafted, ſhould be provided, and ſome new well-fed horſe-dung broken in among it; and if a little ſtraw or hay be mixed amongſt it, it will hold together the better. The addition of a quantity of ſalt will alſo prevent the clay from dividing in dry weather. Theſe ſhould be ſtirred and mixed together, putting water to them occaſionally, in the manner of making mortar. The whole ſhould be hollowed like a diſh, filled with water, and kept every other day ſtirred. It ſhould be carefully kept from being expoſed to froſt or drying winds; and the oftener it is wrought over the better it will become.

Some have lately made uſe of another ſort of compoſition for grafting, which has been found to anſwer the intention of keeping out the air better than the clayey mixture. It is compoſed of turpentine, bees'-wax, and roſin melted together; which, when of a proper conſiſtence, is put on the ſtock round the graft, in the ſame manner as the clay is uſually applied; and though it be not above a quarter of an inch thick, it keeps out the air more effectually than the clay; and, as cold hardens it, there is no danger of its being hurt by froſt, which is very apt to cauſe the clay to crack, and fall off; and, when the heat of the ſummer comes on, it melts and falls off without any trouble. In the uſing it, a tin or copper pot is neceſſary, with a convenience under it to keep a very gentle fire with ſmall coal; otherwiſe the cold ſoon condenſes the mixture. It is neceſſary not to apply it too hot, leſt the graft be injured. A perſon a little accuſtomed to this compoſition, applies it very faſt; and it is much eaſier for him to work with than clay, eſpecially when the ſeaſon proves cold.

In the buſineſs of grafting it is found, that in long-continued dry ſeaſons the grafts are liable to fail in taking, which is ſometimes probably owing to the improper choice of the grafts, as well as to the dry weather. Great care ſhould of courſe always be taken not to graft with weak ſhoots, particularly thoſe taken from near the top, but ſuch as are taken from the lower end of the ſhoots, and in which the wood is plump and freſh: ſuch as are ſhrivelled ſeldom or ever take well. When any have miſſed in the ſpring, it has been adviſed to cut off, about the middle or latter end of June, ſome fine, healthy grafts of the ſorts that are wiſhed to graft with, and to open the bark in the ſame manner as for budding, inſerting the graft with a piece of the former year's wood on it, and after this has been done, to rub in with a bruſh ſome of the compoſition of Mr. Forſyth in a liquid ſtate; then to warp baſs round it, as is done for ſpring grafting, leaving about three eyes in the ſhoot, which ſhould be tied on with the baſs as light as poſſible; then covering the outſide of the baſs, thus tied up, with the compoſition to the thickneſs of about one-eighth of an inch, as well as the end of the ſhoot, to exclude the air and wet. In about three weeks or a month, the grafts ſhould be looked over, to ſee if they have taken. When the graft begins to ſwell, it will throw off the compoſition; in which caſe always remember to apply more to prevent the air from penetrating the inciſion or wound that has been formed.

About the month of September it ſhould be examined whether the wounds are all healed up, and the two barks perfectly united; which, if they are, ſlacken the baſs; and when they are perfectly healed up, it may be wholly taken off; but if not, the baſs muſt be again tied on, and covered with a compoſition as before, letting it remain till the following ſpring. It may then be taken off; and if it be found that the two barks have ſeparated during the winter, with the point of a ſharp knife, all the brown part of the bark (which, if left, would infallibly bring on the canker) ſhould be cut out, and the compoſition rubbed into the wound. When the grafts have produced ſtrong leading ſhoots, the tops of them ſhould be pinched off with the finger and thumb; but if they have not ſhot ſtrong, they ſhould not be cut till the ſpring, when they may be cut down to three or four eyes, according to their ſtrength, to make them produce horizontal ſhoots, and form handſome heads. This ſort of grafting ſhould always be performed in moiſt or cloudy weather, if poſſible, as under ſuch circumſtances the operation moſtly ſucceeds better.

It has been remarked by Mr. Forſyth, that rubbing a little of his compoſition into the inciſion will effectually prevent the canker, and in applying it round the graft, a much leſs quantity is ſufficient than of the clay; as it need not be more than three inches round in grafting ſmall ſtems or ſhoots, and in proportion for thoſe which are larger. It keeps the ſcion moiſt. When uſed in grafting, it ſhould be of ſuch a conſiſtence as to work eaſily with the hand, or a knife, or ſmall trowel, rather ſofter than grafting-clay generally is. This method, on a fair trial, will, he thinks, be found "a ſure, neat, and expeditious way of grafting."

In grafting, or budding, they ſhould be performed as near to the upper ſide of a bud as poſſible, and the moſt proper place for inſerting the ſcions or buds is at the joints, a little above the croſs ſhoot.

And in reſpect to the ſorts of trees that will ſucceed upon one another, it may be obſerved that all ſuch as are of the ſame genus, that is, which agree in their flower and fruit, take upon each other; hence all the nut-bearing trees may be ſafely grafted on each other, as well as all the plum-bearing trees, as the ſeveral ſorts of plums, almond, peach, nectarine, apricot, &c.; but as many of them are ſubject to admit gum from the parts wounded, as the peach and nectarine kinds, it is found the ſureſt method to bud or inoculate them.

All ſuch trees as bear cones alſo do well upon each other, though they may differ in one being evergreen, and the other ſhedding its leaves in winter; as in the cedar of Libanus, and the larch-tree, which are found to ſucceed upon each other; but they muſt be grafted by approach, as they abound with a great quantity of reſin, which is apt to evaporate from the graft, when ſeparated from the tree before it is joined with the ſtock; whereby they are often deſtroyed. The laurel likewiſe on the cherry, or the cherry on the laurel. All the maſt-bearing trees are alſo found to take upon each other, and thoſe which have a tender ſoft wood do well if grafted in the common way; but ſuch as are of a firm contexture, and are ſlow growers, muſt be grafted by approach.

It is likewiſe by this method that many kinds of exotic trees are not only propagated, but alſo rendered hardy enough to endure the cold of our climate in the open air; as by being grafted upon ſtocks of the ſame kind which are hardy, the grafts are rendered more capable of enduring the cold, and the general effects of the atmoſphere.

GRAFTING *Wax*. See WAX.

GRAFTING *Tool*, in *Engineery*, ſignifies a kind of ſpade, made very ſtrong and curving, uſed in digging canals, often called only a *tool*; ſee *fig*. 50. CANALS, *Plate* VII.

GRAFTON, in *Geography*, a town of America, in Windham county, Vermont, chartered by the name of Tomlinſon, but aſſuming its new name in 1791. It contains 1149 inhabitants, and lies W. of Rockingham, adjoining.

GRAFTON *County*, a county of New Hampſhire, bounded N. by Canada, S. by the counties of Strafford, Hillſborough, and Cheſhire, W. by the ſtate of Virginia, and E. by the diſtrict of Maine. It is divided into 50 townſhips, and 17 locations, and contains 23,093 inhabitants.

GRAFTON, a poſt-town in the county above-mentioned, 13 miles S.E. of Dartmouth college, and 19 S.W. of Plymouth. It was incorporated in 1778, and contains 682 inhabitants. Lapis ſpecularis, of the beſt quality, is found in this town; it lies in a mountain about 20 miles E. of Dartmouth college, adhering to the rocks of white or yellow quartz, and lying in laminæ, like ſheets of paper.

GRAFTON, the *Hoſſanamiſco* of the Indians, a townſhip in Worceſter county, Maſſachuſetts, containing 985 inhabitants; 40 miles S.W. of Boſton.

GRAFTON, *Cape*, a cape on the coaſt of New Holland, ſo called by Cook in 1770. S. lat. 16° 57′. W. long. 214° 6′.

Grafton *Iſland*, the moſt northerly of the Baſhee iſlands, in the Eaſt Indian ſea. N. lat. 21° 8′. E. long 118° 14′.

GRAGNANO, a town of Naples, in Principato Citra; 11 miles W.S.W. of Salerno.

GRAHAM's Island, one of the Aladin iſlands, in the Mergui Archipelago, about 6 miles in circumference. N. lat. 9° 19′.

GRAIG, or Graignamanna, a poſt-town of Ireland, in the county of Kilkenny. Here is a good bridge over the Barrow, and the tide flows up. It is 58 miles S. by W. from Dublin.

GRAIN, John Baptist le, in *Biography*, was born, in 1565, at Paris, where he was educated with great care, and in early youth he was introduced to court, and attached himſelf to the ſervice of Henry IV. He was appointed by that prince to the office of counſellor, and maſter of requeſts in ordinary to the queen, Mary de Medicis. His employment was in writing, and in attending on the education of his children. On their account he drew up Memoirs relative to the hiſtory of France, which remained in MS. till the chancellor de Sillery perſuaded him to publiſh a part of them. His firſt publication, which he printed in his own houſe, was entitled, "Decade contenant l'Hiſtoire de Henri le Grand, Roi de France et Navarre, IV. du Nom." fol. 1614, in ten books. It comprizes the period from the peace in 1559, to the king's death in 1610. He publiſhed a ſecond decade, including the hiſtory of that king's reign, in 1618. The former decade was preſented to the young king Lewis XIII. who was highly delighted with the freedom diſplayed by the author, and it was at his deſire that the other was made public. Le Grain, though fortunate in pleaſing his ſovereign, made himſelf many enemies by the honeſty and candour which he diſplayed in the narration. Attempts were made to procure a cenſure upon it from the Sorbonne, but they were unſucceſsful, that body declaring that they found nothing in it deſerving of cenſure. The real grounds of the objections to it were that the author had ſupported the liberties of the Gallican church; that he had cenſured attempts to introduce into France thoſe articles of the council of Trent, which had been rejected; – that he diſapproved the eſtabliſhment of new religious orders, and was not favourable to the perſecution of heretics. For theſe ſentiments, which ought to have endeared him to his countrymen, he was continually haraſſed by bigots, till at length an order was procured from the king for the ſuppreſſion of all the copies of his work, which remained in his hands. The treatment which he experienced diſguſted him with the court, and he went into retirement on his eſtate of Montgeron, where he died in 1642. He left in MS. a manifeſto relating to all the proceedings reſpecting his book, which is ſaid to diſplay in glowing colours the diſcouragements attending honeſt hiſtorians under an abſolute monarchy. He left likewiſe the third decade of his hiſtory, and ſome chronological pieces in MS. Moreri.

GRAIN, Granum, primarily denotes a fruit, or ſeed, growing in a ſpica, or ear.

In this ſenſe, grain comprehends all ſorts of corn; as wheat, rye, barley, oats, &c.

Grain, *Structure of.* There are three particulars obſervable in every grain, whether it be wheat, barley, oat, or whatever elſe of that kind. Theſe are, 1. The outer coat or pellicle, which contains all the reſt. This in the ſame ſpecies of grain is found to be very different in thickneſs in different ears, and as it has grown in different ſoils, 2 The germ or bud; this is always hid within the ſeed or grain, and is the plant in miniature that is to ariſe from it. (See Bud and Germ.) And, 3. The meal, or that farinaceous matter which is incloſed in the ſkin, and which ſurrounds the germ, and ſerves to give it nouriſhment when firſt put into the earth, before it is capable of drawing it from the earth itſelf. Dr. Grew, in his Anatomy of Plants, has treated of this at large. See Fecundation *of Plants*, Germination, Vegetation, &c.

The whole ſtructure of the plant which produces theſe ſeeds is equally admirable. The chaffy huſk is admirably adapted to ſhield and defend the ſeed as long as that is neceſſary, and then to let it fall; and the ſtalk, formed hollow and round, is neceſſarily at once light and ſtrong, capable of ſuſtaining the ear, without abſorbing too much of the juices deſtined to its nouriſhment; and the beards of many kinds are a defence againſt the birds, that would otherwiſe deſtroy the ſeed before its ripening. The covering of the ſeed is formed of two membranes, which meeting in a line on one part of the ſeed, form together that furrow we ſee on it. This is the place at which the ſeed is to burſt open on being moiſtened. Had not nature provided this means of the germ's coming out, the toughneſs neceſſary to the coat of the ſeed, as a defence from injuries, would have ſuffered the farinaceous matter and the germ to rot together, within it, before it would have given them way to come out, and for the germ to grow.

Nor is this the only uſe of this place of opening. The great Creator of all things has provided theſe ſeeds, not only for a ſupply of the ſame ſpecies of plant, but for our food, and for that of birds, &c. We have art enough to erect machines for the reducing of the farina to powder, and the freeing of it from its covering membrane; but the birds eat it as it is, and it would paſs through them whole, and without doing them any good, were it not that the juices of the ſtomach ſwelling it up, it burſts open at this furrow, and all the nutritive matter pours itſelf out. De Landes, Trait. Phyſ. p. 62. See Farina, Fecula, Flour, Bread, &c.

For the laws relating to the importation and exportation of ſeveral ſorts of grain, as wheat, barley, oats, &c. See Corn.

The cleaning and preſerving of grain in a proper ſweet condition have long been objects of conſiderable importance, but it is probable that the latter cannot be effected for any great length of time.

Different methods of managing grain, after being threſhed out, are practiſed by farmers; ſome keeping a large proportion of it in the chaff on the barn floors, while others, after having it cleaned, put it into ſacks, and place them in the ſame ſituation, or in ſome room appropriated to the purpoſe, until they can be ſent to the market. But each of theſe methods is liable to much objection; as when it remains for any length of time on low damp floors, it muſt obviouſly ſoon become muſty, however much precaution is taken to prevent it, whether it be in ſacks, or in a looſe ſtate without being cleaned.

There is another practice ſometimes employed in the more northern parts of Scotland, according to the author of "Modern Agriculture;" which is, that of twiſting ſtraw into large bands, or ropes, and coiling them up in the manner of the cables of ſhips, placing the grain, when threſhed and cleaned, within the coils, in a ſort of well, as it were. But as the grain in this way reſts on the ground or floor, and, of courſe, is liable to imbibe damp, it is not leſs objectionable than the others, while it is much more troubleſome, and more expoſed to loſs.

It has been adviſed, in order to preſerve grain in a proper ſtate after threſhing it out, to have it as expeditiouſly as poſſible cleaned from the chaff, when the air is in a dry ſtate, and put into a room, cheſt, or bin, which is perfectly dry and free from any ſort of moiſture, until it can be properly placed in the granary, or be ſent away for ſale. This ſhould always be effected as early as poſſible, as, by delaying the cleaning of the corn, the ſample is very liable to be injured.

The cleaning of the grain is performed in ſeveral different ways; but where threſhing-machines are in uſe, they are now moſtly contrived in ſuch a way as to execute it at the ſame time the threſhing is going on. The winnowing-machine is alſo frequently employed for the ſame purpoſe, and anſwers perfectly well. And in ſome ſituations the *caſting-ſhovel* and *ſpry*, or flat broom, as well as the *ſcuttle*, are made uſe of, the broom ſerving to remove the chaffy parts and the more minute ſtrawy particles which are ſeparated from the grain by the wind. This method can, however, only be employed with advantage where there is plenty of barn-room; under other circumſtances the winnowing-machine is far more beneficial and proper. The practice of cleaning grain on the barn-floor, by means of the wind, is not only tedious and troubleſome, but an extremely imperfect method.

In whatever way the extraneous matters have been removed from grain, it ſhould, as ſoon as the operation has been performed, eſpecially in barley and wheat, be put through a ſcreen-machine, which, in moſt of the more improved threſhing and winnowing-machines, is provided with this intention, and is thereby rendered free from all ſorts of ſmall ſeeds and other foreign matters. In this way the ova of different ſorts of inſects are alſo removed, and the production of the weevil, moth, beetle, &c. prevented, as well as the deſtruction which they commit while in their vermicular ſtate, guarded againſt.

Screen machines may be had ſeparately from the others; but the work of cleaning the grain is the moſt readily, cheaply, and conveniently performed, where they are connected with the other neceſſary machinery.

It has been ſuggeſted, that as the prevention of all ſorts of corn from being affected by the different cauſes that have a tendency to injure it, when laid up for the purpoſe of keeping, depends upon its being put by in a perfectly dry condition, and on its being afterwards preſerved in that ſituation; it is of much conſequence, in theſe views, to keep it, from the period of its being threſhed out of the ſtraw, as much as poſſible from coming in contact with the earth, ſtone, or any other ſorts of floors that are placed near to, or upon the ground, as they have conſtantly a great diſpoſition to communicate moiſture, and in that way injure the grain that reſts upon them.

It is likewiſe found to be a highly beneficial practice to prevent, as much as poſſible, the entrance of the atmoſpheric air, whenever it is much loaded with humidity; as from the vaſt extent of ſurface that is expoſed to its action, it is eaſy to perceive that it muſt be highly prejudicial to the corn, by imparting its moiſture to it, as a ſort of mucor, or mouldineſs, is thereby brought on, that is attended with a muſty diſguſting ſmell, and that prevents its keeping in a proper manner. In regard to the means of prevention, they muſt be different in different caſes; but much may be done in the firſt of the above ſituations, by cautiouſly avoiding the too general practices of permitting the corn to remain upon the threſhing-floors in the barns, particularly where they are of the earthy or ſtoney kinds, too long after it is threſhed out, before it is cleaned from the chaff, and other uſeleſs matters: or, after it has been cleaned, by preventing its being depoſited upon them, either in the looſe ſtate, or in ſacks. And farther, by having great regard to the dryneſs of the air when the buſineſs is performed.

In inſtances of the latter kind much is capable of being accompliſhed by having proper apparatus, ſuch as ſlides, ſhutters, and other ſuitable contrivances, fixed in the pipes, funnels, and other openings, deſigned for the purpoſe of ventilation in the corn-chambers and granaries; which ſhould be preſerved, conſtantly ſhut in a cloſe manner at all times when the air is much impregnated with watery particles, ſo as to prove hurtful to the grain. Damp and froſty weather are, of courſe, always improper for expoſing grain to the air in, as it muſt, in ſuch ſeaſons, do great miſchief. But, beſides air, light is eſſential in the preſervation of grain in theſe circumſtances, as, where it is not admitted pretty freely, a kind of vegetable mucor, or mould, as already noticed, is liable to fix upon the grain, and injure it greatly. The ingenious author of the "Philoſophy of Gardening and Agriculture," has remarked, that this poſſeſſes the ſame property as that of other funguſes, of growing where there is ſcarcely any change of air, and in places where there is little or no light, provided there be the neceſſary degree of warmth and moiſture. On the ſame principle, with the intention of retaining the grain in a ſtate as free as poſſible from dampneſs, it is ſuggeſted by the ſame writer, that it might be uſeful to have well conſtructed ſtoves in the bottom parts of corn-chambers and granaries, for the purpoſe of occaſionally communicating ſuch moderate degrees of heat to the grain as would be ſufficient to dry up and expel any injurious moiſture that it might have attracted in damp wet ſeaſons. On this idea it has, indeed, long ago been recommended as ſupported by experience by Mr. Tull, to preſerve wheat, by expoſing it to the action of a ſun-ſhine degree of heat upon a hair-cloth, in a malt-kiln, produced by the combuſtion of clean ſtraw, for ſuch a length of time as may be neceſſary to remove the dampneſs, as from four or five to ten or twelve hours, according to the proportion in which it may exiſt. But in this method the heat ſhould be conſtantly kept ſo moderate as not to deſtroy the vegetative property, or life of the grain, as, if that were the caſe, its putrefaction and decay would be promoted. The degrees of heat that would be the moſt adapted to anſwer the purpoſe, in different caſes, would be eaſily regulated by thoſe inſtruments which are in general uſe for meaſuring the heat and moiſture of the atmoſphere. Theſe principles aſſiſt us much in reconciling the differences of opinion that have ſo long prevailed in reſpect to the uſe of air in the preſervation of corn in granaries, as they ſufficiently ſhow, that when admitted in its perfectly dry and elaſtic ſtate, it muſt be particularly uſeful in carrying off any moiſture or diſagreeable ſmell that the grain may have contracted by remaining cloſely heaped together for ſome length of time; as, by the ſtirring that moſtly accompanies the ventilation, it muſt neceſſarily operate in a very extenſive manner; but that when applied in its moiſt heavy ſtate, it muſt be detrimental in an equally proportionate degree, by imparting its humidity to the grain, and thereby cauſing a ſort of muſtineſs.

It is probable that the ventilation of grain is the moſt completely effected by ſtirring it by means of proper ſlides, doors, or other ſimilar contrivances made in the floors, windows, and other openings of the granaries or corn-chambers; but it is capable of being accompliſhed in a more ſlow and leſs economical manner by ſhovels, rakes, and other ſimilar tools. And in order that the work may be more readily and more effectually performed, the grain ſhould not be ſpread out too thickly over the floors of the granaries and corn-rooms. From one to two feet, or two feet and a half in depth, is conſidered fully ſufficient for the purpoſe, in proportion as it becomes more dry and the moiſture more diſſipated. When grain is heaped together to too great a thickneſs at firſt, from the natural moiſture which it contains, it is frequently apt to heat, and thereby greatly injure the ſample. Frequent ſcreening ſhould likewiſe be had recourſe to immediately after its being depoſited in the corn-rooms, and occaſionally at other times as circumſtances may demand.

Other points have been ſuggeſted by Doctor Darwin, as neceſſary to be attended to in this buſineſs, in order to perform it in the moſt effectual manner; ſuch as thoſe of having the doors, windows, and other principal apertures of the buildings placed in ſuch a manner as to face the ſouth, and as cloſe to the ceiling as poſſible, ſo that the rays of the ſun may enter with the greateſt freedom. And in addition, the linings of all ſuch corn-rooms ſhould conſtantly be formed of ſuch materials, as have no tendency from their coldneſs to precipitate the moiſture from the atmoſphere, which is frequently the caſe with particular ſubſtances, when warm, damp, ſouth-weſt winds take place after cold or eaſt ones, and in that way impart it to the grain that comes in contact with them. It is alſo equally neceſſary in all ſuch caſes that the entrance of wet and moiſture ſhould be prevented in an effectual manner, by having recourſe to proper ſheltering boards, ſlides, and other contrivances of the ſame kind.

There is likewiſe a particular ſort of management neceſſary in the turning over and ſtirring of grain in order to its complete ventilation, as when the corn is firſt placed in the rooms it ſtands in need of much more frequent turning over than afterwards, when it has parted with a conſiderable proportion of its moiſture and is become ſomewhat dry. For the firſt month or ſix weeks, once or twice in every week or ten days may be ſufficient to anſwer the purpoſe; but afterwards for four or five months longer, about once in the fortnight may commonly be ſufficient, and from that period only once in the month, except when the ſeaſon proves very moiſt, warm, and of courſe improper for keeping the grain well.

In order to accompliſh this buſineſs different methods are in uſe; it is the cuſtom in ſome places to have empty ſpaces left on the ſides of the heaps of grain and other parts into which they may be turned over when neceſſary; while in others, ſquare holes are formed in the ends of the floors, and round ones in the middle, by which means the grain is thrown from the upper to the lower chambers, and back again, and of courſe becomes agitated and expoſed to the air in a more perfect manner. This is a method that is practiſed with ſucceſs in ſome parts of the county of Kent. As, however, in theſe modes ſuch frequent turnings are not only extremely troubleſome, but expenſive, in conſequence, eſpecially in the firſt caſe, of being performed by the ſhovel, the plan of having ſliding ſhutters in the middle of the different floors ſo contrived, as to have an inclination towards the centre of the granaries, has been had recourſe to; by the occaſional removal of which, and the opening of the windows and ventilators, the grain is turned and expoſed to the influence of the air at the ſame time with great eaſe, convenience, and diſpatch.

This mode of preſerving grain was long ago found by Monſieur du Hamel to anſwer perfectly well, even in caſes where it had been laid up in a moiſt, damp, and improper ſtate.

There can be no doubt, however, but that grain may be preſerved without having recourſe to the means of ventilation, by depoſiting it, when in a perfectly dry ſtate, in deep wells, pits, and caverns that are free from any ſort of damp and moiſture, and ſo far below the ſurface of the ground that it cannot be affected by the heat or the changes that take place in the ſeaſons. But though grain has been known to have been preſerved in this manner for a great length of time in thoſe countries where it is the practice to have it ſtored up for times of ſcarcity, it is by no means either a very ſafe or convenient method.

It muſt be obſerved, however, that in whatever manner grain is ſecured, it is eſſentially neceſſary that care ſhould be taken that ſuch portions as are in a ſoft damp ſtate, or which have been badly harveſted, ſhould not, on any account be laid up with that which is in a dry condition and perfectly ſound; as from the quantity of moiſture that is contained in it, and the tendency to germination that takes place in conſequence of it, a muſty bad ſmell is liable to be imparted to the whole, and the ſample either totally or in a great degree deſtroyed.

The practice of expoſing grain to the free action of the atmoſpheric air, has been diſcarded by ſome in conſequence of the ova or eggs of inſects being liable in that way to be depoſited among the grain, but it would ſeem more probable, when the economy of ſuch inſects is well conſidered, that their ova were either depoſited originally among the grain in ſuch ſituations, or brought in with different parcels of it from different places. On this account it is evident that great caution ſhould be uſed in furniſhing freſh parcels of grain for being laid up, and that the ſcreen ſhould be conſtantly employed before putting it into the rooms.

It is, however, pretty certain that where grain is to be preſerved for much length of time, though it may without doubt be ſafely kept in the ways that have been already mentioned; yet it is moſt probably not only a much better, but more certain and economical method to let it remain unthreſhed from the ear in the ſtacks in which it has been built, particularly where they reſt upon ſtaddles that are properly conſtructed for the purpoſe.

It may be proper to obſerve, that where grain is to be long preſerved after being threſhed out, there ſhould always be proper buildings of the granary kind provided for its reception, the ſizes of which ſhould be proportioned to the extent of the farm, being conſtantly adequate to contain about one-half of the grain-produce after it has been threſhed out and cleaned.

In caſes where the grain is ground and preſerved afterwards in the ſtate of meal, it is the uſual and by far the beſt mode to pack it very cloſely by means of treading or ramming it into dry, cloſe, ſmall rooms, or large cheſts, as, in this way, when laid up in a proper condition, it will keep for a very great length of time quite ſafe and free from miſchief.

But, notwithſtanding the cuſtom of preſerving grain in ſtacks and granaries, from the convenience of it, may, in ſome inſtances, be beneficial, not only to the farmer, but the public, and, conſequently, in ſome meaſure neceſſary, it is clear from the trials that have been already made, that the ſtoring of grain in either way ſhould be carried to as ſmall an extent as poſſible, as it has been aſcertained that there is a conſtant decreaſe taking place in its weight from the period at which it has been harveſted or laid up, but that this loſs is far greater at firſt, than after it has been kept ſome time.

In the ſecond volume of the new edition of Georgical

Eſſays, publiſhed by Doctor Hunter, the loſs is ſtated by Mr. Holt to be in the following proportions in different ſorts of grain :

In Wheat.

	lb.	*oz.*	*drs.*
On being rubbed out in the hot-ſun, and weighed the 31ſt of Auguſt, 1789, ſoon after being cut, afforded	0	2	11
On being weighed again on the 18th of October	0	2	7
Loſs of weight, *per* buſhel, of 70lbs. nearly	6	8	3
Or almoſt one-tenth of the whole in forty days.			
Of this wheat, thirty-two grains weighed one penny-weight.			

It is, however, remarked, that this is the greateſt poſſible loſs that the grain can ſuſtain, as though it was in a full ſtate of maturity or ripeneſs, it had neither had the benefit of being dried by expoſure to the ſun after being cut, nor undergone the proceſs of fermentation after it was put together.

In Wheat.

	lb.	*oz.*	*drs.*
Another quantity, weighed on the 22d of October, produced	0	6	3
Weighed again 24 days afterwards, afforded	0	6	0
Loſs in that time *per* buſhel, at the rate of	2	11	15
A further quantity, weighed on the 8th of January, 1790, produced	0	2	2
Loſs *per* buſhel, on being weighed again 32 days afterwards, at the rate of	2	0	15

In Barley.

On being weighed on the 2d of September, under ſimilar circumſtances, produced	0	2	2
On being weighed again on October the 18th, afforded	0	1	12
Loſs of weight *per* buſhel of 60 lbs.	8	4	22
Or about one-ſeventh of the whole in 47 days.			
Twenty-four grains of this barley were found to weigh one penny-weight two grains.			

In Oats.

With this ſort of grain no experiment appears to have been made by the writer, but there can be no doubt but that the loſs muſt be equally great as in any of the other ſorts.

The reſults of theſe trials render it ſufficiently evident, that the more expeditiouſly grain is brought to the market, the leſs is the loſs which is ſuſtained by the cultivator. Of courſe it ſhould never be laid up or kept in any other way longer than circumſtances render it neceſſary. But in addition to the loſs that has been ſeen to occur from the gradual diminution in the weight of the grain in conſequence of the diſſipation of the more moiſt particles which it contains, there are others that ariſe occaſionally from the ravages of different kinds of vermin, and the effects of damps, muſtineſs, and ſeveral other cauſes.

In regard to the preſervation of grain from the depredations of inſects, and other ſimilar animals, it may probably be the beſt accompliſhed by a timely and frequent uſe of the ſcreen, with proper ventilation, as has been noticed above. Where the injury is produced by the weevil, the moth, or the beetle, it has always ceaſed at the period when theſe vermin appear, as they are, when in this ſtate of exiſtence, merely propagators of their ſeveral reſpective kinds of vermiculi, which, while they continued in that ſtate or form, produced the injury.

In their ultimate or inſect ſtate they eat or conſume very little, their buſineſs being principally that of depoſiting their ova or eggs, which they do by a ſort of unerring inſtinct, in ſituations where the large collections of grain are ſure to furniſh food for their ſucceſſors during the period in which they are in the vermicular ſtate. It is conſequently a matter of great moment to prevent the generation of them, by the deſtruction of the eggs before they are hatched, which is uſually the beſt performed by having recourſe to the ſcreen, and expoſure to a free air, as has been already ſhewn. The frequent ſtirring of the grain breaks the coheſion of their ova, by which the nidus of ſuch minute vermiculi is deſtroyed, as on hatching they collect together, and ſpin or weave numerous neſts of a cob-web-like ſubſtance for their own ſecurity and protection. And a great number of grains are attached together by them to theſe neſts, by an infinity of ſmall threads, both for their ſafety and food. Conſequently, when their habitations are broken and ſeparated by the uſe of the ſcreen, they fall through its ſmall interſtices, and are capable of being eaſily removed with the duſt and other refuſe matters: and ſuch as eſcape the early ſcreenings are deſtroyed by thoſe that follow, and the grain of courſe little injured by the operation, being only rendered more clean and free from impurities. See HARVESTING *of Grain*, REAPING *of Grain*, and STACKING *of Grain*.

GRAIN is alſo applied to the fruits or ſeeds of divers plants, as a grain of millet, of pepper, &c.

GRAIN is alſo extended to a minute body, or parcel of a body pulverized. In which ſenſe we ſay, a grain of ſand, a grain of ſalt, a grain of gunpowder, &c.

GRAIN denotes alſo a ſmall weight, uſed in eſtimating divers ſubſtances.

The grain is the ſmalleſt of all weights known in England. It is taken from the weight of a grain of wheat, gathered out of the middle of the ear, and well dried. By ſtat. 12 Henry VII. cap 7. every ſterling or penny-weight was to weigh thirty-two ſuch grains; but now twenty-four grains make a penny-weight, and twenty penny-weights an ounce. See PENNY and WEIGHT.

The grain is troy weight, and uſed in the weighing of gold, ſilver, jewels, bread, and liquors.

Among the ancients, the grain was the fourth part of the ſiliqua, or twelfth of the obolus, and the twenty-ſecond of the drachma. It coincided with lens.

Fernelius, lib. iv. cap. 6. Method. Medend. affirms it as a thing known and certain, that the grain is of the ſame weight every where: but he is miſtaken. Mr. Greaves, in his treatiſe of the Denarius, in his Miſcell. Works, vol. i. p. 276. has ſhewn, that 179 Dutch grains, which Snellius had found to be the weight of a Philip of gold, only amount to 134½ Engliſh grains. Add, that Monſ. Perrault has computed the French grain to be leſs than the Engliſh, and yet bigger than the Dutch; to the Engliſh, it is as 158 to 134½; and to that of Holland, as 158 to 179. See WEIGHT.

The grain uſed by the apothecaries is the ſame with that of the goldſmiths; though they make a difference in the weights raiſed from it. Thus, 20 grains, with them, make a ſcruple, ℈; 3 ſcruples, a drachm, ʒ; 8 drachms, an ounce, ℥, &c.

The carat uſed in eſtimating the fineneſs of gold, as well as in weighing diamonds and precious ſtones, is alſo divided into four grains; and the carat is about the one hundredth and fiftieth part of an ounce troy, according to Mr. Jeffreys, in his treatiſe on Diamonds and Pearls.

Hence, the jewellers' grain is to the troy grain, inverſely, as 600 is to 480, that is, directly as four to five.

Grain, in Engliſh troy and apothecaries weight, is the 480th part of a troy pound = 20 mites = 480 droits = 9600 periots = 230400 blacks, of the aſſayiſts, = .820386 French grains = .06475 grammes of the new weights of France = .000142857 pounds avoirdupoiſe.

Grain, a weight in France, = 1.21893 Engliſh troy grains = .00017413 Engliſh pounds avoirdupoiſe = .0531217 grammes of the new weights.

Grain is alſo uſed for the figure or repreſentation of grains on ſtones, ſtuffs, leathers, &c. Thus we ſay, morocco has a bolder and richer, that is, a larger grain, than ſhagreen.

In ſome marbles, the grain is very fine; in others coarſer. Steel is known by its grain, which is much finer than that of iron.

Grain, in *Mining*, is applied by quarry-men and maſons to the minute figures in moſt blocks of ſtone, by which they are diſpoſed to ſplit moſt eaſily in ſome certain direction, than in any other, as wood is diſpoſed to ſplit in the direction of its grain. Beat, ſheet, lamella, and ſtratula, are other terms of almoſt ſimilar import. Experienced maſons can generally diſcover the grain of the moſt homogeneous or perfect free-ſtone blocks, or ſuch as will cut with equal eaſe in any direction, and this they often do, by obſerving the directions of the very minute plates of mica, or ſilver, as they call it, which are frequently found arranged, in the ſtone, in the direction of the grain, or beat of the ſtone; which, it muſt be obſerved, is not always that of the beds or ſtratification, many rocks having ſtratula which croſs their beds obliquely, often at an angle, of from 30° to 45° with the bed or plane of the ſtratum; and ſuch ſtratula, not uncommonly, diſpoſe the ſtone to ſplit into flags or paviers or even tile-ſtones, or ſlates for houſes, and into the moſt thin and perfect lamina. Sometimes theſe oblique ſtratula croſs ſtone beds of very great thickneſs, and have been frequently miſtaken, by inattentive obſervers, for the ſtratification itſelf, as Mr. Kirwan obſerves of the argillites or ſlates, p. 283 of his "Geological Eſſays." See Stratula and Strata.

Grain, *Cochineal.* See Cochineal.

Grain, *Scarlet.* See Scarlet.

Grain, *Oily*, in *Botany*. See Myagrum.

Grain, *Tin.* See Streaming and Tin.

Grains, in the *Materia Medica*, or the ſeeds of vegetables, are diſtinguiſhed into emulſive, which yield a conſiderable quantity of mucilage and oil, which may be ſeparately extracted from them; ſuch are almonds, and the ſeeds of almoſt all fruits; and farinaceous, which are entirely compoſed of a dry ſubſtance, eaſily reducible into a fine powder, called meal. Of this kind are the grains of all graminous and leguminous plants.

Grains, in *Rural Economy*, a term applied to the remains of different ſubſtances of the grain kind after they have been employed in the brewing of beer, or the diſtillation of ſpirituous liquors. They are in much uſe by the farmers and cow-keepers near large towns for the feeding of various deſcriptions of domeſtic animals, ſuch as milch cows, hogs, fowls, geeſe, ducks, &c. as well as ſometimes for the fattening of neat cattle. In this laſt intention, it is however neceſſary to mix other ſubſtances with them, ſuch as good pollard, coarſe ground oatmeal, &c. It muſt be obſerved, that theſe matters can only be made uſe of while they are in a freſh ſtate with advantage. It is of courſe neceſſary, particularly during the more hot ſummer months, to employ ſuch means as are proper for preventing their running into a ſtate of fermentation, which would render them wholly uſeleſs. This is uſually effected by having them well preſſed and trodden down into large vats and ciſterns formed deeply in the ground, and covered from the action of the air. In this way they may be kept perfectly ſweet and fit for uſe for a conſiderable length of time. See Cow-keeping and Stall Feeding.

Grains *of Paradiſe.* See Medea.

Grain-*Coaſt*, *Malaguetta*, or *Pepper-Coaſt*, in *Geography*, a country of Guinea, extending about 300 miles along the coaſt of the Atlantic from the vicinity of Cape Palmos to that of the river Meſurada, but its limits are not preciſely aſcertained; and bounded by the country of the Foulahs, or the Sierra Leona country on the weſt, and the Ivory Coaſt on the ſouth-eaſt. It derives its name from the great quantity of Guinea pepper which it produces. The climate is inſalubrious, and is found to be particularly noxious to Europeans. The productions of this country are peaſe, beans, gourds, lemons, oranges, bananas, and a kind of nut with a thick ſhell, which is a moſt delicious fruit. The palm-wine and dates are in high perfection; cows, hogs, ſheep, and goats, are very plentiful; but this country derives its chief wealth from the abundance of Guinea pepper, or grains of Paradiſe, called Malaguetta by the Portugueſe, which it produces. It ſupplies alſo a conſiderable quantity of pimento. Its commerce has alſo very much conſiſted in ivory and ſlaves. The natives are reckoned temperate and abſtemious; but they are ſaid to allow Europeans every kind of familiarity with their females, and to invite them to love-banquets with their own wives and daughters. They are actuated in common with other negroes, by an invincible propenſity to ſteal, not only from ſtrangers and foreigners, but from the neareſt of their own kindred. Their language is peculiar to themſelves, and difficult of attainment. Their trade is carried on by ſigns and tokens, ſome of which are not very decent. The natives are, in general, well-formed, and handſome in their perſons and features. Their common dreſs is a "paan," or unſhaped piece of cloth round the waiſt. They are extremely ſubject to hernias and ruptures. They have among them ſome excellent mechanics, ſome of whom underſtand and practiſe the art of tempering ſteel, making arms, and all ſteel inſtruments, and conſtructing canoes; others have introduced improvements in huſbandry, particularly with reſpect to the method of cultivating rice, millet, and Guinea pepper. Their king, called "taba," "taba ſcyle," or "taba ſcil," exerciſes deſpotic authority over his ſubjects, and never appears abroad without the utmoſt pomp and magnificence; and he receives from the people a degree of veneration and awe, which belongs to ſuperior beings. They are ſaid to be believers in a future ſtate, which appears by the ceremonies performed to the ſouls of the deceaſed, and the prayers they offer for a happy meeting in another world. They welcome the new moon with ſongs, dancing, and every kind of diverſion; and their ſuperſtitious regard for ſorcerers is extreme.

The ſole employment of many of the negroes, eſpecially about the river Seſtos, is fiſhing, which they perform in their canoes by a hand-line and hook. The artiſts of Seſtos are alſo peculiarly expert in their manufacture of iron and metals.

The Portugueſe poſſeſſed for many years an independent and uncontrouled connection with this country; but in the year 1664 the Engliſh and Dutch, perceiving the advantages which were derived from their commerce, interfered, and their rivals prevailed to ſuch a degree as to drive the Portugueſe ſettlers into the interior parts of the country, where they united themſelves with the natives; and from this intercourſe ſprung that mixed progeny of Mulattoes, who are more numerous here than in any part of Guinea. The ſmall remnant of trade now poſſeſſed by the Portugueſe is entruſted with theſe perſons, to whom they give the appellation of the hidalgos or gentlemen, having proſelyted them to their forms of Chriſtian faith and practice, and initiated ſome of them into holy orders, whom they employ in propagating their notions of Chriſtianity.

The months moſt favourable to trade on this coaſt are February, March, and April; ſmall veſſels, which are capable of ſailing up the rivers into the country, are more convenient than large ſhips; and it ſhould be recollected, that the S.S.E. winds begin to blow in the month of May, and they bring with them heavy rains and tornadoes, with terrible thunder and lightning, extremely dangerous to ſhipping.

GRAINE, an iſland in the mouth of the river Thames, about 3½ miles long, and 2½ broad, ſeparated from the coaſt of Kent by a narrow channel, called the "Stray," or "Yenlade." It is low, flat, and marſhy, and has upon it only a number of detached huts, with ſome ſalt works. N. lat. 51° 27′. E. long. 0° 42′.

GRAINED MEDALS. See MEDAL.

Croſs GRAINED *Stuff.* See CROSS *Grained.*

GRAINGER, JAMES, in *Biography*, a phyſician and poet, was born at Dunſe, a ſmall town in the ſouth of Scotland, about the year 1723. After finiſhing his ſchool education, he was ſent to Edinburgh, where he commenced his medical ſtudies under profeſſors who were highly celebrated through the medical world, and in due time he received his degree of M. D. He commenced his profeſſional career as ſurgeon in the army, and in that capacity he ſerved in Germany, under the earl of Stair, till the peace of Aix-la-Chapelle, in 1748. He afterwards ſettled in London, and practiſed as a phyſician. He here obtained and cultivated the friendſhip of ſeveral diſtinguiſhed literary men, particularly of Shenſtone and Dr. Percy, afterwards biſhop of Dromore. While in London he publiſhed his tranſlation of the elegies of Tibullus; but this work did not receive the approbation to which he thought it entitled, eſpecially from Dr. Smollet, whoſe criticiſms were the occaſion of a long paper-war between them, and produced an irreconcileable difference. Probably his ſucceſs in practice in London was not great, as he embraced an offer of ſettling advantageouſly in the iſland of St. Chriſtopher, in the Weſt Indies; where, by marriage, he became connected with ſeveral of the principal families, and practiſed his profeſſion with great ſucceſs. He continued, however, to cultivate his attachment to the muſes, and wrote, during his leiſure hours, an intereſting poem "On the Culture of the Sugar Cane." He likewiſe compoſed a treatiſe "On the Diſeaſes of the Weſt Indies," for the uſe of the planters. At the concluſion of the war, he paid a viſit to his native country, and at the ſame time publiſhed his poem, with copious notes relative to the natural hiſtory of the iſland. He afterward returned to St. Chriſtopher's, and continued to practiſe till the beginning of the year 1767, when he was ſeized with a fever, which then raged in the iſland, and died. Dr. Grainger was benevolent in his diſpoſition, engaging in his manners, and an able phyſician: he ranks alſo conſiderably above mediocrity as a poet. An "Ode to Solitude," and "A Weſt Indian Ballad," (the latter publiſhed in Dr. Percy's collection) have been much admired. He publiſhed ſeveral medical tracts. Hutchinſon. Biog. Med.

GRAINGER, in *Geography*, a county of America, in the diſtrict of Hamilton, Teneſſee, formed of parts of the counties of Knox, Jefferſon, and Hawkins, and bounded N. by Virginia and Kentucky. Its chief town is Rutledge. It is very mountainous, interſperſed with fertile valleys. It contains 7367 inhabitants, of whom 496 are ſlaves.

GRAINING, in *Ichthyology*, the name of a fiſh found in the Merſey, near Warrington; it reſembles the dace, but is more ſlender, and has a ſtraighter back. See DACE.

GRAINING *Board* is a board uſed by the curriers, to give the grain to their leather.

It is made with teeth, or notches, running quite acroſs; into which the ſoft, moiſtened, ſuppled leather being preſſed, its ſurface readily takes the impreſſion. See CURRYING.

GRAINVILLE, in *Geography*, a town of France, in the department of the Eure, and chief place of a canton, in the diſtrict of Les Andelys. The place contains 393, and the canton 10,846 inhabitants, on a territory of 185 kiliometres, in 32 communes.

GRAKLE, in *Ornithology*. See GRACULA and PARADISEA.

GRALLÆ, the fourth order of birds, compriſing thoſe which have the bill cylindrical, and a little obtuſe; tongue entire and fleſhy; and the legs naked above the knees.

GRALLATORIÆ. See CLASSIFICATION.

GRAMAT, in *Geography*, a town of France, in the department of the Lot, and chief place of a canton, in the diſtrict of Gourdon; 22 miles N.N.E. of Cahors. N. lat. 44° 47′. E. long. 1° 49′. The place contains 1842, and the canton 9888 inhabitants, on a territory of 275 kiliometres, in nine communes.

GRAMAYE, JOHN BAPTIST, in *Biography*, a writer of hiſtory, was a native of Antwerp, and flouriſhed in the early part of the 17th century. He ſtudied at Louvain, and became profeſſor of rhetoric in that univerſity. He was afterwards hiſtoriographer to the Low Countries, and obtained ſome other offices of truſt and honour. He travelled through the greater parts of Germany and Italy, and proceeding from the latter country to Spain, he was made captive by an Algerine corſair and carried to Africa. How he obtained his releaſe does not appear, but his writings prove that he had been an attentive obſerver of that country. Upon his return to his native land, he travelled into Moravia and Sileſia, and in the latter province he was, by cardinal Dietrichſtein, placed at the head of a college. He died at Lubec in 1635, leaving behind him many works, which ſhew that he was unqueſtionably a man of great learning. He wrote in proſe and alſo in verſe. Of the former are "Africæ Illuſtratæ, lib. x." 4to. 1622: "Diarium Algerienſe;" "Peregrinatio Belgica;" "Antiquitates Flandriæ;" and "Hiſtoria Namurcencis." The firſt of this liſt of works contains a hiſtory of Africa from the remoteſt periods to his own times, with geographical details; and the ſecond is the reſult of local obſervation during his captivity. Moreri.

GRAMEN, in *Botany*. See GRAMINA.

GRAMEN *Murorum, Micalongiſſima*. See FESTUCA.

GRAMINA, Graſſes, a moſt natural order of plants, the fourth of Linnæus, and the fourth order of the ſecond claſs in the Genera Plantarum of Juſſieu, who chooſes to alter the appellation of it to *Gramineæ*. The Latin word *gramen* is ſuppoſed to be derived from *gradiens*, going or proceeeding along, in alluſion to the great increaſe of many of theſe plants by their creeping roots.

Juſſieu's ſecond claſs conſiſts of monocotyledonous plants with a ſuperior germen. His definition of the preſent order is as follows.

Calyx, (which he terms *glume*,) ſingle or many-flowered, encloſing, in the latter inſtance, two or more flowers, diſpoſed in two ranks in a little ſpike or ear; it is moſtly of two valves, rarely of one or of many, or altogether wanting. Each flower has a *corolla*, (called *calyx* by Juſſieu,) reſembling the before-mentioned calyx, moſtly of two valves, rarely of only one, or altogether wanting; the outer valve either beardleſs or awned. *Stamens* below the germen, of a definite number, except in the *Pariana* of Aublet, generally three, rarely two, or ſix, or one; their anthers oblong, forked at each end. *Germen* one, ſuperior, accompanied at the baſe by two little ſcales, not always evident. *Styles* often two, with two feathery ſtigmas; ſometimes one, with a ſimple or divided ſtigma. *Seed* in either inſtance ſolitary, naked, or often clothed with the permanent inner valve of the corolla. *Embryo* ſmall, attached below to the ſide of the farinaceous and much larger *albumen*. The lobe of the embryo in germination is permanent and ſeſſile along with the annexed albumen, attached on one ſide, at the bottom, to the primary ſheath which ſurrounds the plumula, or bud of the future plant.

The *roots* are fibrous and capillary. *Stems* or *culms* cylindrical, either hollow or filled with pith, jointed or ſeparated into diſtinct portions by knots, moſtly ſimple and herbaceous. *Leaves* alternate, generally ſolitary at each knot of the ſtem, ſheathing, their ſheath ſplitting down to the knot. *Flowers* either in denſe cluſters, or ſpiked upon a common *rachis*, or panicled, concealed before they arrive at maturity in the ſheath of the upper leaf. Some ſpecies are monoicous, by an abortion of ſome of the organs.

Botaniſts have differed much about the principles on which the genera of Graſſes ſhould be founded. Linnæus and Juſſieu take into conſideration the number of flowers, or rather florets, in each calyx; Haller in a great meaſure rejects this, paying regard chiefly to the figure of the parts, which indeed is of primary importance. He does not, however, ſufficiently attend to other equally important marks, as the diſtinction, for inſtance, between *Poa* and *Briza*, conſiſting in the incorporation of the ſeed of the latter with the larger valve of the corolla, and its depreſſed figure. It were to be wiſhed that the awns of graſſes were permanent and conſtant in the ſame genus, or at leaſt ſpecies, but though conſtant in ſome, as *Avena*, in others, as *Agroſtis* and *Triticum*, they are not ſufficient to diſcriminate ſpecies.

In the ſexual ſyſtem Graſſes chiefly belong to *Triandria Digynia*. Some few have proper monoecious, none dioecious, flowers, and ſeveral are polygamous, having a few male bloſſoms intermixed with perfect ones furniſhed with both ſtamens and piſtils, and were therefore referred by Linnæus to *Polygamia*. But this latter circumſtance is ſo common and variable, and cauſes ſuch unnatural ſeparations of ſpecies or genera, that botaniſts have generally agreed to pay no regard to it in this family, but to claſs all ſuch graſſes by their perfect flowers.

Linnæus remarks that "Graſſes are the moſt general of plants, conſtituting almoſt a ſixth part of all the vegetables on our globe, eſpecially in open ſituations. There they multiply, and extend themſelves by creeping roots, to a vaſt extent. In confined and woody places they ſcarcely creep, but grow erect. They are the moſt important of plants, eſpecially as affording the chief ſuſtenance of animals who feed on vegetables. They furniſh the verdure of our ſummers, and ſpread a carpet over our meadows. Their leaves are not eaſily damaged, even by our walking over them; and though winter deſtroys their foliage, and the early ſpring finds them dry and withered, they revive in a wonderful manner from apparent death. How ſolicitouſly has the Author of Nature protected theſe plants, by giving them ſuch hard ſtems, while they are perfecting their ſeed, that cattle cannot readily attack them in that ſtate! Then, on the other hand, they are ſo conſtituted, that the more their herbage is cropped, or hardly uſed, the better they thrive, and extend themſelves the more under ground. That they may be able to exiſt in almoſt every ſituation, their narrow ſpiny leaves are purpoſely contrived to inſinuate themſelves between other plants.

"The creeping roots of graſſes are formed like a tapeworm; and are moſtly fibrous, rarely tuberous or bulbous. They conſiſt of numerous joints and knots, each of which has its bud, capable of producing a new ſtem, and the more they are ſeparated by the heavy tread of cattle, the more they multiply, thus conſtituting the ſtrength of the vegetable kingdom.

"Very few graſſes have any peculiar taſte, moſt of them having the inſipidity of pot-herbs, though ſome few are fragrant, at leaſt when dry. None are dangerous or poiſonous, if we except the intoxicating ſeeds of *Lolium temulentum*. They are the moſt ſimply conſtructed of all herbs, ſcarcely any of them having thorns, prickles, tendrils, ſtings, bracteas, or other appendages. Their ſtems are with us generally ſimple; in India frequently branched. Leaves always ſimple and undivided, moſtly quite flat, and if one ſide be ſomewhat rounded, it is never that next the ſtem. The ſheath of their leaves is often crowned with a membranous ſtipula, called by ſome *ligula*, which cloſely embraces the ſtem in growing, to keep out water.

"The fructification of Graſſes is ſo different from other plants that it was judged impoſſible to reduce them to order. They were firſt divided into Corn and Graſſes, but the former differ from the latter merely in the greater ſize of their ſeeds, which compoſe the baſis of our aliment, as the ſmalleſt of the graſs-ſeeds nouriſh ſmall birds. Ray firſt examined this tribe ſcientifically, dividing them by their habits or likeneſſes, but he traced out no juſt limits. Tournefort, though a moſt eminent botaniſt, was not equal to this ſubject. Monti followed Ray, but examined the graſſes of Italy only. John Scheuchzer, at the perſuaſion of Sherard, undertook ample and minute deſcriptions of every graſs he could procure, but the herbage of all is ſo ſimilar, that his deſcriptions, till he comes to the infloreſcence, are too little contraſted. They are, however, very exact. Micheli firſt contrived a method of arrangement founded on the ſpikelets being ſimple or compound, with an attention alſo to the ſexual parts; but he ſubjoined ſome plants, termed *graminibus affines*, which have really no connection with them. If the ſexes of graſſes be attended to, their arrangement becomes leſs difficult. Their infloreſcence is either ſpiked or panicled."

The principal writers on Graſſes, beſides thoſe abovementioned, are Schreber, who wrote in German, with fine plates, coloured or uncoloured, and who is very full on their qualities and uſes; Rottböll, who deſcribed new or rare ſpecies, with plates; Linnæus the younger, in a theſis deſcribing new genera of graſſes; Hoſt, who has publiſhed three folio volumes, with excellent coloured plates in the ſtyle of Jacquin, entitled *Gramina Auſtriaca*; Leers, who in his *Flora Herbornenſis* has delineated and engraved all the graſſes of that Flora, with more exquiſite preciſion than can be found in any ſimilar performance. Stillingfleet, Curtis, and Swayne have in England publiſhed botanical and economical remarks on graſſes, the latter giving dried ſpecimens to illuſtrate them. Many ſpecies are admirably repreſented and deſcribed in the *Flora Londinenſis*, and the ſecond part of the firſt volume of the *Flora Græca* contains 50 plates of rare and curious graſſes, from the drawings of Mr. Ferdinand Bauer, which are among the moſt beautiful and perfect of their kind.

The number of genera of graſſes in Juſſieu are 60, arranged in 13 ſections, nine of which comprehend graſſes with two ſtyles, four thoſe with only one. This diſtinction however is not one of the moſt abſolute, even in the ſame genus. His ſubdiviſions are marked by the number of ſtamens, or of florets, according to what we have mentioned above.

Willdenow has in his *Triandria Digynia* 34 genera, beſides five in *Triandria Monogynia*, *Cinna* in *Monandria*, and *Nardus* in *Diandria;* he has moreover, in *Hexandria*, *Ehrharta*, and *Oryza*, in all 43. He has five genera in *Monoecia*, making 48 in the whole, beſides the polygamous ones, which after the original plan of Linnæus, he refers to *Polygamia*. We have not yet ſeen this latter part of his work. In the 14th edition of Linnæus's *Syſtema Vegetabilium* the genera of polygamous graſſes are eight, only, *Holcus*, *Cenchrus*, *Iſchæmum*, *Maniſuris*, *Ægilops*, *Spinifex*, *Andropogon*, and *Apluda*. Willdenow places *Cenchrus* in *Triandria Monogynia*, we believe with great propriety, but the genus appears unnatural with reſpect to habit, and perhaps requires to be new modelled.

Mr. R. Brown, in his *Prodromus Floræ Novæ Hollandiæ et Inſulæ Van-Diemen*, has defined 35 new genera of this natural order; *Sporobolus* ſeparated from the Linnæan *Agroſtis;* *Polypogon* of Desfontaines; *Pentapogon* of Billardiere; *Streptachne* very near *Stipa;* *Amphipogon* remarkable for having an awn to each of the five ſegments of its corolla; *Diplopogon* apparently too nearly akin to the laſt; *Aniſopogon* very near the following; *Danthonia* of Decandolle; *Glyceria* of which we have treated in its proper place; *Triodia* very near *Poa;* *Eriachne* ſomewhat akin to *Aira;* *Triraphis;* *Ectroſia;* *Eleuſine* of Gærtner; *Chloris* of Swartz; *Cœlachne* remarkable for having its imperfect flower female, not, as uſual in graſſes, male; *Chamæraphis* diſtinguiſhed from *Panicum* chiefly by the peculiarity of three ſtyles; *Orthopogon* formed of Linnæus's *Panicum compoſitum* and others; *Penniſetum* of Richard; *Neurachne* reſembling an *Alopecurus;* *Iſachne* to which belongs the *Meneritana* of Herman's Zeyl. 24; *Xerochloa* whoſe ſeed is incloſed in the *inner* paper-like valve of the corolla; *Thuarea* of Thuars in Perſoon's Synopſis; *Imperata* of Cyrilli, which is *Lagurus cylindricus* of Linnæus; *Dimeria* near *Saccharum;* *Ophiurus;* *Lepturus;* and *Hemarthria;* the three laſt ſeparated from *Rottböllia;* *Microchloa* which is *Nardus indica* of Linnæus; *Zoyſia* recently formed by Willdenow of his *Agroſtis Matrella;* *Hierochloe* of Gmelin Sibir which is *Diſarrenum* of Billardiere; *Tetrarrhena* compoſed of the *Ehrharta diſtichophylla* of Billardiere with other ſpecies; *Microlæna* his *E. ſtipoides*; *Potamophila* a water graſs near *Oryza* and *Zigania;* and finally *Leptaſpis* which has the aſpect of *Pharus latifolius*.—It is not wonderful that a country whoſe natural productions are all ſo very anomalous with reſpect to thoſe of the reſt of the world, ſhould afford ſo many novelties, even in ſo natural and well-known a family as the graſſes.

GRAMINEA, in *Antiquity*, is applied to a crown formed of graſs, *gramen*, beſtowed by the Romans on certain of their generals, in conſideration of their having ſaved or reſcued an army.

The graſſy crown, *corona graminea*, was but rarely conferred, and for ſome ſignal exploit; when, through the courage or dexterity of a general, an army reduced to the laſt extremities had been ſaved, or delivered, and the enemy put to flight.

GRAMINEOUS HERBS, among *Botaniſts*, are ſuch as have a long, narrow leaf, with no foot-ſtalk.

GRAMINIFOLIA, a name given by Dillenius to a genus of plants, called by Micheli and Linnæus zannichellia.

GRAMMAR, teaches the right uſe of language, or to ſpeak, to read, and to write a language with propriety. Particular grammar teaches the principles peculiar to any one language. Thus the Engliſh grammar aſcertains and teaches the principles which excluſively belong to, and which diſtinguiſh the Engliſh tongue. The French grammar profeſſes the ſame end with regard to the French; and this is the caſe with the grammar of any other language.

When grammar is limited to any particular language, it is employed in its humbleſt province, and may be conſidered only as a mere *mechanical art*, the rules of which are little inveſtigated, and have no other foundation than the practice of thoſe who ſpeak and write that language. But when grammar, riſing above the conſideration of any one language, compares many languages together, and by this compariſon traces the principles which are common to them, unfolding by that means the nature and origin of ſpeech, the cauſes by which it is divided into diſtinct dialects, and the analogies which facilitated the growth and determined the idioms of each: grammar, in this extenſive view, aſſumes the nature of a *ſcience*, and is juſtly diſtinguiſhed by the name of *general* or *univerſal grammar*.

That grammar claims the dignity of a ſcience, in conſequence of inveſtigating the general principles of ſpeech, is evident from the ſlighteſt conſideration. All languages, however different, have many properties in common. They have in general the ſame parts of ſpeech, becauſe the ideas or things which they expreſs exiſt with little or no variation in the nature of things. Men alſo, in all ages and countries, have the ſame organs of ſpeech, which are ſimilar in ſtructure, however modified by peculiarities of enunciation. Finally, the ſame great law of aſſociation regulates the mind of every man; and the political, moral, and religious inſtitutions, which direct the operations of this law, however remote in age and country, conſiderably reſemble each other. To theſe cauſes it is owing, that the languages of all nations, ancient and modern, are marked by a ſimilitude truly ſurpriſing; and the more cloſely they are examined, the more numerous will appear the points in which they all reſemble each other. Hence may be juſtified the concluſion, that as all the tribes of men originated in one family, ſo all the languages of men are but ramifications of one original tongue.

Grammar has uſually been divided into four departments, namely, *orthography*, *etymology*, *ſyntax*, and *proſody*. Orthography teaches to form and to ſound letters, to analyſe or combine ſyllables, or to expreſs words by their proper letters. Etymology comprehends the claſſification, the properties, or, more properly ſpeaking, the derivation and compoſition of words. Syntax preſcribes the government or the right order of words in a ſentence; while proſody directs the juſt pronunciation, the poetical conſtruction of words, or ſupplies the laws of verſification. But this diſtribution of the parts of grammar is neither uſeful nor accurate, as they are not independent of each other. Etymology is a principle neceſſary to account for phenomena in every department, and is that upon which orthography is chiefly founded. We therefore diſcard theſe diviſions of grammar, and diſtribute and confine our obſervations on this ſubject to the origin, nature, claſſification, and the properties of words.

The Origin, Nature, and Claſſification of Words.

Words have been defined articulate or ſignificant ſounds, formed by the organs of ſpeech, and uſed by common conſent as ſigns of ideas. The propriety of this definition will appear, if we attend to the mode in which words acquire their ſignification. The beſt method to teach a language, with which a youth is yet entirely unacquainted, would, if attended to, clearly unfold the nature and origin of ſpeech in general. Suppoſe a *book* is held out before him for the firſt time, an *impreſſion, phantaſm,* or *idea* of that object is thus conveyed to his mind by the organ of ſight. While this impreſſion continues, ſuppoſe farther that the *ſound* book is diſtinctly uttered; he will then have an impreſſion or idea of the ſound conveyed through the ſenſe of hearing, which will be rendered more diſtinct, if he himſelf be taught to enunciate it. The two ideas, namely, that of the *object*, and that of the *ſound* will then, if long continued, or often repeated, coaleſce in his mind, and become ſo ſtrongly connected, that the idea of the object ſhall ſuggeſt that of the ſound, book: and, on the other hand, the ſound ſhall recal the object. The principle on which this coalition is founded, is a law of the human mind, known under the name *aſſociation of ideas;* and the progreſs of the learner in connecting other ideas with other ſounds, is only a repetition of the operation, till the whole language is acquired.

From this brief deſcription, naturally follow a few inferences of importance, to be obſerved on this ſubject. *Firſt*, ſounds, though ſo cloſely connected by frequent uſe with the things ſignified, as not to be ſeparated from them even in imagination, have no natural affinity with them. Any other ſound than *book*, *moon* for inſtance, might have been aſſociated with that object in the mind of a learner, and this laſt name would as naturally, by uſe, be applied to book, as we now apply it to the object ſo known in the ſky. And this is the reaſon why the ſame idea is expreſſed by different ſounds in different countries, where each ſound is rendered equally natural and familiar by repeated aſſociations. *Secondly*, as language altogether depends on an arbitrary compact between ſound and ſenſe, there exiſt not, in any regular poliſhed tongue, ſuch words as *natural* articulate ſounds. There are, indeed, in all languages, certain ſounds indicating deſire or averſion, pleaſure or pain, but theſe are natural cries, and not articulate ſounds; and they ariſe more from the ſtructure of man as an animal, than from his rank as an intelligent being, capable of forming diſtinct ideas, and expreſſing them by articulate ſounds. Hence ſuch ſounds are common to him with inferior animals, and abound moſt among men in the ſavage ſtate, where language is leaſt formed. The above explanation farther excludes what have been called *factitious* words, or words whoſe ſound bears ſome reſemblance to the ſenſe. Some words indeed, of this kind, are ſuppoſed to exiſt in all languages; but the ſuppoſition, we venture to affirm, is erroneous, the imagined ſimilarity being altogether the effect of aſſociation. This principle, when a word is heard, inſtantly ſuggeſts its meaning, and while we overlook the ſuggeſtion, we aſcribe the ſenſe to a fancied ſimilitude between it and the ſound. Let an idea be in your mind, when you hear a *cock crow*, or a *bell toll,* and you will immediately ſuppoſe, that the ſound of the cock, or of the bell, conveyed the entertained idea. This is a deluſion preciſely ſimilar to that into which we fall reſpecting the import of factitious words. If there be any word in our language, or in any language naturally indicative of the ſenſe, it is *cuckoo;* and yet aſk a foreigner, altogether unacquainted with Engliſh, what the term means, and he will not by any means be able, from the ſound, to aſcertain the object ſignified. The word is a repetition of *coo coo*, which exiſts in Greek under the form of γοαω, and which in Perſian ſignifies the ſound made by a ſtrong emiſſion of the breath. Hence the Perſians expreſs the *ox-kind* by *caa*, which we have borrowed and confined to the female *cow*, which originally meant a *lowing* animal. In Chaldee, *cuckeo* means a *magpie*, the ſound of whoſe voice is very different from that of the cuckoo. We cannot help remarking, that if a ſimilitude between ſound and ſenſe obtained in any part of language, it would appear more manifeſt and predominant in the moſt *ancient* languages, and eſpecially in Hebrew, which we conceive by far the moſt ancient, even of the Aſiatic tongues. But we venture to affirm, that not a ſingle inſtance of the kind can be produced in that tongue. And this early ſpecimen of human language is a fair preſumption, that the principle of factitious ſounds did not in the leaſt obtain in the firſt formation of ſpeech.

From the above explanation we infer, in the *third* place, that the names of things, at firſt, were names of *individual* objects, and that man learnt in youth, to form *general* ideas, *ſolely by means of language.* Thus with reſpect to the above-mentioned youth, when he has connected the ſound book with the thing ſo called, the word is only a ſign of the individual book which was firſt preſented to him. Preſently, however, he perceives the ſame ſound applied ſucceſſively to other objects of the ſame kind; and this application leads, and in a manner *compels* him to note thoſe peculiar circumſtances which diſtinguiſh each book, and thoſe, on the other hand, which belong to that whole claſs of objects. As the ſound is not repeatedly aſſociated with the former, he *forgets*, and conſequently *overlooks* them; while he combines the ideas belonging to the claſs, and retains them in a cloſer and yet cloſer union, under the term which was his inſtrument in forming thoſe ideas. In this manner are all our *abſtract ideas* acquired; and language, as the mind riſes by means of it, from the contemplation of one to many objects, from individuals to claſſes, is the ſole inſtrument in acquiring them. Some indiſtinct idea of this proceſs was probably the circumſtance which led our celebrated grammarian, Mr. H. Tooke, to ſay, (vol. i. p. 36.) "That the compoſition of ideas was merely a contrivance of language; that the only compoſition was in the *terms*, and that they are not ideas, but merely terms which are general and abſtract." In another place, he denies the operations of the mind as influencing ſpeech, and talks of the operation of language. Theſe, and ſuch other remarks are, however, ſo palpably erroneous, that we cannot aſcribe it to ignorance or inattention in ſo enlightened a critic, but ſuppoſe them to have proceeded chiefly from a deſire which pervades his works, of rejecting the ideas of others as unjuſt, becauſe they were *known*, and conſpicuouſly diſplaying his own as right, becauſe they were *new*. The compoſition of terms in grammar, is merely the derivation or combination of terms, by ſuch laws as cuſtom or analogy have previouſly determined. Compoſition of this kind, with which a grammarian, as ſuch, has any thing to do, is as diſtinct from the compoſition of ideas, as ſound is from ſenſe, or grammar is from logic. Language has no power but what it has derived from *aſſociation;* and he who ſpeaks of the operation of language, inſtead of the operation of the mind, acts the abſurd part of a man who aſcribes to the pen, the motion of the hand which directs it. If we can judge from his works, Mr. Tooke appears not to have ſtudied the true theory of the human mind; and from the want of juſt ideas on this ſubject, he has, as we ſhall ſhew in the ſequel, plunged himſelf and his readers in deep and manifold errors.

As general or abſtract ideas, which are the chief materials of ſcience, are formed ſolely by the inſtrumentality of language, we may hence ſee the reaſon why the ſtudy of language ought to form the *baſis* in every ſyſtem of education; and why ſcience can flouriſh only among a people previouſly acquainted with the arts of eloquence and compoſition. The philoſophy of grammar, moreover, as it retraces the track of the human mind, in the formation of its ideas, through the medium of ſpeech, is the beſt guide to the knowledge of its powers and operations, and conſequently to their proper direction. Hence the only ſyſtems of metaphyſics and logic, worthy the attention of a philoſophical enquirer, are thoſe which are built on the foundation of grammatical analyſis.

But further, as words in the very commencement of every man's education denote individual objects, and become ſigns of claſſes or kinds by the ſucceſſive application of each word to many individuals of that claſs, we might conclude that in the original language of mankind, if ſolely the effect of human invention, each term at firſt was but a proper name of a thing or of a quality, and afterwards repreſented a greater number of individuals as the mind advanced in the principle of generalization. But this inference is contrary to the fact. The Hebrew tongue carries us back almoſt to the infancy of human ſociety, and, whether it be the original language of mankind or not, it preſents us with much fairer ſpecimens of what language muſt have been, than we can gather from any modern dialect. The primitive words of that language are founded upon the moſt comprehenſive analogies; and the learner, in acquiring that tongue, inſtead of being carried up from the individual to the ſpecies, and from the ſpecies to the genus, finds himſelf on the top of the moſt extenſive claſs; and in the formation of words he is made to deſcend from general to ſpecific terms, and from ſpecific terms to proper names; ſo that all the proper names which we meet with in the Hebrew records are really derived from general appellations. This phenomenon appears to us completely to annihilate the ſuppoſition, that language is ſolely the fruit of human ingenuity. Moſes, in his hiſtory, obliquely ſtates, and, with his uſual brevity, accounts for the fact: "And out of the ground the Lord God formed every beaſt of the field, and every fowl of the air, and brought them *to ſee* what he would call them: and whatſoever Adam called every living creature, that was the name thereof." The Arabic tranſlation, we apprehend, alone places this verſe in its proper light, by rendering *to ſee*, to cauſe *to ſee*, *i. e. to ſhew*. The author then intimates that God ſhewed or directed Adam in the application of names to things. And what can be more probable, than that *He*, who formed the organs of man, ſhould at firſt inſtruct man in the proper uſe of them.

Laſtly, it follows from the above explanation, that words, as they are at firſt aſſociated with ideas, are in ſtrict propriety ſigns of *ideas*, and not ſigns of *things*. For unleſs the idea be previouſly in the mind, there can be no union by aſſociation of ſenſe with ſound. The aſſociation takes place in the mind, and where the idea of the thing, and that of the ſound do not meet, there can be no formation of articulate ſound. The learner, however, is not ſenſible of any diſtinction between his ideas and the external objects which are their origin or prototypes; and he refers the ſound immediately to its prototype, without being conſcious that an impreſſion or idea of it exiſts in his mind. As, however, we know nothing of things but through the medium of our ideas, and as ideas muſt depend for their properties and diſtinction upon the things they repreſent, the above overſight is not productive of any error or inconvenience; and we may ſay that words are ſigns of things, or of the ideas of things, without any prejudice to philoſophical accuracy. This leads us to the claſſification of ſpeech, or its diviſion into parts.

The common diſtribution in our own tongue is into *nouns*, *articles*, *adjectives*, *pronouns*, *verbs*, *participles*, *adverbs*, *prepoſitions*, *conjunctions*, and *interjections*. This diviſion has obtained with little variation in other modern languages, and has been derived, on the authority of ancient grammarians, from the languages of Greece and Rome. The above claſſification, however general and convenient in a popular view, is by no means to be admitted in a philoſophical grammar. And the few writers of this kind in Engliſh, or other tongues, have been ſenſible of the inaccuracy of the popular diviſion. The Oriental grammarians admit only *three parts* of ſpeech, the verb, the noun, and particles derived from theſe. Plato, whoſe notion of language as a ſcience muſt have been formed in Egypt, mentions only two, the noun and the verb; tom. i. p. 261. Edit. Ser. And Ariſtotle mentions no more, where he treats of propoſitions. (De Inter. c. 2.) But Mr. Harris, Herm. p. 38. thinks that thoſe philoſophers were not ignorant of the other parts of ſpeech, but ſpoke with reference to logic or dialectics, conſidering the eſſence of ſpeech as contained in theſe two, becauſe they alone combined to make a perfect aſſertive ſentence, which none of the reſt without them are able to effect. But Ariſtotle, in his treatiſe of Poetry, where he was to lay down the elements of a more variegated ſpeech, adds the *article* and *conjunction* to the noun and verb. The latter Stoics, improving on the authority of Ariſtotle, inſtead of *four* parts, made *five*, by dividing the noun into the *appellative* and *proper*. Others increaſed the number, by detaching the *pronoun* from the *noun*; the *participle* and *adverb* from the verb; and the *prepoſition* from the conjunction. The Latin grammarians went farther, and detached the interjection from the adverb, within which by the Greeks it was always included as a ſpecies.

Mr. Harris, following Ariſtotle and the elder Stoics, divides ſpeech into words that are ſignificant as *principals*, and thoſe which are ſignificant as *acceſſories*, including under the former claſs *ſubſtantives* and *attributives*, and under the latter *definitives* and *connectives*. This diſtribution is ſet aſide and ridiculed by Mr. Tooke, who ſays, vol. i. p. 47; "In Engliſh, and in all languages, there are only two ſorts of words, which are neceſſary for the communication of our thoughts, and they are noun and verb. And as to the parts of ſpeech, they may be either *two* or *twenty*, or more. In the ſtrict ſenſe of the term, both the neceſſary words and the abbreviations are all of them parts of ſpeech; becauſe they are all uſeful in language, and each has a different manner of ſignification. But I think it of great conſequence, both to knowledge and to languages, to keep the words employed for the different purpoſes of ſpeech as diſtinct as poſſible. And therefore I am inclined to allow that rank only to *neceſſary* words: and to include all the others, which are not neceſſary to ſpeech, but merely *ſubſtitutes* of the firſt ſort, under the title of *abbreviations*." In this boaſted diviſion, as we ſhall preſently ſee, there is neither utility nor accuracy, and the author was betrayed to it by a ſecret wiſh to place the novelty of his own ſyſtem in the moſt conſpicuous light, namely, that conjunctions and prepoſitions are but abbreviations of nouns and verbs.

Now it is ſingular, that the diviſion which we think the moſt philoſophical, and, therefore, the moſt ſimple and uſeful, is that which is thus proſcribed in a very laboured treatiſe on grammar, in the Encyclopædia Britannica, (article 11.) "The diviſion of words into thoſe which are *ſignificant of themſelves,* and thoſe which are *ſignificant by relation,* is abſolute nonſenſe, and has been productive of much error and myſtery in ſome of the moſt celebrated treatiſes on grammar. It is indeed probable, that any attempt to eſtabliſh a different claſſification of the parts of ſpeech, from that which is commonly received, will be found of little utility, either in *practice* or in *ſpeculation.* As far as the *former* is concerned, the vulgar diviſion ſeems ſufficiently commodious; for every man who knows any thing, knows when he uſes a noun, and when a verb. With reſpect to the *latter,* not to mention that all the grammarians, from Ariſtotle to Horne Tooke, have differed on the ſubject; it ſhould ſeem to be of more importance, after having aſcertained, with preciſion, the nature of each ſpecies of words, to determine in what circumſtances they differ than in what they agree."

If theſe remarks be juſt, any attempt at a philoſophical arrangement of the parts of language muſt be frivolous and uſeleſs. But we regard the paragraph as a manifeſt acknowledgment that the writer knew of no ſuch arrangement, and that, as is often the caſe, he endeavours to conſole himſelf and his readers, under the abſence of this knowledge, with the conſideration that if attained it would not be uſeful. We ſhall, however, attempt briefly to do what he thinks unneceſſary to be done: but what we think not only uſeful and neceſſary, but even eſſential, in a philoſophical treatiſe. An accurate diſtribution of our words, is but an accurate diſtribution of our ideas; and as in logic we cannot think juſtly, unleſs we know how to diſtinguiſh our thoughts; ſo we cannot with preciſion reaſon in grammar, unleſs we have previouſly diſtinguiſhed the parts of ſpeech. The ſource of this diſtinction muſt be ſought in the nature of the ideas expreſſed by thoſe parts, and the enquiry, how many ſorts of words there exiſt in human language, is merely, when directed to its proper object, how many ſorts of ideas there are in human knowledge.

We have then ideas of *things:* we have ideas of the *properties* or *attributes* of things: we have ideas of the *connection* of things, *i. e.* of the arrangement of things, or of their increaſe or diminution: finally, we have ideas of the *relation* of things. Nor have we an idea which may not rank with one of theſe claſſes. And as language conſiſts of terms expreſſing ideas, it conſiſts of terms which expreſs either ideas of *things* or the *attributes* of things, or the *connection* of things, or the *relation* of things. The terms expreſſing things are *nouns,* including ſubſtantives and the perſonal pronouns, which are only *ſubſtitutes* for nouns, and therefore, in their nature, names of things. *Sweet* is an attribute of ſugar, and ſo is *to think* an attribute of a man; *to fly* of a bird; *to be* of a being that exiſts, and ſo, moreover, *loving, hating,* are attributes of ſome creatures ſuſceptible of love and hatred; finally, the circumſtances which define things or diſtinguiſh them from others, may be conſidered as attributes or properties of the things ſo defined. The terms expreſſing attributes may be called *attributives;* and include adjectives, verbs, adverbs, participles, and definitives. The terms expreſſing the relations of things are prepoſitions; while thoſe which expreſs the connection of things are conjunctions. And thus the moſt comprehenſive, and, as we conceive, the moſt philoſophical diviſion of ſpeech is into four parts, *nouns, attributives, prepoſitions,* and *conjunctions* or *connectives;* nor is there any language, however few or numerous its terms may be, which is not capable of being diſtributed into theſe four claſſes. As to the *interjection,* it muſt be regarded as a ſound which is either inarticulate, or which, as far as it partakes of articulation, partakes of the nature of a noun or of a verb. Having noted this diſtribution, we, as not ſyſtematically writing on grammar, ſhall, in our remarks, follow the popular diviſion.

Nouns and attributives, to uſe Mr. Harris's language, are ſignificant as *principals,* and we do not depart from philoſophical accuracy, when we ſay that prepoſitions and connectives are ſignificant by *relation.* Our notions of the relations and connections of things ariſe by the principle of abſtraction from our notions of the things themſelves ſo related or connected. If all ideas of things or actions were obliterated from our minds, the ideas of their aſſociated relations would be entirely obliterated with them. And as our notions of relation ſpring from the objects ſo related, ſo language, following the riſe and progreſs of ideas, has derived thoſe terms which expreſs relations and connections, from the terms expreſſing the things and operations ſo related and connected. In other words, prepoſitions and conjunctions are words which, by aſſociation, flowed from nouns and verbs as their real ſources. If this be correct, what ſhall we ſay to Mr. H. Tooke, who affirms prepoſitions, conjunctions, and other particles, to be ſubſtitutes for thoſe neceſſary words, the noun and verb. If this aſſertion be put in clear language, it means that the relations of things, or of the operations of things, are *ſubſtitutes* for the things ſo related; that is, the relation of *cauſe* and *effect* is a ſubſtitute for cauſe and effect; the relation of *beginning* is a ſubſtitute for things which begin; the relation of *inſtrumentality* is a ſubſtitute for that which is inſtrumental; and the relation of *end* is a ſubſtitute for that which ends. Moreover, the ſeparation or concatenation of two or more aſſertions is a ſubſtitute for the operations ſo ſeparated or connected. This is not philoſophical reaſoning, calculated to throw light on language, but a ſophiſtry calculated to confound the moſt diſtinct ideas which the human mind is capable of forming, and a jargon not to be equalled by any error or contradiction, which Mr. Tooke has ſo ſeverely cenſured and ridiculed in Mr. Harris. Beſides, terms to expreſs the relations and connections of things are not leſs neceſſary than thoſe which denote things and their operations. A language without conjunctions and prepoſitions is not merely a ſledge, (to uſe his own words,) which cannot be drawn along as ſmoothly, and eaſily, and ſwiftly, as a carriage with wheels, but is a ſledge which has nothing to connect it with the horſe; nothing to direct it in the way along which it ſhould be dragged. The noun and the verb indeed may expreſs a complete propoſition; but the inſtances in which ſuch ſimple propoſitions occur are very few, compared with thoſe more complicated caſes where the uſe of prepoſitions and connectives is abſolutely neceſſary. The diſtribution of ſpeech into neceſſary words and abbreviations, is therefore, in this point of view, alſo frivolous and erroneous.

The Origin and Properties of Nouns.

Nouns are the names of things, or ſigns of thoſe ideas by which we come to the knowledge of things. The term is a corruption of *nomen,* which is from ονομα, while *name* came probably from the Perſian *naam,* which ſeems to be of the ſame origin with the Greek word. Nouns may be divided into three claſſes: names of *individuals,* names of *ſpecies* or *kinds,* names of *abſtract ideas.* To this may be added, as a fourth claſs, the *pronoun,* which is made the ſubſtitute or repreſentative of all other nouns. But we ſhall conſider this in the place uſually aſſigned to it by grammarians. On each of the above claſſes we beg to make a few brief remarks.

'Names of individuals do not enter into the compoſition of language; becauſe individual objects are too numerous to have each a diſtinct name; and becauſe language would then be changing in endleſs ſucceſſion, each term dying away with the object it ſignified, and another riſing to occupy its place. This is the reaſon why *proper names* cannot be tranſlated from one tongue to another, the individuals ſpecified by them, being confined to one time and one place, are not capable of being the prototypes of words in other times and places. Individuals, however, among men, animals, and places, which the purpoſes of life render it neceſſary to ſpecify, have appropriate names given them to diſtinguiſh them from all other individuals. And it ſometimes happens that when individuals among men become eminent for any attainment or profeſſion, their names are uſed to deſignate others who are eminent in the ſame way. Thus proper names are ſometimes converted into common names.' The former are called proper, as being peculiar to individuals, in oppoſition to ſuch names as are common to all the individuals of a claſs.

The perceptions of the human mind, as we have obſerved, commence with individual objects: but we are ſoon induced to compare thoſe objects; and on comparing individuals together, we readily diſcern a reſemblance between them in ſome things while they differ in others. The mind then ſeparates the particulars in which objects *differ*, and collects into one idea their points of ſimilitude. Thus it forms ideas of claſſes, or in logic called *ſpecies*, comprehending under them various individuals. After this the ſpecies themſelves ſoon become ſubjects of compariſon; and excluding from each its individual qualities, the human mind formed thoſe more general aggregates termed *kinds*, comprehending under them different ſpecies, as the ſpecies comprehend different individuals. Thus mankind claſſified all the objects around them, and acquired ſpecific and generic ideas in nature, in art, and in abſtract qualities. Having, as it is ſuppoſed, firſt advanced in the claſſification of their ideas, men gave names to each claſs, and thus acquired thoſe general terms which are called ſpecific and generic terms. But we have already ſhewn that the proceſs of the human mind, in the principle of abſtraction, is the reverſe of this: general terms do not ariſe, as will appear evident if we attend to the commencement of education in ourſelves and others, from general ideas, but, on the contrary, general ideas ariſe from general terms. The former have no exiſtence till they are generated in the mind ſolely by the inſtrumentality of language; the learner being *involuntarily* and *paſſively* led by the ſucceſſive application of the ſame word to different individuals of the ſame claſs, to compare them, to ſeparate their component parts where they differ, and to combine them where they agree. In this point of view, grammar is the foundation of logic; and language, inſtead of being the offspring of human invention, is the ſole medium of awakening the firſt dawn of intelligence in the human mind, and points for its exiſtence to ſome intelligence ſuperior to man.

Specific and generic ideas being thus formed, the ſubject matter of language is reduced, ſo as to be *commenſurate* with the limited faculties of man; becauſe, though individual objects are infinite, the claſſes comprehending them are comparatively few. The ſubject matter of ſpeech by this means, moreover, is rendered *permanent* and *univerſal*, or unconfined to points of ſpace and time; becauſe, though particular things are local and tranſient, the ſpecies and kinds of things are univerſal and eternal. This is the reaſon why words which are unintelligible in one age and country are underſtood in other ages and countries; and may be tranſlated from one tongue into another, without ambiguity or error, where the prototypes exiſt in common. Farther, though general terms are often indefinite and uncertain, yet whenever they expreſs ſpecies or kinds, they may be defined by aſcertaining the ſeveral ideas which conſtitute thoſe ſpecies or kinds. And as the properties which conſtitute each claſs are found complete in each individual of each claſs, the name of the kind is applied to each of the ſpecies; and the name of the ſpecies to each individual included under it: and thus generic and ſpecific terms are employed by the aſſiſtance of certain adjuncts hereafter to be conſidered, to denote individuals.

General ideas may be conſidered as abſtract ideas, as they are generated by the mind *ſeparating* or *abſtracting* from each object thoſe particularities which conſtitute individuality. But they are to be diſtinguiſhed, at leaſt in a grammatical view, from that numerous and important claſs of ideas which we acquire by the more ſimple act of ſeparating from a thing the quality which belongs to it. Thus, the attribute *to think* becomes *thought*; and *good* is converted into *goodneſs*. Abſtract nouns of this kind are all, without exception, derived from *verbs* and *adjectives*, and formed by the ſimple power of withdrawing a property from the ſubject which ſupports it, and giving it an independent exiſtence in the imagination. Now, it is a fact worthy of attention, that as general, ſo abſtracted, ideas are formed by the ſole agency of language, and would not have exiſted in the ſlighteſt degree, if words had not previouſly been applied to expreſs the qualities of things. For as ſoon as a property was marked by an appropriate word, the ſeparate and independent exiſtence of that word, recognized by the eye or by the ear, induced the mind, without an effort and, perhaps imperceptibly, to give the property ſo deſignated an independent exiſtence alſo. Mr. Tooke rejects the principle of abſtraction, and would introduce in the room of it what he calls *ſubaudition*. Thus, according to him, *goodneſs* is that which is good; *flying* is that which flies: and under this erroneous and circuitous mode of explaining abſtract qualities which he has borrowed from the neuter participle in Latin, he has attempted to bury out of ſight the operation of the mind in forming abſtract ideas. The exiſtence of this operation, however, is too obvious to be denied with effect, and too important, in philoſophical grammar, to be abandoned on the authority of any perſon whoſe acuteneſs of intellect may enable him ſometimes rather to perplex than to unravel truth. In conformity to his own theory, Mr. Tooke ſuppoſes ſuch words as *ſcience*, *diligence*, which are abſtract nouns, derived from the Latin *ſcientia*, *diligentia*, to be neuter participles plural in *entia*, a ſuppoſition contrary to the analogy of the Latin tongue, which affords not a ſingle inſtance of plural adjectives being converted into abſtract nouns.

We cannot help noticing in this place an obſervation in the Encyclopædia Britannica, 13; "As all the objects which exiſt muſt be either in the ſame ſtate in which they were produced by nature, or changed from their original ſtate by art, or abſtracted from ſubſtances by the powers of imagination, and conceived by the mind, as having at leaſt the capacity of being characterized by qualities; this naturally ſuggeſts a diviſion of nouns into *natural*; as *man*, *vegetable*, *tree*, &c.; *artificial*, as *houſe*, *ſhip*, *watch*, &c.; and *abſtract*, as *whiteneſs*, *motion*, *temperance*, &c." This diviſion has been borrowed from Mr. Harris, in his Hermes, and borrowed without conſideration. Abſtract ideas are the chief materials of ſcience, which, giving birth to art, extended to the productions of art, as its genuine offspring, the uſe of its own terms. Accordingly, all *artificial* terms are abſtract terms, or terms derived from adjectives and verbs. Thus, *ſtable* denotes an artificial production, and is at the ſame time an abſtract noun from *ſtabilis;* and *plough* is taken from the Hebrew פלג, *phalag*, and means an inſtrument of ſeparation. And even natural objects are often expreſſed by abſtract nouns, as *creation* from the verb *create*. And if abſtract nouns are extended by aſſociation to deſignate natural and artificial objects, they cannot with propriety be ſaid to form a claſs of nouns diſtinct from nature and art.

Abſtract nouns, expreſſing ideas properly ſo called, are very numerous in our language, and worthy of attention. They are chiefly taken from the Latin; as thoſe in *tion* or *ſion*, *ment*, *ence*, *ty*, or *tude;* as *faction*, *colluſion*, *commandment*, *conſequence*, *piety*, *altitude*. And all the nouns of this termination, with others in *nſe* and *t*, ſuch as *expanſe*, *merit*, are alſo from this ſource. Many others are derived from the Anglo-Saxon or Gothic, ſuch as all thoſe in *neſs*, *ſome*, and *hood;* as *goodneſs*, *noiſome*, *neighbourhood*. The far greater part of Mr. Tooke's ſecond volume is occupied in tracing nouns of this deſcription. His etymological reſearches are, in many reſpects, uſeful and important; but we cannot help bearing our teſtimony againſt his work, as tending to direct the labours of philological enquirers to wrong objects, and to withdraw their attention from thoſe ſources, whence Engliſh and all other European languages, ancient and modern, have ſprung. But let us hear his own words: "The bulk and foundation of the Latin language is Greek; but great part of the Latin is the language of our northern anceſtors grafted upon the Greek. And to our northern language the etymologiſt muſt go, for that part of the Latin which the Greek will not furniſh; and there, without any twiſting or turning, or ridiculous forcing and torturing of words, he will eaſily and clearly find it. We want, therefore, the teſtimony of no hiſtorians to conclude that the founders of the Roman ſtate and of the Latin tongue, came *not from Aſia, but from the north of Europe*. For the language cannot lie. And from the language of every nation we may with certainty collect its origin. In the ſame manner, even though no hiſtory of the fact had remained; and though another Virgil, and another Dionyſius, had again in verſe and proſe brought another Æneas from another Troy to ſettle modern Italy, after the deſtruction of the Roman government, yet, in ſpite of ſuch falſe hiſtory, we ſhould be able, from the modern language of the country, (which cannot poſſibly lie,) to conclude with certainty, that our northern anceſtors had again made another ſucceſsful irruption into Italy, and again grafted their own language upon the Latin, as before upon the Greek. For all the Italian which cannot be eaſily ſhewn to be Latin, can be eaſily ſhewn to be our northern language. Mr. Wakefield had, ſhortly before his death, agreed with me to undertake, in conjunction, a diviſion and ſeparation of the Latin tongue into two parts; placing together in one diviſion all that could be clearly ſhewn to be of northern extraction." (Vol. ii. p. 140.) In p. 299, he gives the following inſtances, with many others, of Latin words derived from the northern language:

Habian,	*habere*	Dilgian,	*delere*
Hnæcan,	*necare*	Malan,	*molere*
Higan,	*ire*	Erian,	*arare*
Hentan,	*hendere*	Tillian,	*tollere*
Wealopian,	*volvere*	Gnittan,	*nectere*
Fleuan,	*fluere*	Nigtan,	
Spiran,	*ſpirare*	Kerſan,	*creſcere*
Speowian,	*ſpuere*	Tekan,	*tangere*
Spitan,	*ſputare*	Deman,	*damnare*
Mileſcian,	*mulcere*	Profian,	*probare*
Meolgian,	*mulgere*	Reafian,	*rapere*
Pinan,	*punire*	Suegian,	*ſuadere*
Pyngan,	*pungere*	Biddan,	*petere.*
Fegan,	*figere*		

According to Mr. Tooke, the words in Roman letters are plainly of northern origin, while thoſe correſponding to them in italics are Latin verbs derived from them. The reverſe of this poſition we can prove to be true. The Anglo-Saxon, or Gothic words, which this author dignifies as northern primitives grafted on the Latin, are no other than Latin words borrowed and corrupted by the northern barbarians when they over-ran the Roman empire. This poſition, if proved, will render the far greater part of Mr. Tooke's labours perfectly nugatory; and nothing more is neceſſary to prove it than to ſhew that the originals of the Latin words exiſt in Greek, or in one of the Oriental tongues, and exiſt too in ſuch a form, as to evince that *theſe* are the primitives, and conſequently that the northern words are only corruptions derived from thence. Thus the Hebrew כף, *kaph*, is *a hand;* hence *capio*, to take in hand, and by ſoftening *c* into an aſpirate, as is often the caſe, *habeo*, to hold in the hand, *i. e.* to have. The Greek νικη, overthrow, is the parent of the Latin *neco*, corrupted into *hnæcan;* ειω, I go, *eo*, *higan;* χανδω, *hendo*, *hentan*, to ſeize; ειλεω, *volvo*, *wealopian*, to roll; φλυω, *fluo*, *fleuan*, to flow; שׂפ, *ſpu*, and שׂפת, *ſput*, ſignify *lips;* hence *ſpuo*, or *ſputo*, the action of the lips in throwing out of the mouth, *i. e. ſpue*, *ſpit;* μαλακιζω, to ſoften, *mulceo*, *mileſcian;* αμελγω, *mulgeo*, *meolgian*, to milk; ποινα, recompence, puniſhment, *punio*, *pinnan*, to puniſh; πυγη, a tail, *pungo*, *pyngan*, to act as a tail does, *i. e.* to prick; πηγω, *figo*, *fægan*, to fix; λουω, *leo*, *deleo*, to waſh down, to obliterate by waſhing, *dilgian;* μυλλω, molo, Goth. *malan*, to mill; Chaldean ארע, *aro*, αροω, aro, *erian*, to plow; τελλω, to riſe, tollo, *tilian;* νηθω, to ſpin, twiſt, *necto*, *gnittan*, or *nigtan;* θηγω, tego, or tango, *tekan*, to touch; δαμαω, *damno*, *deman;* φορβη, food, *probo*, to taſte food, *profian*, to prove; αρπαζω, tranſpoſing *r*, as is often the caſe, *rapio*, *reafian;* ποθεω, to deſire, *peto*, to ſeek in conſequence of deſiring, *biddan*.

Though this liſt clearly ſhews that the Northern language is, in a great degree, a corruption of the Latin borrowed from the Greek, the Hebrew, and other Oriental tongues, yet Mr. Tooke gives it as exhibiting inſtances of the Northern dialect grafted on the Latin. The primitive language of the North could have been no other than a branch of the primæval language of men, conveyed there by the firſt emigrants, diverſified and enriched by communications with the Eaſt on the north of Aſia, by early irruptions into Greece, as is mentioned by Herodotus, and, in far later days, by amalgating with the Latin, when in the dark ages the tribes of the North invaded and diſmembered the Roman empire. In this ſtate, the Northern language became the parent of the Engliſh; and though a multitude of its words, eſpecially monoſyllabic words, are, no doubt, immediately from the Anglo-Saxon and Gothic; yet few inſtances, we believe, can be produced, which may not be traced, by a competent etymologiſt, through the medium of thoſe corrupt changes, to their primordial purity in Italy, in Greece, and in the Eaſt, the ſole origin of language and literature. But Mr. Tooke reverſes this natural and neceſſary order; and, without the teſtimony of hiſtorians, without any documents of the language ſubſiſting in the North, antecedent to that which was ſpoken in the middle ages, he fixes on corruptions borrowed from the Latin, and holds them up as the origin whence Latin, Greek, and Engliſh have been derived. His theory, thus far, is ridiculous and miſchievous; ridiculous, becauſe it is a palpable error, profeſſing important diſcoveries; and miſchievous, becauſe, while it pretends to trace words to their genuine roots, ſtops up all the true ſources of information on the ſubject of language. As we have paſſed this cenſure on his ſyſtem, we feel ourſelves called upon to juſtify it by more numerous inſtances. And we think this the more neceſſary, as ſubſequent grammarians, and the public in general, ſeem willing to acquieſce in his poſitions as incontrovertibly juſt.

In doing this we ſhall adopt the words which preſent themſelves, without much ſelection, referring our readers to the page where they occur in his ſecond volume. It was impoſſible to err as to the derivation of *right* from *rectum;* but *ſomething ordered* is not the leading idea of the term, though Mr. Tooke employs many quarto pages in explaining it on this principle. The primary ſenſe of *right* is *ſtraight*, a relative term, denoting the means to an end. Thus, *virtue* is *right*, becauſe it is the ſhort or direct road to happineſs. That hand is *right*, which does its work in the *ſhorteſt* way. Property is *right*, becauſe it is the ſtraight road to the welfare of ſociety. In this ſenſe we may ſay of God, if we ſay it with reverence, that it is *right* in him, becauſe, when he has an end to anſwer, right means the ſtraight way to accompliſh it. "The *left-hand* is that which is *leaved*, or which we are taught to leave out of uſe on ſuch occaſion," p. 10. This appears to us nonſenſe. *Left* is the Greek λαιος, and Latin *lævus*, with *t*, the uſual termination of northern words. *Lex*, Fr. *loi*, and our *law*, is from *lego*, and means ſomething *read* or *dictated*, and not *ſomething placed*, p. 8. The Anglo-Saxon, *lecgan*, *ponere*, is but a corruption of *locare*, to place. *Juſtus*, indeed, means ſomething commanded, *juſſum*, from *jubeo*. But this laſt is the Hebrew גוב, *gob*, and the Arabic *jaab*, to anſwer or aſſent. Hence, in Latin, *jubere legem*, to enact a law, *i. e.* to allow it to paſs, and promiſe to obey it.

"*To cucol* is to do as the cuckow does," p. 21. Few people know how the cuckow does; but all know how *a cock* acts on ſuch occaſions. *Kokoraa* is an Eaſtern word, which, coming into Italy, gave birth to *cicurio*, to crow; and, changing *r* into the connate *l*, as is often the caſe, to *kokolaa*, which, in Celtic, is *kilog* and *kilogee*, to act as a cock does with a hen. This, we preſume, is the origin of *cuckold*. *Hen-pecked* is a figure of the ſame nature, and from the ſame ſource. "*Alert* is *all-erecta*," p. 24. No, we preſume it is *all-ert*, or *all-art*, *i. e. all active*. The word *art*, ſignifying ſkill, came to ſignify that diligence by which ſkill is attained. The oppoſite, which ſanctions this etymology, is *inert*, not active. *A knave*, *i. e.* a man cunningly ſkilful, came, by the ſame aſſociation, from *gnavus*, diligent. "*Laſh*, (French *laſche*) of a whip, *i. e.* that part of it which is *let looſe*," p. 32. Rather from λυγος, *an oſier*. The French *laſche*, or the Italian *laſciare*, is the Latin *laxare*, from λυγοω, to bend. *To bren*, or *to burn*, gave birth to *brand*, *i. e.* a mark by burning;—*brandy*, *i. e.* ſpirits which burn;—*brown*, *i. e.* bread burnt;—*brunt*, brunt of the battle, *i. e.* the heat of the battle, or the place where the battle burns. The origin is *furnus*, an oven. *Odd* is not the participle *owed*, *i. e.* ſomething owed to make up a pair, p. 38; but the Hebrew אחד, *ahad*, one, ſingle, ſingular, *i. e.* one that has no other to make an even number, or pair, with him. Thus we ſay, an *odd man*, *i. e.* a ſingular man. *Loud*, p. 39, is, we preſume, from κλυτος, a voice heard. The Anglo-Saxon, derived from this word, has preſerved the κ aſpirated, *hlowan*. In Celtic it is *cloed*, that which is heard in praiſe of a man. The Latin has rejected the guttural altogether in *laudo*. The Greek poets have applied the epithet κλυτος to ſuch animals as *bleat;* hence *low: ſhred*, or *ſherd*, *ſhur*, *ſhare*, (as plough ſhare) p. 41, come from κειρω, to clip, by prefixing *s*, a practice very frequent in Latin; and hence the Anglo-Saxon *ſcyran*, to ſheer.

One of thoſe broad analogies by which the Latin ſeparated from the Greek, is to convert a guttural into a labial, as in χλοη, *flos*, χλωρος, *floridus*. Thus it may be, *cultus* became, as it were, *fultus*, *fult*, *field*, *i. e.* a cultivated ground, and not *a place felled*, p. 41. *Coward* is the participle of *cower*, to bend; but the parent of this verb is *corruo*, to ſhrink, p. 42. *Bread* is beared, *i. e.* the produce of the earth, as *bearn*, offſpring, is *boren*, ſomething born, and not from the obſolete *bray*, to pound, which is taken from the Latin *frico* or *frango*; both of which originated in the Arabic פרק, *pharac*. *Fiend*, *foe*, is the participial termination of βια, or βιαζω, *violence*, in which, as Socrates ſays, there is *enmity*; while *friend* is the ſame form of *frau*, a woman, (from φερω *i. e.* the bearing animal,) and ſeems at firſt to mean a *female loved*. The letter *l*, being of the ſame organs with *n*, is often changed for it in all languages, as νυμφη, *lympha;* πνευμα, *pulmo*. On the ſame principle, the Hebrew נאף, *naaph*, *to marry*, became *laaf*, or *love*. The Hebrew חית, *hhit*, and the Perſian *hhod*, *ſelf*, paſſing to the North, gave birth to the pronoun *hit*, or, as it is farther corrupted, *it*, which, like *id* in Latin, directs the attention to ſomething going before, and is a ſubſtitute for it. Gothic *haitan*, Anglo-Saxon *hætan*, or *gætan*, to *ſpeak* or *command*, is, perhaps, the Greek αυδαω, which, in Celtic, is *gwyd*, in Engliſh *quoth*, and in Latin in the compound form of *in-quit*, p. 53.

Tight, *i. e.* tied, and the Gothic *tian*, is from πτυσσω, *to fold up*, 67. *Twiſt* is *tortus* or *toſtus*, and not that which is *twiced*. *Quilt* is *coiled*, (κυλιω,) twiſted. *Draught*, *drag*, is τρωχαω, *traho*. *Tilt* is *tilted*, lifted, from τελλω, *tollo*. "*Barren*, *i. e. barred*, cloſed, ſhut", p. 72. The verbs φερω, *fero*, *bear*, *paro*, *pareo*, *pario*, with the numerous tribes of words derived from theſe in all languages, owe their exiſtence to the Arabic *barron*, *the earth*, or that which produces all things: and *barren*, we preſume, meant primarily an animal having produced; and thence it denoted *infecundity*, conſequent on production, or, more generally, incapacity to produce. The Hebrew צר, *ſter*, denotes any thing *cloſe*, *ſharp*, or *hard*. Hence the Greek στερεος, *firm*, *rigid;* and our *ſtern*, p. 73. The ſame word in Arabic means a harſh or acute ſound, and hence ſeemingly the Engliſh *ſtir*. The Arabic שיר, *ſeer*, which we ſhould pronounce *ſteer*, denotes to flow, or to move as water does. Hence the Anglo-Saxon *ſtiran*, which means to cauſe a ſhip to move, which is the meaning of the hence-derived *ſteer*. *Stern* is that part of a ſhip which is thus moved. The Hebrew גור, *gur*, *to turn*, has given birth to *churn*, turning or ſtirring cream being the means of obtaining butter, which in Anglo-Saxon is *gyran*, 76; to *year*, which is a revolution of time; to *yarn*, which means therefore ſomething *turned* or *twiſted*, and not prepared. Πιλος, *pilus*, means hair on the head; hence it ſignified to form hair, or to grow into a head. And this is the origin of our words *pile*, *build*. *Bold* or *bald* originated in *validus*, bodily ſtrength naturally inſpiring mental energy, 79; but *bolt*, p. 128, is βελος or βλητος, the thing caſt, 129. *Boar* is the Hebrew בעיר, *bacer*, a ſturdy ſtupid animal; but *brawn* we think is not *baeren*, but *pork*, *porken*, *proken*, *brawn*, from *porcus*, and therefore it means the fleſh of a pig, 87.

Chop, *chip*, is ſomething cut off, from κοπτω. The Anglo-Saxon *plihtan*, to pledge, is from πλησσω or πληγω, *to ſtrike*, plight being a bargain ſtruck. *Shut* is the ſame in ſenſe and ſound with the Arabic שד, *ſhud*. The Anglo-Saxon *ſcitan* is nothing but the Hebrew שת, *ſhit*, *nates;* and hence it came to ſignify the action of the nates in throwing away the excrements. We ſhall merely add the following liſt, and all the words in the laboured chapter on *abſtraction* are, with few exceptions, capable of being traced in the ſame manner; and we deſire our readers to compare the derivations here given with thoſe of Mr. Tooke in the pages referred to.

Θρυλλεω, to divulge or expoſe; *trull*, a public woman, p. 153. Τρεπω, *to turn, drab,* a woman that turns about, a vagabond woman, 154: hence the Gothic *treiban,* to drive about, or turn out, 155. The Arabic עלף, *alph*, means *food, ſupport*, and hence *loaf,* the means of ſubſiſtence. The Anglo-Saxon has preſerved the naſal aſpirate *hlaf*, 157. From Λοφος, *a hill*, came the Anglo-Saxon *hliſian*, to raiſe to an high place; hence too *lofty, lift*, 162. רען, *rhen*, Anglo-Saxon *grenian*, vireſcere, *green.* Γηρασκω, Anglo-Saxon *geregnan*, to decay. *Grey*, 167, the colour of old age. שער, *ſhâr, ſhower.* שׂרה, *ſhire*, principality. *Shire, ſire, ſir.* *Ruga*, a wrinkle. *Rough*, Anglo-Saxon *rof*, 177. Υφω, *weave, woof,* Anglo-Saxon *wefan*, 178. Τασσω, *to arrange, bind, command*; hence *texo, to weave*; *tax,* tribute, *i. e. tag*, the thing faſtened, 179. Τελλω, to riſe; hence *tello, tall, i. e.* what is raiſed. Τελλω ſignifies alſo to command, and thence it came to denote voice, or ſound in general; *tell, tale, toll*, the ſound of a bell. Τελος, a tribute, *talio*, to pay, *toll.* Δουλευω, to ſlave, *to toil*, or, as it was formerly ſpelt, *tueil, ual; tool*, the medium of toil, an inſtrument. Hence, moreover, Anglo-Saxon *tillian, till, i. e.* to ſlave on the ground, cultivate the ground, 180. בר, *bar*, ſomething added on the outſide for the ſake of defence, is the origin of *bar:* בריה, *barvich*, is *burgh, borough*, a place barred, *i. e.* ſecured, which in Greek is πυργος, a tower, and in Engliſh *park:* moreover, the *bark* of a tree is ברק, *birk*, or that which ſeparates from the tree. The Arabic *borhaan, a nobleman*, is the parent of *baron*, and to this ſenſe of the word St. Paul alludes, in Acts, xvii. "the *Bereans* were more *noble* than thoſe of Theſſalonica." פלך, *phalk*, in Arabic means a *ſhip*, and this, by changing *l* into *r*, gave birth to *bark* and *barge*, 182. בור, *bur*, pit or grave, *bury*. Σωρος is *ſtore*, treaſure, 185. זרם, *ſtarm*, to inundate, is the Anglo-Saxon *ſtyrmian*, to rage as a flood, and hence *ſtorm*, 183. דא, *dana*, in Arabic means a body of people come together; hence *town*, 201. בית, *beet*, means *a houſe*, a place that holds or contains; hence *bed, abode, pot*, in Greek βαιτις, in Celtic *bedh*, the laſt abode of man, and *pit*. *Cauſo, to plead, to deliberate*, gave birth to *choice*, the effect of deliberation, and to *cozen, i. e.* to deceive by pleading. The Perſian *ſhiraab*, is vine, juice; and hence the Latin *ſorbeo*, and the Engliſh *ſyrup, ſhrub*, 209. מחר, *mehur, morrow*, Anglo-Saxon *mergen, morn*. Θερω, *to heat, to dry*, to evaporate by heat; hence Anglo-Saxon *drygan, drain*, 224. Ρηγος, *a garment, rug, rig.* Τρωχαω, *traho*, Anglo-Saxon *drag, dragen, drone*, an inſect that drags itſelf. שכל, *ſkal*, produced *ſkill*. The Anglo-Saxon *ſcylan*, to ſeparate, ſeems to have come from σκελος, *leg, i. e.* to put the legs in action, to ſeparate one from the other. *Scale*, to diſperſe, is σκυλλω, *jacto*; while *ſcale*, to weigh, is שקל, *ſhakl*, 233. Βρεχω, Βροχη, is *brook*. Φαυλος, *foul*, Anglo-Saxon *fylan, file, defile.* Γονυ, *genu, knee. Nuo, nutus, nod*, 254. Τελος, *talio, tole, dole, dollar, deal*, 256. לעג, χλευη, Anglo-Saxon *hlian*. Ταριχος, *ſalted curds, tart.* Στεγος, *a roof*, Anglo-Saxon *ſtigan*, to aſcend the *roof*. *Sty*, a place covered for hogs. *Stage*, a place covered for actors to entertain the people. Πλεω, *fluo*, by tranſpoſing *l*, is *full, fill.* Ferveo, *fretum*, the boiling ſea; hence *bruit*, noiſe of the boiling waves, and the Celtic *frood*, alſo *fret*. *Paſco*, to feed, Anglo-Saxon *byſcian*, to be occupied in feeding cattle, *buſy*. דין, *din, dun, dint*, 305. Κερμα, a ſmall piece, *crum*, Anglo-Saxon *grymman*, to prepare ſmall pieces by fire. *Dono*, to produce, yield, is the parent of *do*. דום, *dum; mute, dumb.* Μειρω, μορος, *mors*, Anglo-Saxon *myrran, mar.* שמד, *ſamad*, σμινθευς, *ſmite, ſmith, ſmitter*, 416. א־צ, *artz*, in Arabic *aarth, earth*, 417.

Theſe ſpecimens (and they are ample ſpecimens) will be ſufficient to enable us to form a juſt eſtimate of Mr. Tooke's merit as an etymologiſt. If the above are well founded, they ſhew that his labours have been greatly over-rated. His great error is, that by forced analogies, or rather contrary to all analogy, he has yoked together words as of a common origin, which have flowed from very different ſources; and this error has ariſen from his ſtudied inattention to the operations of the human mind, to his entire want of acquaintance with the Oriental tongues, whence all the European dialects, ancient and modern, have been derived; and to his prepoſterous attempt to deduce Engliſh, Latin, and Greek, from the corruptions of Latin and Greek by a barbarous people in the dark ages. Before we quit this ſubject, we ſhall make one or two obſervations worthy the attention of thoſe who trace the ramifications of modern languages from their ancient ſtems.

In the Oriental tongues gutturals abounded, which, like other conſonants, contained in themſelves the vowels neceſſary to their pronunciation. But it is the tendency of every guttural, when become habitual, to ſoften down, in the rapidity of utterance, into a mere aſpirate, till it at length vaniſhes. Thus *cornu* has degenerated into *horn*, and χωμος into *humus*, and into *homo*, a creature of earth; ſo in the Greek, the Oriental *khaan*, a king, became ανασσω, to reign, which Homer pronounced Φανασσω. This principle has obtained in the formation of many words, derived into Engliſh through the medium of the Anglo-Saxon and the Gothic. And the inſtances are ſtill more numerous where the aſpirate, inſtead of vaniſhing, has been converted into the labials *v, f,* or *y*. Thus *wicked* is the Arabic חקד, *haguad*; *warm*, the Perſian *garm*; *all*, ὁλος, *whole*, the Hebrew כל, *kal*; *work*, εργον, the Chaldean ארך, *aark*. חיל, *cheil, ſtrength*; hence *weal, wealth*, the ſtrength of a ſtate; *wall*, the ſtrength of a town; *heal, health*, the ſtrength of the human body. הרט, *hart, write*.

An inattention to this principle has betrayed Mr. Tooke into many errors; thus he derives *field* from *felled*, that is, a piece of ground in which the wood is felled; whereas we conceive it is a corruption of *cultus*; as if *fultus, fuld, field, i. e.* a cultivated piece of ground, preciſely in the ſame way as χλοη, became *flos*, and χολη, *fel, gall.* Ths ſubſtitution of the labial for a guttural or aſpirate obtained in an early period of the Greek, and conſtitutes the origin of what is called the *digamma*. This digamma prevailed in the age of Homer, when the language was chiefly oral. But his poems, as being written, preſerved the guttural or aſpirate, the true original character, which being ſtudied, cauſed the aſpirate to prevail in time over the digamma; and thus it reſtored the language to its primitive purity. But the Latin, having flowed from the Greek at an early age, when the caprice of oral ſounds ſpread uncontrolled by *written* letters, and having no monument of genius like the Iliad and Odyſſey to correct that caprice, as was the caſe in Greece, adopted the digamma, and thus ſeparated, by a broad line of diſtinction, from the parent tongue. We now return to the *properties* of nouns.

The properties of nouns are gender, number, and caſe. Gender, as meaning the diſtinction of ſex, was by no means a neceſſary property of nouns, for the ſignification was ſufficient to ſhew the ſex to which it belonged. Thus, as there were but two ſexes, there ſhould have been two genders, maſculine and feminine, nouns meaning males being ranked under the former claſs, thoſe meaning females under the latter; while the *neuter* or neither gender comprehended the names of inanimate things, or ſuch animals as had their ſex not diſcernible, or not neceſſary to be diſtinguiſhed. But unfortunately the termination of nouns became a mark of gender independent of their ſignification; and thus nouns were conſidered as maſculine, feminine, or neuter, as they happened to have the endings which cuſtom uſually aſſigned to either of theſe three claſſes. The Hebrew tongue, in its primitive purity, appears to have been exempt from this unhappy embarraſſment, and the only languages known to us which have maintained the empire of common ſenſe againſt the caprice of cuſtom are the Engliſh, the Perſian, and the Bengaleſe. In Greek and Latin the dictates of reaſon have ſo far prevailed as to cauſe all thoſe nouns, whatever be their terminations, which mean males and females, to be deemed maſculine and feminine; while the names of inanimate objects only are determined by the termination. In other languages, ſuch as the Arabic, French, and Italian, this abſurdity has been carried much farther, the names of inanimate objects being ſaid to have gender: the neuter, which is only the negative of ſex, is excluded; and the learner has his memory loaded with the gender of nouns which really meant things without ſex, and this without any one advantage to counterbalance ſo much fruitleſs trouble, and ſuch glaring ſacrifice of common ſenſe.

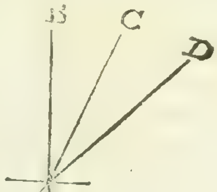
The Engliſh language, as conforming to nature in regard to the diſtinctions of gender, has greatly the advantage over other tongues: when riſing to the rhetorical and poetical ſtile it addreſſes the fancy by perſonification. This figure is eſſential to poetry. In order to intereſt the imagination, the ſubject of diſcourſe, when inanimate, muſt be inveſted with the forms and attributes of living beings. Now, when things are thus perſonified or ſpoken of as perſons, they muſt be repreſented as *male* or *female*. May they be made either? Or is there any analogy to give one the preference over the other? Let us hear what Mr. Harris (Herm. p. 44.) ſays on this ſubject. Having obſerved that ſome nouns are of ſuch a gender from having ſuch a termination, he thus proceeds: "In others we may imagine a more ſubtle kind of reaſoning, a reaſoning which diſcerns even in things without ſex a diſtant analogy to that great natural diſtinction which, according to Milton, animates the world. In this view we may conceive thoſe ſubſtantives to have been conſidered as *maſculine*, which were conſpicuous for the attributes of imparting or communicating, or which were by nature active, ſtrong, and efficacious, and that indiſcriminately whether to good or to ill, or which had claim to eminence either laudable or otherwiſe. The *feminine*, on the contrary, were ſuch as were conſpicuous for the attributes either of receiving, of containing, or of producing and bringing forth; or which had more of the paſſive in their nature than of the active; or which were peculiarly beautiful and amiable; or which had reſpect to ſuch exceſſes as were rather feminine than maſculine." On this principle the *ſun*, as imparting light, is maſculine; the *moon*, as receiving it, feminine. The *ſky*, or *ether*, *time*, *death*, the *ocean*, the *Supreme Being* are all maſculine; while the *earth*, *ſhip*, *city*, *virtue*, *religion*, are feminine. And yet Mr. Tooke roundly pronounces this reaſoning fallacious. "As for Mr. Harris's poetical authorities, the Muſes are bitter bad judges in matters of philoſophy. Beſides, that Reaſon is an arrant deſpot, who, in his own dominions, admits of no authority but his own. And he is particularly unfortunate in the very outſet: for his very firſt inſtances, the *ſun* and the *moon*, deſtroy the whole ſubtlety of this kind of reaſoning. For Mr. Harris ought to have known that in many Aſiatic languages, and in all the northern languages of this part of the globe which we inhabit, and particularly in our mother language, the Anglo-Saxon, *ſun* is feminine, and *moon* is maſculine," vol. i. p. 54. The author of the learned treatiſe on grammar in the Encyclop. Britannica, 17, reſting no doubt on the authority of Mr. Tooke, thus pronounces on the reaſoning of Mr. Harris; "Such ſpeculations are wholly fanciful; and the principle on which they proceed are overturned by an appeal to facts. Many of the ſubſtantives that in one language have maſculine names, have in others names that are feminine, which could not be the caſe, were this matter regulated by *reaſon* or *nature*."

The languages from which the objection to Mr. Harris's theory is derived are *not* regulated in regard to the diſtinction of gender by reaſon or nature. And facts borrowed from them are not ſurely to be admitted as concluſive againſt a principle in a language which *is* regulated by reaſon and nature. Mr. Harris deduced his theory from the Engliſh, though he has applied it with perhaps more fancy than truth to ſome inſtances in the claſſical languages. Our own tongue, as making all things neuter which have no life, admits the operation of fancy in perſonifying inanimate objects; and where perſonification is admitted, the *analogy* to the natural diſtinction of the ſexes muſt neceſſarily be admitted alſo. But, Mr. Tooke and his abettor ſay, it is *fanciful* becauſe it does not obtain in other tongues. Their argument is briefly this:—The ſun, by perſonification, is not made maſculine in Engliſh, where the conſideration of gender is founded on reaſon, becauſe it is made feminine in ſome languages where the termination, and not reaſon, determines the gender. Reaſoning of this kind is not only inconcluſive, but frivolous; and the analogy ſtated by Mr. Harris invariably and neceſſarily operates on our own tongue, and would have operated in *all* tongues, if, like the Engliſh, they had conformed to the ſtandard of nature; and we ought no more from their caprice to argue againſt the dictates of reaſon and analogy, than we ought to deny a regard to the diſtinction of ſex in the nouns of one language, becauſe the gender of the ſame nouns in others is regulated by conſiderations independent of ſex.

When a noun repreſents its object as *one*, it is ſaid to be in the *ſingular*, and *plural* when meaning more than one. This property alſo can hardly be ſaid to be neceſſary to nouns, as its place might have been ſupplied with greater accuracy by numerical adjectives when extended to expreſs numbers, as *two* men, *three* men, &c. "Bengal nouns," ſays Mr. Halhed, in his excellent grammar of that tongue, p. 68. "have neither dual nor plural numbers, I may add that neither is wanted. The *dual* is found in no modern language, and probably never exiſted but in the Arabic and its branches, in the Shanſcrit and in the Greek. That the idea of multitude is not confined to the plural number, is clear beyond a doubt, becauſe ſingular nouns are uſed in all languages with a collective ſenſe, almoſt as frequently as plurals, thus: *men love to ſtudy*, and *man loves to ſtudy*, are phraſes perfectly equivalent. So alſo we join to a noun in the ſingular number an epithet of indefinite plurality to convey a plural meaning: *many a man* is written by the Bengaleſe *bohoot manhooſh*. Perhaps it might be ſafely urged that the ſingular number has more occaſion for an accurate ſpecification than the plural; at leaſt this is the only circumſtance which can account for the extenſive uſe of the article or repreſentative of unity in moſt of the modern dialects of Europe."

The plural number in its origin was no other than a noun of multitude, annexed to that preceding it, in order to mark its extenſion from *one* to *many*. Thus in Hebrew, whoſe high antiquity unfolds to the philoſophical enquirer the ſeveral ſteps which mankind took in the formation of ſpeech: אנוש המון, *anoſh hemon*, a man multitude, became contracted, for the ſake of brevity, into אנושים, *anoſheem, men*. In the Chaldean and Syriac the final *m* was changed into *n*. Hence the Hebrew *eem* in Chaldean became *een*, in Arabic *oon*, in Perſian *aan*, to denote the names of animals, and *aa* inanimate things. And from this ſource are derived the plural terminations in *an* or *a* in the Anglo-Saxon and German tongues. The letters *n* and *s* being of the ſame organ, the Chaldean *een* became *ες* in the formation of the Greek, or *es* in the third declenſion of Latin nouns. Hence, too, the plural termination *s* in Engliſh and French; while the Italian excluſively follows the analogy of the ſecond Latin declenſion in *i*. Thus the plural termination in all languages, ancient and modern, appears to have been derived from one ſource: and that conſiſted of the annexation of a noun of multitude to the ſingular form of a preceding noun. And it is remarkable that in the Bengaleſe, which is but a branch of the Shanſcrit, this mode of expreſſing plural nouns is preſerved to this day; as, *projaa*, a peaſant, *projaa-lok*, peaſant-people, *projaalok*, peaſants; *lok* ſignifying people annexed to the ſingular noun whatever it might be. We ſhall only obſerve, that the names of claſſes only admit the plural form; while *proper* names in all languages are, by their ſignification, confined to the ſingular, unleſs many individuals by accident have the ſame name. The names of *families* and *nations* muſt likewiſe be excepted, which, from a regard to their ſignification, are neceſſarily *plural*.

We come next to the conſideration of *caſes*, which are properties of nouns, perplexed and undefined, as is evident from the different, and we may add, erroneous accounts given of them by moſt grammarians. The beſt and ſureſt way to aſcertain the nature and origin of caſes, is to attend to the manner in which they were at firſt conſidered in the Peripatetic ſchool. We adopt the words of Mr. Harris, p. 277. "The Peripatetics held the nominative to be no caſe, and likened the noun in this, its primary and original form, to a perpendicular line, ſuch for example as the line



A B. The variations from the nominative, they conſidered as if A B were to fall from its perpendicular, as for example to A C or A D. Hence, then, they only called theſe variations πτωσεις, *caſus, caſes*, or *fallings*. The Stoics, on the contrary, and the grammarians with them, made the nominative a caſe alſo. Words they conſidered (as it were) to fall from the mind, or diſcurſive faculty. Now, when a noun fell thence in its primary form, they then called it πτωσις ορθη, *caſus rectus*, an erect or upright caſe or falling, ſuch as A B, and by this name they diſtinguiſhed the nominative. When it fell from the mind under any of its variations, as for example in the form of a genitive, a dative, or the like, ſuch variations they called πτωσεις πλαγιαι, *caſus obliqui*, oblique caſes or ſide-long fallings, (ſuch as A C or A D), in oppoſition to the other (that is, A B), which was erect and perpendicular. Hence, too, grammarians called the method of enumerating the various caſes of a noun κλισις, *declination, a declenſion*, it being a ſort of progreſſive deſcent from the noun's upright form, through its various declining forms, that is, a deſcent from A B to A C, A D."

We copy this account becauſe it is very plauſible, though we regard it as erroneous; the learned author and Ammonius (De Interpret. p. 35.) from whom he derived it, being miſled by the figurative language borrowed from geometry. We believe that the nominative is ſaid to be in the right caſe, not becauſe it is an erect or upright falling from the mind, but becauſe the nominative, the verb, and its object following each other in direct ſucceſſion, form one ſimple propoſition. The nominative is the leading noun or *agent*, and the accuſative is the *effect*, in which the action ſtraightway terminates. And when other nouns are introduced, they are ſpoken of not directly as the agent or ſubject, but *collaterally* or *obliquely*, as objects to which the direct noun ſomeway belongs. Thus the accuſative as well as the nominative are right caſes, or direct parts of a propoſition; whereas the genitive, dative, ablative, and vocative are oblique caſes, or indirect parts of a propoſition.

From this ſimple ſtatement, which we recommend to our readers as important, we infer, that a caſe did not at firſt mean a *change* in the termination of a noun, but the *poſition* of a noun expreſſing its relation to ſome other word in the ſentence. And our next object is to aſcertain thoſe leading relations which the poſition of a noun, or ſome other means more ſpecific, expreſſes. *God made man* is a ſentence in which the agent, the action, and the object follow each other in the order of nature: *God*, as occupying the place of the agent, is the nominative; and *man*, as correſponding to the effect, is the accuſative. But in the ſentence *God is good*, we cannot ſay *God* is the agent, becauſe the verb *is* does not expreſs an action, but ſerves only to connect the epithet *good* with *God*. The nominative, therefore, here expreſſes not the agent, but the *ſubject* of the attribute connected to it. The nominative caſe, then, is that leading ſtate or poſition which expreſſes the *ſubject* of a connecting verb, and the agent of an active verb. And the accuſative is that poſition which expreſſes the effect of an active verb, and thus far ſimple poſition will carry us: and the nominative and accuſative have evidently to each other the relation which a cauſe has to its effect, and that for no other reaſon, but that their order correſponds to the order of cauſe and effect.

But ſuppoſe that my purpoſe was not only to expreſs a cauſe or agent, but the *origin* of that cauſe, or the *inſtrument* by which it acts, or the *end* for which it acts. In ſuch caſes ſimple poſition will be of no avail. I muſt have recourſe to ſome other expedient, and no expedient ſo well can ſerve as ſuitable words to expreſs origin, inſtrumentality, and end. "Thus, the *Son of God* redeemed mankind—he redeemed them *by his death*—he redeemed them *for happineſs*. In the firſt ſentence, *of* means beginning or origin; and *God*, ſucceeding it, as being the origin of *ſon*, is ſaid to be in the *genitive* caſe. In the ſecond, *by* denotes *inſtrumentality*, or medium; and as *death* is the inſtrument or medium by which Chriſt redeemed man, it is ſaid to be in the *ablative* caſe, and might more properly be ſaid to be in the *inſtrumental* or *medial* caſe. In the third inſtance *for* expreſſes the *end* for which Chriſt redeemed man: the noun happineſs ſucceeding it, is therefore in the *final caſe*, or as it is commonly, though unmeaningly, called the *dative* caſe."

The caſes, then, or thoſe leading poſitions of a noun that anſwer the purpoſes of ſpeech, are the nominative, accuſative, genitive, ablative, and dative. Let it be added, that the nominative, as it implies the name of its object, is often uſed merely to addreſs a perſon, and thus to fix his attention. In this ſtate the noun is ſaid to be in the *vocative* caſe, and is ſometimes preceded by the interjection O! But we have not yet done: the nominative and accuſative are expreſſed by poſition; while the oblique caſes, the genitive, ablative, and dative depend on words expreſſing beginning, medium, and end. Let us a little contemplate the conſequence of theſe words, or words of the ſame import, when firſt introduced into diſcourſe. As the relations of things are in the order of our ideas *conſequent* upon the things ſo related, prepoſitions denoting thoſe relations muſt at firſt have ſucceeded the nouns which they now precede and govern. Thus in the above inſtances, the order would have been *God of—death by—happineſs for*. And it is remarkable, that in the Hindooſtanic the prepoſitions to this day generally ſucceed the dependent nouns, inſtead of going before them, as in other tongues. The conſequence of this was, that the prepoſitions, abbreviated perhaps into ſingle letters, coaleſced with the preceding noun, forming thereby one word with it. Thus *godof, godby, godfor*: and the variety of terminations given by this means to the noun is the origin of caſes. Modern tongues, in rejecting this variety, and ſubſtituting prepoſitions, have only recurred to the original purity of language.

Grammarians have generally concurred in defining caſes to be changes of termination. In this, if the above account be juſt, they are miſtaken, not only becauſe *poſition* is the primary and eſſential idea of a caſe; but becauſe while they reject prepoſitions as marks of caſes, the caſes defined by them are no other than the prepoſitions which they reject. Conformably to this notion, they maintain that the Engliſh noun has no other than the poſſeſſive caſe: and Dr. Lowth and Mr. Lindley Murray, purſuing the ſame error to its conſequences, comprehend nouns expreſſing the relation of effect, the relation of beginning, the relation of medium, and the relation of end, under one unmeaning phraſe of *objective caſe*, thus confounding relations the moſt neceſſary to the purpoſes of ſpeech, the moſt diſtinct in themſelves, and moſt requiſite to be kept diſtinct in the mind.

The ideas of the moſt acute and learned grammarians have hitherto been confuſed and contradictory on the ſubject of caſes, eſpecially the oblique caſes. And the author of the treatiſe in the Encyclop. Britannica has juſt left the matter obſcure and uncertain, as he found it. "The genitive, ſays he, is the moſt general of all the caſes, and gives notice that ſome connection indeed ſubſiſts between two objects, but does not point out the particular kind of connection. *That* we muſt infer, not from the nature or termination of the genitive itſelf, but from our previous knowledge of the objects connected. That the genitive denotes merely relation in general, might be proved by adducing innumerable examples, in which the relations expreſſed by this caſe are different." Theſe obſervations clearly ſhew that this writer did not himſelf underſtand the meaning of the genitive caſe, which, inſtead of expreſſing *ſome connection* between two objects, or *mere relation in general*, uniformly expreſſes one and the ſame relation, namely, that of *beginning*, *ſource*, and *origin;* and *of*, the mark of it, has uniformly the ſame ſenſe with *from*. Thus a table *of* wood, a table *from* wood; wood being the origin of the table. Rays *of* the ſun, rays *from* the ſun, the ſun being the origin of the rays. And *beginning* will appear to be the primary idea implied in *of*, if we trace it to its origin; *of, ab, απο*, אב, *ab, parent, ſtem, root*. Thus alſo in Latin *Dei gratia*, the grace of God, the grace from God, the grace of which God is the ſource. Of the phraſe *injuria regis* the writer ſays, no man can know whether the injury mentioned be an injury *ſuffered*, or an injury *inflicted* by the king. We deny this: if the terms be uſed in ſtrict propriety they muſt mean an injury from the king, an injury of which the king is the ſource and author; and, if they are intended to denote an injury received by him, the expreſſion is incorrect and ambiguous, though the ambiguity would be removed by the context: and this leads me to remark, that as the beginning of a thing is the *author* of it; and as the author has a full right to the fruits of his labours, ſo that ſtate of the noun which expreſſes beginning came to ſignify the *owner* or *poſſeſſor*. And thus the genitive in Greek and Latin expreſſes the relation of poſſeſſion, and anſwers to what is called in Engliſh the *poſſeſſive* caſe. Thus, *my father's will* may mean the will of which my father is owner; it means alſo the will which originated in my father. The poſſeſſive caſe, in our tongue, is an evident abbreviation of the genitive termination of the third declenſion in Latin, *father is houſe, father's houſe*, the apoſtrophe above ſupplying the place of the excluded vowel.

The ſame writer has not defined the meaning of the *dative*, though the relation denoted by it is the moſt obvious of any, contenting himſelf with ſaying, that it has nearly the ſame ſenſe with the accuſative, 19. No two relations, however, can be more diſtinct; as the accuſative expreſſes the effect of an action, and therefore ſtands immediately connected with that action; whereas the dative denotes the *end* to which a motion or action tends, and in which it terminates, or the point to which the attention is directed forward, as that to which ſomething elſe is related. Thus, in the inſtance given by him, *comparo Virgilium Homero*. The immediate object of compariſon is *Virgil*, and *Homer* is the point, or ſtandard placed before me in making that compariſon. The two firſt words expreſs the action and its effect, the laſt holds to view the point to which they are directed. It is true that in this and ſimilar inſtances, the mind brings under one view the perſon compared and the perſon to whom the compariſon is made; and this proximity or juxtapoſition conſtitutes the affinity which the writer erroneouſly ſuppoſes to be between the two caſes. *Antonius læſit Ciceronem*, and *Antonius nocuit Ciceroni*, he farther ſuppoſes to be expreſſions of the ſame import; but in this he has been miſled by the genius of our tongue, which would expreſs each phraſe by *Antony hurt Cicero*. But this is the exact meaning of the firſt clauſe only. In the ſecond clauſe *nocuit* expreſſes not an *action*, but aſſerts a *quality*. Antony was hurtful to Cicero. Antony was hurtful, and Cicero was a perſon to whom his hurtful behaviour was directed.

The dative caſe ſtands oppoſed to the genitive as *end* to *beginning*. The latter is the point where motion *begins*, the former where it *terminates*, and the ablative is the medium or inſtrument between both. In conſequence of this connection between the ablative and the genitive, on one hand, it came in Latin, by the mere impulſe of repeated aſſociations, to mean in many inſtances the ſame relation with the genitive, and this is the reaſon why the ſame word often governs a genitive or an ablative, why in our own tongue *of* and *from* have preciſely the ſame ſignification, and why the French and Italian expreſs the genitive by thoſe prepoſitions which in Latin govern the ablative. On the other hand, as the inſtrument or medium is connected with the end, the ablative holds a ſimilar connection with the dative. Hence in Latin theſe two caſes are often uſed one for the other, which is certainly a great impropriety in that language, and which occaſions much perplexity to the learner; while in Greek, which has not a diſtinct ablative, the relations of inſtrumentality and end are expreſſed by the ſame termination, which is certainly a great defect in that elegant and copious language. Inſtrumentality implies *concomitancy;* but this is not the primary ſenſe of the ablative, as the author of the above treatiſe erroneouſly ſuppoſes.

The Origin and Properties of Adjectives.

Things or ſubſtances are known and valuable on account of their qualities; the qualities of things therefore firſt engaged the attention of mankind. And as they perceived that the ſame quality exiſted in the ſame or in a different degree, in different things, men, however rude or uninformed, learned to form ideas of qualities independent of the ſubſtances to which they belonged. Hence they acquired that claſs of words called *adjectives*, which are only the names of qualities. Now as qualities reſult from things, the names of qualities are derived from the names of things; and, as moreover qualities are conſtant concomitants of the things they characterize, the names of qualities are conſtant adjuncts of ſubſtantives expreſſed or implied. Hence they are ſometimes called *nouns*, becauſe they have been borrowed from nouns; and always called *adjectives*, becauſe they are always *adjected* or *added* to nouns, and for this reaſon they have alſo the name of *adnouns*. From this account of adjectives we deduce the following inferences, which are worthy of attention.

Firſt, adjectives expreſſing the ſimple qualities of natural objects, which do not imply *motion* or *action*, are derived from nouns, by the mind firſt abſtracting the quality from the thing it qualifies, and then generalizing it ſo as to make it an epithet expreſſive of a ſimilar quality in different things. Thus in πρηων, *a ſteep rock*, the quality *ſteep*, contemplated firſt as a quality of that particular thing, the mind ſoon learned to conſider as *ſeparate* from the rock, and hence to make it a general term of the like quality in other objects. Thus was derived the adjective πρηνης, *pronus*, prone. And in the manner this ſingle adjective is formed, are formed all the adjectives which exiſt in all languages.

When adjectives became numerous in any language, analogy or cuſtom ſoon aſſigned them a particular termination. Hence, on every converſion of a noun into an adjective, that adjective immediately aſſumed the ending which analogy had appropriated to words of that claſs. Thus φορβα, *food, reliſh*, was changed into *probus*, ſignifying agreeable food or wholeſome reliſh. Thus alſo *wood*, *wind*, became *wooden*, *windy*, in our own tongue. It is obvious from this to obſerve, that in the earlier periods of human language, adjectives approached nearer in meaning and termination to the nouns whence they were derived; that is, they were leſs abſtracted and generalized. But the principles of abſtraction and generalization were greatly facilitated, when a quality was once expreſſed by an independent word; the eyes and the ears being made by that means to aid the conceptions of the mind. This is the reaſon why a barbarous people have few or no adjectives; and why, in the more ancient dialects of the Eaſt, the uſe of adjectives is far leſs frequent than in the more recent languages of Europe.

In ſpeaking of the qualities of things, *ſimilitude* or *reſemblance* is an idea of high importance and frequent recurrence. A perſon diſcourſing to another of ſomething *unknown*, naturally ſays, that it is *like* to ſome other that *is* known. Thus in Greek εικος, *image;* ειδος, *form;* ιος, *like;* are combined with nouns in order to expreſs *likeneſs*; ανθρωπικος, *man-like*; Εκτορειδης, *having the form of Hector*, *Hector-like*, i. e. *the ſon of Hector;* ανθρωπειος, *man-like.* This laſt termination, by inſerting *s*, gave birth to the Latin adjectives in *oſus*, and to our adjectives in *ous; pecunia*, *pecunioſus; glory*, *glorious.* The numerous adjectives and adverbs in Engliſh are formed on the ſame principle. *Earthly*, i. e. earth-like, which is the Greek διγκιος. *Gladſome* is *gladſame*, the *ſame* with glad; *ſome* or *ſame* being, we conceive, corruptions of *ſimilis*. The termination *iſh* is originally the Perſian *waſh*, added to a noun to expreſs likeneſs; as *gomer, the moon; gomer-waſh, mooniſh, like the moon; womaniſh, like a woman.* The termination *en*, derived, it is allowed, from the northern language, is borrowed by that language from the Greek participle in *on*. In the ſame manner we form ſome adjectives after the analogy of the paſt participles in *ed*, as *honied*, *wooded*; while that of *y* is the Anglo-Saxon *ig*; but this is only the Latin termination *cus*; as *unicus*, Anglo-Saxon *anig*, *any*.

But it muſt not be omitted that a very numerous claſs of adjectives is derived from *verbs*, and that independently of participles. Of this origin are all thoſe adjectives whoſe qualities pre-ſuppoſe *motion* or *action;* and they imply greater power of abſtraction than thoſe derived from nouns. Mr. Tooke, indeed, denies this power as a principle influencing language; and by this rejection is led to deny the exiſtence of adjectives as a claſs diſtinct from nouns. His definition is the following. "An adjective is *the name of a thing*, which is directed to be joined to ſome other name of a thing." (Vol. ii. p. 241.)

As his authority on the ſubject of language is ſo high in the eſtimation of many, we ſhall briefly examine and refute the above definition. His arguments are theſe; "I think you will not deny that *gold* and *braſs* and *ſilk* is each of them the name of a thing, and denotes a ſubſtance. If then I ſay a gold-ring, a braſs-tube, a ſilk-ſtring, here are the *ſubſtantives* uſed adjectively, yet names of things, and denoting ſubſtances. If again I ſay a golden ring, a brazen tube, a ſilken ſtring, do gold and braſs and ſilk ceaſe to be the names of things, and ceaſe to denote ſubſtances, becauſe, inſtead of coupling them with ring, tube, and ſtring by a hyphen thus (-), I couple them to the ſame words by adding the termination *en* to each of them? Do not the adjectives which I have made ſuch by the added termination *golden*, *brazen*, *ſilken* convey to the hearer's mind, and denote the ſame things as gold, braſs, and ſilk? Surely the termination *en* takes nothing away from the ſubſtantives gold, braſs, and ſilk, to which it is united as a termination: and as ſurely adds nothing to their ſignification, but this ſingle circumſtance, *viz.* that gold, braſs, and ſilk are deſignated by this termination *en* to be joined to ſome other ſubſtantive;" p. 430. Again he ſays, p. 442, "But if, indeed, it were true that adjectives were not the names of things, there could be no attribution by adjectives; for you cannot *attribute nothing*. How much more comprehenſive could any term be by the attribution to it of *nothing?* Adjectives therefore, as well as ſubſtantives, muſt equally denote ſubſtances; and ſubſtance is attributed to ſubſtance by the *adjective* contrivance." He concludes with what Dr. Jonathan Edwards ſays of the language of the Muhhekanew Indians. "The Mohegans have no adjectives in all their language, although it may at firſt ſeem not only ſingular and curious, but impoſſible that a language ſhould exiſt without adjectives, yet it is an indubitable fact."

This account, inſtead of unfolding that ſimplicity and preciſion which mark the proceſs of the human mind in the formation of language, tends to eraſe the very elements of knowledge, and to confound ideas the moſt palpable and diſtinct. Our ideas naturally and obviouſly divide into two claſſes, ideas of qualities and ideas of things. The diſtinction between theſe claſſes is univerſal; it is common to the philoſopher and the bulk of mankind; and is moſt readily comprehended even by children. As we have then *ideas* of qualities, language muſt have *words* to expreſs thoſe qualities, *i. e.* it muſt have *adjectives*; and as our ideas of qualities are in their nature diſtinct from, though concomitant ideas of things; ſo adjectives muſt in their nature be diſtinct from, though adjuncts of nouns.

The firſt ſtep in the formation of adjectives is *abſtraction*; the mind being led to conceive of the quality independent of the thing, in conſequence of perceiving it in *different* things. The frequent recurrence of the quality, which is one and the ſame, and therefore remembered, while the ſubſtances which preſent it are numerous and ſucceſſive, and therefore forgotten, greatly facilitates our abſtract conceptions. A ſimilar facility, as we have already obſerved, is afforded by the independent uſe of words to expreſs qualities. The dependence of adjectives on the principle of abſtraction is evident from one circumſtance. *Like* is a very abſtract quality; and the union of this word with nouns is one copious ſource of adjectives in moſt languages of which we have any knowledge.

The next ſtep in the formation of adjectives is *aſſociation*. This principle is ſo powerful and inſtantaneous, that it changes the nature of a word, in conſequence of its connection with other words, and of our previous experience. Thus, "the ladies *fan* themſelves"—"The plumy people *eye* the falling verdure." Becauſe we have experienced the middle term of a ſimple direct propoſition to be always a *verb*, we inſtantly, in the above examples, conclude that *fan* and *eye* do not here denote the things uſually meant by them, but the *operations* of thoſe things; that is, aſſociation and experience convert the nouns *fan* and *eye* into verbs, without any thing to aid or indicate that converſion but aſſociation ſuggeſted by the collocation. This converſion of a noun into a verb by ſimple experience, illuſtrates the converſion of a noun into an adjective. We place a word ſignifying a quality before a word denoting a ſubſtance; and as we uniformly find that qualities belong to the things which they qualify, and firſt act upon our perceptions, we inſtantly infer from the collocation that the firſt expreſſes an attribute of the ſecond; and this attribution is not indicated by the termination of the attributive, but an *inference* of the mind founded on experience. The termination *en* ſignifying *to be added* is a conceit of this grammarian, and has no foundation in truth: for it is the Greek participial termination in *on*, borrowed by the Goths. The formation of language did not require ſuch petty, circuitous contrivances; but points to the broad and ſimple principles of abſtraction and aſſociation as the copious ſources of all its phenomena.

From this it appears, that a peculiarity of termination is not neceſſary to form an adjective, the collocation being ſufficient to aſcertain its character as ſuch. An adjective may have the ſame ending with any other noun, or with the very noun from which it was derived; and it has this identity of termination in Greek and Latin, and yet no ambiguity ariſes as to its nature and uſe. The inference, which we inſtantly, and we may ſay, imperceptibly, draw from the *juxtapoſition* in our own tongue, and from the ſimilarity of terminations in the claſſical tongues, is an unerring guide in theſe reſpects. And this is the reaſon why, in a barbarous language, it is poſſible that the name of a quality may be always the ſame with the name of the thing to which that quality belongs, and yet abound with adjectives, *i. e.* abound with nouns converted into adjectives by juxtapoſition. And this is all that can be meant by the teſtimony of Dr. Edwards, in regard to the language of the Mohegans. If there exiſted a language which had no verbs, but nouns converted (as in the above inſtance of *fan* and *eye*) into verbs without any variation of termination, a perſon who did not underſtand the nature of the human mind, and who had been accuſtomed to claſſify words only by their endings, might ſay of that language, that it had *no verbs*.

The foundation of Mr. Tooke's error, is the circumſtance that moſt adjectives were originally nouns. As they were nouns *in their origin*, and as he rejected the operations of the mind in the conſtruction of language, he inferred with confidence, that they were nouns *ſtill*, thus confounding in one promiſcuous maſs our ideas of qualities, and our ideas of things; yet, notwithſtanding this confuſion, he writes thus: "If in what I have ſaid of the adjective, I have expreſſed myſelf clearly and ſatisfactorily; you will eaſily obſerve that adjectives, though convenient abbreviations, are not *neceſſary* to language; and, therefore, are not ranked by me amongſt the parts of ſpeech; and, perhaps you will perceive, in the miſapprehenſion of this uſeful and ſimple contrivance of language, one of the foundations of thoſe heaps of falſe philoſophy and obſcure (becauſe miſtaken) metaphyſic with which we have been bewildered."

Adjectives, as expreſſing not things, but their qualities, cannot, in ſtrict propriety, have any *gender*; but, as in Greek and Latin, they have the ſame terminations with nouns, they are ſaid to be maſculine, feminine, or neuter, merely as they have maſculine, feminine, or neuter terminations.

In moſt languages, adjectives vary their endings to correſpond with the plural form of nouns; in Engliſh they have no ſuch variation, nor is it neceſſary, ſince qualities are not ſuſceptible of numerical diſtinction, being the ſame, whether applied to one or to many.

There is, however, one variation which adjectives have in all languages, namely, the variation to expreſs the three degrees of compariſon. The qualities of things differ in different objects, and they muſt be expreſſed with *augmentation* or *diminution*, as they are compared with others more or leſs intenſe.

When a quality is expreſſed without reference to any other, the adjective is then ſaid to be in the *poſitive* degree. When expreſſed with reference to the ſame quality or to another more or leſs intenſe, it is ſaid to be in the *comparative* degree; and when in the higheſt or loweſt degree of all, it is in the *ſuperlative*. Different languages have different ways of forming the comparative and ſuperlative; but in almoſt all, both theſe degrees are derived by certain ſyllables added to the poſitive: the adjective itſelf, by being thus *lengthened*, is made to correſpond with the augmentation in ſenſe, which the quality acquires by compariſon. The mode of expreſſing the degrees of qualities being only *two*, and therefore very general and imperfect, while the qualities themſelves vary in endleſs gradations, a more adequate method is uſed, by having recourſe to thoſe attributes of an inferior order, called *adverbs*, as *much good*, *tolerably good*, *exceedingly good*, *more good*, *moſt good*.

As it is not our object to detail the minute rules of grammar in our own tongue, we ſhall conclude this part of the ſubject with one or two obſervations on the three degrees of compariſon. The poſitive degree, though not implying an immediate compariſon with the ſame quality in a higher or lower degree, often conveys a *relative* or *comparative* idea; and for this reaſon may, by the aſſiſtance of a prepoſition, be made to expreſs the comparative or ſuperlative degree, as "Bleſſed among women, *i. e.* the moſt bleſſed of women." And this relative or comparative idea, implied in the poſitive, is the reaſon why the poſitive has ſometimes after it the caſe which is uſed after the comparative. On the other hand, the comparative and ſuperlative are uſed in a poſitive ſenſe, or uſed to expreſs a high degree without any immediate object of compariſon. Thus Virgil ſpeaks of Venus: "Triſtior et lacrymis oculos ſuffuſa nitentes."—*Triſtior*, more ſad than uſual, *i. e.* very ſad. This is more uſual in the ſuperlative degree, *vir doctiſſimus, a very learned man.* The comparative is uſed with propriety only when *two* things are compared;

the ſuperlative when a thing is compared with *many*. The elder of the two—the eldeſt of all. Nevertheleſs it is to be allowed, that multitude may be the object of the comparative, if preceded by *all* or *whole*, to give it a collective idea; as, "he is wiſer than all his teachers, *i. e.* he is wiſer than the whole body of his teachers,—he is wiſer than them all put together;—or, compared with his teachers one after another, he is wiſer than them all."

The Origin and Properties of Pronouns and Definitives.

Pronouns have been defined ſubſtitutes for nouns, to prevent their too frequent recurrence. Mr. Harris accounts for pronouns, or, as he calls them, *nouns of the ſecond order*, in a different way; and, as his explanation is curious, we ſhall here place it before our readers. "All converſation paſſes between individuals, who will often happen to be till that inſtant unacquainted with each other. What then is to be done? How ſhall the ſpeaker addreſs the other, when he knows not his name? or how explain himſelf by his own name, of which the other is wholly ignorant? Nouns, as they have been deſcribed, cannot anſwer this purpoſe. The firſt expedient on this occaſion, ſeems to have been *pointing* or *indicating* with the finger or hand; ſome traces of which are ſtill to be obſerved, as a part of that action which naturally attends our ſpeaking. But the authors of language were not content with this: they invented a race of words to ſupply this pointing, which words, as they always ſtood for ſubſtantives or nouns, were characteriſed by the name of *pronouns*. Theſe, alſo, they diſtinguiſhed into three ſeveral ſorts, calling them pronouns of the firſt, the ſecond, and the third perſon, with a view to certain diſtinctions, which may be explained as follows.

"Suppoſe the parties converſing to be wholly unacquainted, neither name nor countenance on either ſide known, and the ſubject of converſation to be the ſpeaker himſelf. Here, to ſupply the place of pointing, by a word of equal power, the inventors of language furniſhed the ſpeaker with the pronoun I; *I write, I ſay, I deſire*, &c.; and as the ſpeaker is always principal with reſpect to his own diſcourſe, this they called, for that reaſon, the pronoun of the firſt perſon. Again, ſuppoſe the ſubject of the converſation to be the party addreſſed. Here, for ſimilar reaſon, they invented the pronoun *thou*; *thou* writeſt, *thou* walkeſt, &c.; and, as the party addreſſed is next in dignity to the ſpeaker, or at leaſt comes next with reference to the diſcourſe, this pronoun they therefore called the pronoun of the ſecond perſon.

"Laſtly, ſuppoſe the ſubject of converſation neither the ſpeaker nor the party addreſſed, but ſome third object different from both. Here they provided another pronoun, *he, ſhe, it*, which, in diſtinction to the two former, was called the pronoun of the third perſon. And thus it was, that the pronouns came to be diſtinguiſhed by their reſpective perſons."

This account, which the author, as he ſays, received from Apollonius, is arbitrary and erroneous. The uſe of the pronouns is not to ſupply the names of perſons unknown to each other; nor can they be ſaid to have been *invented*: for though they anſwer the moſt uſeful purpoſes, they originated in circumſtances in which *deſign* had no concern. The origin of the two firſt pronouns we conceive to be this. They are the adjectives *one, two*, loſing their numeral ſignification, and coming to mean the ſpeaker and the perſon addreſſed, by the mere force of aſſociation with the verb. Let us ſuppoſe that a perſon wiſhed, in the infancy of language, to expreſs the propoſition *I love thee*. If Engliſh were his words, he would have ſaid, *one love two*. This form being repeatedly uſed, and the perſon uſing it accompanying the leading term *one* with a conſciouſneſs of himſelf, that term would gradually drop its character of one in oppoſition to *two*, and derive a new character by aſſociation from the verb, namely, one that was ſpeaking in oppoſition to the other ſpoken to. Thus the ſame proceſs which converted *one* in general into *one ſpeaking*, converted *two* into the perſon addreſſed.

That the pronouns *I, thou*, were originally *one, two*, will appear probable from hence. In Hebrew, the moſt ancient language, the pronoun anſwering to *I* is evidently the parent of the numeral *one*; and *two* has a cloſe reſemblance to *thou*. Thus אני, *ani*, ego, is ἓν in Greek, and *unus* in Latin, and the other form אנכי, *anki*, is *unicus*. Moreover, אתה, *ato*, by dropping א ſeems to have produced τυ, *tu, thou*: and δυο, *duo, two*. And in other tongues the pronoun *thou* and the numeral *two* have ſuch reſemblance as to beſpeak one common origin in Hebrew. Beſides, the pronouns *I* and *thou* ſtill retain their origin in their names; *I* being the *firſt* perſon, *thou* the *ſecond*; not becauſe the former is the firſt and the latter the ſecond in dignity, but becauſe theſe were their original meaning. Moreover, the numerals *one, two*, muſt have been among the firſt adjectives formed by abſtraction from ſuch things as nature produced in pairs, or thoſe which alternately ſucceed each other, ſuch as *day* and *night*. And as diſcourſe is but an *alternation* or *interchange* of ſentiments between *two* perſons, the numeral adjectives in queſtion were the moſt likely to be uſed on ſuch occaſions. Remains of this uſage may be ſtill traced in ſome languages, as we ſay, *One thinks ſo*, or in French, *On dit*; *one* being not as Condillac (ſee his Works, tom. v. p. 184.) aſſerts, a corruption from *homme*, but of the Latin *unus*, and is not a ſubſtantive, but a ſubſtitute for a ſubſtantive, *i. e.* a pronoun. Finally, we obſerve that no words but *numerals* were capable of being formed by aſſociation into pronouns. The ſpeaker, indeed, might uſe his own name, and which, when repeatedly uſed, the verb would convert into the firſt perſon. But on the ſame principle another would employ his own name, and thus the aſſociations of one man would counteract the aſſociations of another; and neither name would be received as the repreſentative of the ſpeaker.

From this ſtatement of the origin of the pronoun, ſome particulars reſpecting its nature and uſe may be deduced with preciſion. Firſt, the adjective, in being changed into a pronoun, loſes the generality of a numeral, and aſſumes an individual character; that is, the character aſſigned to it by the verb. But as any other perſon may uſe that term in ſimilar circumſtances, the pronoun *I*, which was changed into the index of an individual by aſſociation, becomes again *general* by ſucceſſion; each ſpeaker having a right in his turn to uſe it: and thus the pronouns *I* and *thou* became ſubſtitutes for the names of all perſons in a change of ſituation. Secondly, *I* and *thou* are not, as has been ſuppoſed, ſubſtitutes for the names of the ſpeaker and the perſon addreſſed, to avoid their too frequent repetition, nor yet ſubſtitutes for thoſe names while yet unknown, but repreſentatives of thoſe perſons in that limited or reſtricted character which they derive from the aſſociated verb. Now as *ſpeakers* there is no difference between a man and a woman. A man that ſpeaks and the woman that ſpeaks, in that particular function, is the ſame: and the ſame thing holds in regard to the perſon addreſſed. The firſt and ſecond perſons, therefore, have not, in any language, the diſtinction of gender merely; becauſe they repreſent human beings in that particular character which excludes the idea of ſex. Thirdly, there is, properly ſpeaking, no ſuch thing as a *third* perſon; this being a *definitive*, marking the ſubject of diſcourſe, and ſaid to be the third perſon in reference to the *firſt* and *ſecond*, and thus repreſented as ſomething diſtinct from them, and not included under them. Thus הוא, *hoa*, in Hebrew, and *he* in Engliſh, were, as we ſhall preſently ſee, but the article; and ſo ὁ, ὁυτος, εκεινος, αυτος in Greek, and *hic*, *ille*, *is*, *ipſe*, in Latin, are all a ſpecies of reſtrictive or definitive adjectives, agreeing with the defined noun expreſſed or implied. As the firſt and ſecond perſons repreſent two individuals in peculiar circumſtances, they comprehend no other noun under them; whereas the third perſon is only in general a ſubject of diſcourſe, and therefore it comprehends any noun in the language, excepting the firſt and ſecond: accordingly every ſubject or agent in every language is the third perſon ſingular and plural, except four, *I*, *thou*, *we*, and *ye*, or their equivalents. The firſt and ſecond perſon, we have ſeen, exclude the idea of ſex, whereas it is a character often neceſſary to be marked in the ſubject or agent: for this reaſon pronouns of the third perſon have the triple diſtinction of maſculine, feminine, and neuter.

All the three perſons admit the plural number, as each is capable of repreſenting numbers. In our own tongue *I*, *we*, *thou*, *you* or *ye*; *he*, *ſhe*, *it*, *they*. Here it may be obſerved that *ye* is a corruption of *you* or *you* abbreviated; and as this abbreviation naturally takes place in the nominative or vocative, when the perſons addreſſed are called; and as it is neceſſary to be diſtinct when expreſſing the addreſſed perſons as affected by a verb, *ye* is uſed with propriety only in the nominative or vocative, and *you* in the accuſative. Men of rank being uſually ſurrounded with attendants, it became a compliment to addreſs a perſon as ſuch; in the ſame manner as in Greek, οἱ περι Πριαμον, *thoſe around Priam*, was a reſpectful way of deſignating Priam. Hence in common diſcourſe we uſe *you* for *thou*; and on ſuch occaſions the verb alſo ſhould be in the plural; as *you were* and not *you was*. But this complimentary ſtyle is not applied to the Supreme Being, who is always addreſſed by *thou*, from a regard, probably, to his *unity*, numbers being not able to add to his dignity or greatneſs. The regal ſtyle *we* has reſpect to the king's counſellors, who are ſuppoſed to adviſe the ſubject of diſcourſe, and who are reſponſible for it. With regard to the third perſon, though it be convenient to mark the gender, it is not eſſential: for the plural *they* is made to repreſent men, women, and things, without any inconvenience or ambiguity.

The perſonal pronouns, contrary to the analogy of nouns, have each three terminations, or three variations, to denote caſes. This is owing to their being derived from the Greek and Latin, with their reſpective inflexions. Their genitive, dropping the primary ſenſe of *beginning*, has uniformly the ſecondary ſenſe of *poſſeſſion*. Hence it is called, in our tongue, not improperly, the *poſſeſſive caſe*.

In Hebrew, Arabic, and Perſian, the perſonal pronouns are converted into adjectives, by being annexed to nouns, which, from their poſition, are called *affixes*. In this ſtate they are ſomewhat abbreviated and changed: but however changed when connected with nouns, they are always adjectives, but retain their perſonality when affixed to verbs. In our own tongue the perſonal pronouns are changed into adjectives from the genitive or poſſeſſive caſe: as *mine*, *my*; *thine*, *thy*; *hers*, *ours*, *yours*, *theirs*; *her*, *our*, *your*, *their*. Thus formed, they are properly called *pronominal adjectives*—adjectives, as qualifying nouns, and pronominal, as derived from the perſonal pronouns. *His* muſt be conſidered, by coaleſcence, as an adjective of this kind, through the genitive *he's*. Theſe pronominal adjectives, as derived from the genitive, may be reſolved into the ſignification of that caſe: as *my* of *me*; *thy* of *thee*; *his* of *him*, though ſeldom in Engliſh uſed in their perſonal form. The reaſon is, that our tongue has a ſtrong propenſity to convert nouns into adjectives by juxtapoſition, and thus to uſe them for the ſake of brevity, inſtead of the genitive: as when we ſay *ſilk-ſtring* for *ſtring of ſilk*, and *gold-ring* for *ring of gold*. The Greek and Latin do not abound with the ſame analogy, and therefore frequently uſe the perſonal pronoun in the genitive as equivalent to the pronominal adjectives.

The reciprocal or reflex pronoun *ſelf* is added to theſe pronominal adjectives: as *myſelf*, *thyſelf*, &c. The third perſon ſingular and plural by analogy ſhould be *his-ſelf* and *theirſelves*: but in order to humour the ear or the organs of ſpeech, theſe are changed into *himſelf* and *themſelves*. *Self* means an individual in oppoſition to another, and is derived from the Latin *ſolus*, alone, through the medium of the Anglo-Saxon *ſolus*, *ſoul*, Anglo-Saxon *ſaſel*, *ſelf*: hence alſo *ſoul*, which means that part of man in which conſiſts the vital principle in oppoſition to the body: *own*, often uſed to precede *ſelf*, is a corruption of the Anglo-Saxon *ogen*, which by the inſertion of the letter *g*, after the analogy of that language, is borrowed from the Latin *unus*. *Ownſelf*, therefore, is *oneſelf*.

Mr. Harris gives the following account of that ſpecies of adjectives called *definitives* or *articles*: "The viſible and individual ſubſtances of nature are infinitely more numerous than for each to admit a particular name. To ſupply this defect, when any individual occurs, which either wants a proper name, or whoſe proper name is not known, we aſcertain it as well as we can, by referring it to its ſpecies; or if the ſpecies be unknown, then at leaſt to ſome genus. For example, a certain object occurs with a head and limbs, and appearing to poſſeſs the power of ſelf-motion and ſenſation: if we know it not as an individual, we refer it to its proper ſpecies, and call it *dog*, or *horſe*, or *lion*, or the like. If none of theſe names fit, we go to the genus, and call it animal."

"But this is not enough: the thing at which we are looking is neither a ſpecies nor a genus. What is it then? An individual. Of what kind? Known or unknown? Seen now for the firſt time, or ſeen before, and now remembered? It is here we ſhall diſcover the uſe of the two articles *a* and *the*. *A* reſpects our primary perceptions, and defines individuals as unknown: *the* reſpects our ſecondary perception, and denotes individuals as known. To explain by an example: I ſee an object paſs by, which I never ſaw till now. What do I ſay? There goes *a* beggar with a long beard. The man departs, and returns a week after. What do I ſay then? There goes the beggar with *the* long beard. The article only is changed, the reſt remains unaltered. Yet mark the force of this apparently minute change. The individual, *once vague*, is now recognized as ſomething known, and that merely by the efficacy of this latter article, which tacitly inſinuates a kind of previous acquaintance, by referring the preſent perception to a like perception already paſt.

"The truth is, the articles *a* and *the* are both of them definitives, as they circumſcribe the latitude of genera and ſpecies, by reducing them for the moſt part to denote individuals. The difference between them, however, is this; the article *a* leaves the individual itſelf *unaſcertained*, whereas the article *the* aſcertains the individual alſo, and is for that reaſon the more accurate definitive of the two."

We give this ſtatement as that of an eminent grammarian, without ſubſcribing to it as juſt in all reſpects. It is not, we conceive, true, to ſay that the individual defined by *a* is always *unaſcertained*; nor does *the* neceſſarily imply a previous acquaintance, by referring the preſent perception to a like perception already paſt. And we cannot help obſerving that, if Mr. Harris and other writers on the ſubject had traced theſe words to their ſources, and thus aſcertained their primary meaning, their readers would have been more informed in one paragraph, than they otherwiſe could by the moſt elaborate treatiſe.

The article *a* is in truth the numeral adjective ἓν in Greek, *unus* in Latin, *een, an, ane*, in Anglo-Saxon: and the import of it preciſely correſponds with its original ſignification of *one*. *A* book is one book; *a* man is one man. Hence we may learn with certainty the following particulars. That it is enveloping the word in myſtery to call it an *article*, inſtead of calling it by the more appropriate name of *numeral adjective*, or *definitive*. That as it means *one* it cannot be prefixed to plural nouns, unleſs thoſe nouns be taken in a collective ſenſe. That the uſual rule, *a* becomes *an* before a vowel, ſhould be juſt reverſed in order to be true. "*An* becomes *a* before a conſonant." That the equivalent of the article *a* exiſts in Greek and in Latin, but is rejected as uſeleſs in thoſe languages; and that the frequent uſe of it in Engliſh and other modern language is ſo far from being neceſſary, that it is an incumbrance and inelegance. *I ſee man* would be as intelligible as when we ſay *I ſee a man*; and *they read book*, as definite, as *they read a book*; and this, from the nature of the caſe, juſt as in Latin, *video hominem, legunt librum*, where *unum* would be both unneceſſary and inelegant. The Engliſh *I ſee man*, and the Latin *video hominem*, are both equally indefinite in themſelves; but they are ſufficiently limited by the nature of our perception, and by previous experience. "The indefinite article," ſays the author of the treatiſe on Grammar in the Encyclop. Britannica, "is much leſs uſeful than the other; and therefore the Greek and Hebrew languages have it not, though they both have a definite article. In languages, of which the nouns, adjectives, and verbs have inflexion, no miſtake can ariſe from the want of the indefinite article; becauſe it can always be known by the terminations of the noun and the verb, and by the whole circumſtances predicated of the noun, whether a whole ſpecies or one individual be intended. But this is not the caſe in Engliſh. In that language the adjectives having no variation with reſpect to gender and number, and the tenſes of the verbs being for the moſt part the ſame in both numbers, it might be often doubtful, had we not the indefinite article, whether the ſpecific name was intended to expreſs the whole ſpecies or only one individual." All this reaſoning, however, appears to us fallacious, and only ſhews that even a wiſe and able man, ſuch as the writer of this article certainly is, will readily think that neceſſary and uſeful to which he has been accuſtomed, and therefore will ſeldom be at a loſs for ſome plauſible reaſons to juſtify it. In truth, the inflexions of adjectives and verbs in the learned languages alluded to, have no influence whatever in defining the extent of the general term, but ſerve merely to ſhew that they qualify that term, and depend upon it. The very example adduced by this writer ſhews the fallacy of his reaſoning: Εγενετο ανθρωπος απεϛαλμενος παρα θεου ὡ ονομα Ιωαννης. Here ανθρωπος as clearly denotes not the whole ſpecies, but an individual, as if it was written εἱς ανθρωπος, and that not becauſe of the ſingular correſpondence of εγενετο, nor from the termination of απεϛαλμενος. Of this there is an evident proof; εγενετο and απεϛαλμενος would be ſtill the ſame, though ανθρωπος had a ſpecific or collective ſenſe. But the individual ſenſe of the noun appears from the nature of the caſe, from the context, and eſpecially from the clauſe, *whoſe name was John*: and theſe circumſtances, which ſufficiently define it in Greek, would be ſufficient to define it in Engliſh, were it written "Man was ſent from God whoſe name was John" It is impoſſible to feel in this any ambiguity; and the expreſſion ſeems uncouth only becauſe we have been accuſtomed to the uſe of *a man* was ſent from God, &c.

Mr. Tooke derives *the* and *that* from the Anglo-Saxon verb *thean* or *thegan, to take*. But theſe definitives *exiſt in that language*, and why ſhould he attempt to derive them from any word, when they are already formed and employed in the ſame ſenſe? He ſeems to have been aware of this objection. And he adds, vol. ii. p. 60, "*The* (our article, as it is called) is the imperative of the ſame verb *thean*, which may very well ſupply the place of the correſpondent Anglo-Saxon article *ſe*, which is the imperative of *ſeon, videre*. For it anſwers the ſame purpoſe in diſcourſe to ſay—*ſee man*, or *take man*." The Engliſh *take*, and the Anglo-Saxon *thegan*, which this writer would lead us to regard as a primitive northern word, is only the Greek δεχω, *to accept*—*Take this*, therefore, means, *receive this*.

Light is the medium of ſight, and hence, in the moſt ancient languages, the word ſignifying light gave birth to verbs ſignifying *to ſee*. Thus the Hebrew צוא, *tsa*, pronounced in Arabic *thao*, but in Perſian *ſeea, light*, is the parent of the Anglo-Saxon *ſeon* and our *ſee*, which accords with the Perſian pronunciation, and alſo of the Anglo-Saxon article *ſe* or *ſeo*, or, as we found it, conformably to the Arabic, *the*. It is remarkable the article ὁ in Greek is founded entirely on the ſame principle, though derived from a very different word For its original appears to have been the Hebrew article ה, which probably was ſounded *hu* or *ho* ſhort, and which is but an abbreviation of הא, *ha*. Now the uſe of this laſt conſiſts in directing the attention to an object, and anſwers to *en* or *ecce* in Latin, and *behold* in our own tongue. And as the neceſſary conſequence of looking upon *a thing* is to ſee it, as diſtinguiſhed from other things, hence ה in Hebrew, ὁ in Greek, *the* in Engliſh, from ſignifying to *perceive*, through the medium of light, came to ſignify an effect of perception, namely, the diſtinction or oppoſition which the thing ſo ſeen has to other things which may be related to it.

From this account we may gather the following particulars reſpecting the nature and uſe of the definitive article. Its primary force conſiſts merely in directing the *eye* or the *attention* to an object; and the definitive power aſſigned to it is rather an effect of the ſight where the object is preſent, or of the mind in drawing the neceſſary inference, where the object is previouſly deſcribed or ſpecified. If this account be juſt, the aſſertion of Mr. Tooke, that the article, in combination with a general term, is a mere ſubſtitute for a particular term, (ſee vol. i. p. 69.) is erroneous. The article is only an *index*; having indicated the thing intended it does no more: the eye or the mind does the reſt, and the general term is defined or made particular, by being brought under immediate inſpection. It is neceſſary to ſubjoin the general term to the article, becauſe it is neceſſary to ſpecify the object intended; but the reſtriction of the ſpecific or general noun to that individual object is a *conſequence* of the article, rather than a power belonging to it. The article therefore cannot be a mere ſubſtitute, to do that which is done by another principle, namely, the eye or the mind.

The article ſerves as an index to ſpecify an object hitherto *unknown*, as well as one previouſly known; and thus Mr. Harris's diſtinction, that *a* reſpects our primary perception, and denotes individuals as unknown; *the* reſpects our ſecondary perception, and denotes individuals as *known*, is unfounded. The index indeed may be directed to a paſt event or object, thus to make it the ſubject of inſpection a ſecond time. In this view Mr. Harris's poſition is true, but the uſe of the article is far more general, and by no means confined to ſuch caſes.

The article *the* is the ſame in origin, and often in uſe the ſame with *that*, and indeed in the Anglo-Saxon *that* is only the neuter gender of *the*; and Mr. Tooke ought to have made this remark inſtead of repreſenting each as independent of the other.

This definitive is in our tongue variouſly applied; and the objects of its application are ſo diſtinct and different, that it has been thought to change its nature, and to belong to different parts of ſpeech. And Mr. Tooke has the merit of being the firſt to ſhew that in all circumſtances, *that* retains one and the ſame character. Let us briefly conſider its various applications. And *firſt*, it is uſed to bring under the eye of the [illegible], *i. e.* to define individual objects; as *that* book. In this ſenſe it is oppoſed to *this*, anſwering to *ille* as oppoſed to *hic* in Latin. Ille, *that*, denotes the remoter of two objects; hic, *this*, the nearer. "Alexander and Julius Cæſar were great commanders, *that* (ille) conquered Aſia; *this* (hic) ſubdued the Gauls—*that,* meaning Alexander as the fartheſt off; *this*, Julius Cæſar, as the neareſt." In ſuch a ſentence it would be more uſual to ſay the *former* and the *latter*. *Secondly*, *that* is frequently uſed to characterize *a whole clauſe*, which is the object of a tranſitive verb, thus ſerving to fix the attention on what is going to be ſaid, and by that means to render it emphatic and prominent. Thus, "I wiſh you to believe *that* (that thing which I am going to ſay, namely,) I will not hurt a fly;" which Mr. Tooke thus reſolves, "I would not willingly hurt a fly; I wiſh you to believe *that* aſſertion." In this application it anſwers to *quod* in Latin. *Thirdly*, *that* is an index to point out the *end* or *purpoſe* which a perſon has in view, and as ſuch precedes a verb in the ſubjunctive mood, expreſſing that end thus: "Thieves riſe in the night *that* they may ſteal."—"Thieves riſe in the night, *that* being their purpoſe, namely, they might ſteal." In this ſenſe it correſponds to the Latin conjunction *ut*, which, perhaps, led to the error of conſidering *that* as a conjunction in the ſecond and third ſenſes. *Fourthly*, it is an index pointing to a noun in the preceding clauſe, and is a ſubſtitute for that noun, or rather it agrees with that noun implied, though never expreſſed. "The man, *that* hath not muſic in himſelf, is fit for treaſon." Here the firſt clauſe, *the man*, is repreſented as definite, while the reader as yet is not able to recogniſe it as ſuch. What man is fit for treaſon? To preclude the neceſſity of this queſtion, a clauſe is introduced, *that* man, namely, he who hath not muſic in himſelf. In this ſentence *that* is thought to be a relative equivalent to *who*, which may be ſubſtituted for it. But in reality it is ſtill a definitive, uſed to aſcertain the preceding ſpecified noun, which has the form of being definite without being really ſo; and the preceding noun is to be repeated, or, as *that* is *deſcriptive,* a generic or ſpecific noun of the ſame import is underſtood to be introduced. Thus the man, namely, *that ſort of man*, who hath not muſic in himſelf, is fit for treaſon. The ſubject of diſcourſe may be *plural*, and yet the ſingular form of *that* may, on this ſuppoſition, be uſed. "The men *that* have not muſic in themſelves, are fit for treaſon," *i. e.* the men, *that ſort of men*, namely, who have not muſic in themſelves, are fit for treaſon: and this is the ſolution of the apparent anomaly of *that* being uſed in both numbers, without variation, when taken relatively.

We come next to ſpeak of the *relative pronoun*, which Mr. Harris thus explains, p. 77. "But beſides thoſe there is another pronoun (in Greek ὃς, ὅσις, in Latin *qui*, in Engliſh *who, which, that*), a pronoun having a character peculiar to itſelf, the nature of which may be explained as follows. Suppoſe I was to ſay *light* is a body,—*light* moves with great celerity. Theſe would apparently be two diſtinct ſentences. Suppoſe, inſtead of the ſecond *light*, I were to place the prepoſitive pronoun *it*: *Light* is a body; *it* moves with great celerity; the ſentence would be ſtill diſtinct and two. But if I add a connective (as for example an *and*) ſaying light is a body, and it moves with great celerity; I then by connection make the two into one, as, by cementing many ſtones I make one wall.

"Now it is in the united powers of a connective and another pronoun, that we may ſee the force and character of the pronoun here treated. Thus, therefore, if in the place of *and it* we ſubſtitute *that* or *which*, ſaying *light* is a body, *which* moves with great celerity; the ſentence ſtill retains its unity and perfection, and becomes, if poſſible, more compact than before. We may with juſt reaſon, therefore, call this pronoun the *ſubjunctive*, becauſe it cannot, like the prepoſitive, introduce an original ſentence; but only ſerves to ſubjoin one to ſome other which is previous."

This account, though elegant and ſpecious, we nevertheleſs deem erroneous; becauſe the relative pronouns in all languages are the ſame in their origin and uſe with the articles or definitive pronouns. In Greek ὃς is only the article ὁ with ς annexed after the analogy of that termination in Greek nouns. Hence the reaſon why ὁ and ὃς are, by the more ancient writers, ſuch as Homer and Herodotus, uſed for one another, either as demonſtrative or relative pronouns. The Latin *hic* is alſo the article ὁ with a guttural annexed—*hoc;* while *qui*, which Scaliger, and after him Mr. Tooke, derive from καὶ ὁ, is no other than the Perſian *ke* or *che*, *who, which.* Moreover, *quis* is the Oriental *kis*, *who* or *what*; and it is remarkable that in Hindooſtan *kis* is redoubled *kis kis*, and this has been imported into Latin *quiſquis*. Finally, our *who* is the Greek ὁ, having the labial *w* ſubſtituted for the aſpirate, which is a broad and general analogy, by which words in Latin and the Anglo-Saxon are formed from Greek or from the Oriental tongues. *Which* is the neuter termination of ὁ, formed on the ſame principle as *hoc* in Latin, that is, a guttural is annexed to *who, whoc, which.* And this is the reaſon that, while *who* is applied to perſons, *which* is made to ſtand for inanimate things.

As the relative and definitive pronouns have the ſame origin, they are alſo the ſame in uſe. For in Latin the relative always ſuppoſes the antecedent to be repeated, and is repeated when obſcure or doubtful. In our own tongue, indeed, *who* never coaleſces with the antecedent noun, and is therefore a *ſubſtitute* for it, and this peculiarity in our own tongue has cauſed *who*, with its other caſes *whoſe*, *whom*, to drop its nature as a definitive, and to become really a *pronoun*, *i. e.* a ſubſtitute for a noun. This peculiarity has alſo obtained in regard to *he*, which was the Hebrew and Greek article ה, *ha*, or ὁ. And this is the reaſon why the article in Homer may be often rendered by *he* in our own tongue. Dr. Middleton, not perceiving this circumſtance, was led, in a voluminous work publiſhed on the Greek article, to ſuppoſe that the Greek article is in its nature a *perſonal pronoun*, and may be always reſolved into a pronoun. The foundation being thus fallacious, the whole ſuper-ſtructure, however learned and elaborate, is frivolous and uſeleſs.

We obſerve farther that *hic*, *ille*, and *is*, which are really definitives, often refer, like *qui*, to a preceding noun, and for this reaſon have a claim equally juſt to be called relative pronouns. Thus, "Deus nobis hæc otia fecit; namque erit *ille* mihi ſemper Deus; *illius* aram ſæpe tener noſtris ab ovilibus imbuet agnus." Here the firſt *ille* is *ille homo*, or *ille juvenis*, meaning *Auguſtus*, elegantly kept out of ſight, the reader being left to conceive of him only as a *god;* while *illius* is illius dei, *of that god.* "Tres littore cervos proſpicit errantes, *hos* tota armenta ſequantur, *i. e.* hos cervos." "Cognoſcimus Deus ex operibus ejus," we know God from the works of the ſame—*ejus dei.*

Becauſe the relative *qui* is thus a definitive, the defined noun, when not antecedent, is made to ſucceed it in Latin and in Greek, as " Maximis laboribus conſequuntur eam, quam ex diſcendo capiunt, voluptatem;"—literally, with the greateſt toil they purſue that, which pleaſure, (for that pleaſure, which) they derive from ſtudy. " Quas condidit arces, ipſa colat,"—let her inhabit which citadels ſhe built, *for*, let her inhabit the citadels which ſhe built. In our own tongue ſuch an arrangement is not allowed, or even intelligible, becauſe here the relative is really a ſubſtitute for the noun preceding it, and refuſes to coaleſce with it as an adjective. And it is obvious to remark in this place, that with the exception of *who* in Engliſh, the articles or definitives are not *pronouns*, but *adjectives*, numeral or reſtrictive, agreeing with a noun expreſſed or underſtood, and to be ſupplied from the context or the preceding clauſe. We remark, finally, that as articles are definitives, the Latin tongue has not only *one* but ſeveral articles, which it is erroneouſly ſuppoſed to want. Thus, hic homo, *this man*, ille homo, *that man*, is homo, *the ſame man*, ipſe homo, *that very man*, are phraſes, either of which is equally definite and emphatic with our *the man*, and on many occaſions preciſely the ſame with it.

Before we quit this ſubject we ſhall advert to a queſtion propoſed and ſolved by Mr. Tooke, vol. i. p. 273. " What is AS?—The truth is that *as* is alſo an article; and however, and whenever, uſed in Engliſh, means the ſame thing as *it*, or *that*, or *which*. In the German, where it ſtill evidently retains its original ſignification and uſe, (as *ſo* alſo does,) it is written *es*." Now, if Mr. Tooke had properly underſtood the nature of the article, he would not have made this aſſertion. *As* indeed, like the article, is an *index*, but it is an index directing the mind from one object to another, and the conſequence of its being ſo directed is the perception of ſome *reſemblance* between them. Accordingly *as* is ὡς, an adverb of ſimilitude in Greek, which being inverted (as is often the caſe with monoſyllabic words), has become *ſo*. On the other hand, the conſequence of the indication conveyed by the article is not to the obſervance of ſome likeneſs between the objects ſpecified, but the limitation of the general term to the individual object, circumſcribed by the eye or the mind by being ſo indicated.

In a note this writer adds: " Dr. Lowth, amongſt *ſome* falſe Engliſh which he has recommended, and *much* good Engliſh which he has reprobated, ſays, *ſo-as*, was uſed by the writers of the laſt century to expreſs a conſequence inſtead of *ſo-that*. Swift, I believe, is the laſt of our good writers who has frequently uſed this manner of expreſſion." If *that* denote *end* or conſequence, the third ſenſe we have *aſſigned* to it in the preceding page, and if *as*, on the other hand, ſignify *ſimilitude* between two objects, *ſo as* is, as Dr. Lowth ſtates, very improper; while *ſo that* alone is good Engliſh and good ſenſe: and Mr. Tooke is himſelf guilty of the charge he brings againſt Lowth, namely, of recommending ſome falſe, and reprobating much good Engliſh. We cannot help obſerving that the object of compariſon marked by *as* is often implied, and is to be gathered from the context; as in the following ſtanza:

Save that from yonder ivy-mantled tower,
  The moping owl does to the moon complain
Of *ſuch as*, wandering near her ſecret bower,
  Moleſt her ancient ſolitary reign.

i. e. complain of ſuch *perſons*, as *thoſe who* wandering, &c.

The Origin and Properties of Verbs.

We ſhall begin this part of our ſubject alſo with an extract from Mr. Harris, becauſe his opinion, though plauſible, is erroneous, and has been the means of leading other grammarians, who followed his authority, into error. " We are now," ſays he, " to deſcend to the common herd of attributes, ſuch as *black* and *white, to write, to ſpeak, to walk*, &c. among which, when compared and oppoſed to each other, one of the moſt eminent diſtinctions appears to be this. Some, by being joined to a proper ſubſtantive, make, without farther help, a perfect aſſertive ſentence; while the reſt, though otherwiſe perfect, are in this reſpect deficient. To explain by an example, when we ſay *Cicero eloquent*, *Cicero wiſe*, theſe are imperfect ſentences, though they denote a ſubſtance and an attribute. The reaſon is, that they want an aſſertion to ſhew that ſuch attribute appertains to ſuch ſubſtance. We muſt therefore call in the help of an aſſertion elſewhere, an *is* or *was*, to complete the ſentence, Cicero *is* wiſe, Cicero *was* eloquent. On the contrary, when we ſay *Cicero writeth*, *Cicero walketh*, in inſtances like theſe there is no ſuch occaſion, becauſe the words *writeth* and *ſpeaketh* imply, in their own form, not an attribute only, but *aſſertion* likewiſe. Hence it is they may be reſolved the one into *is* and *writing*, the other *is* and *walking*.

" Now all theſe attributives, which have this complex power of denoting both an attribute and an aſſertion, make that ſpecies of words which grammarians call *verbs*. If we reſolve this complex power into its diſtinct parts, and take the attribute alone, without the aſſertion, then have we *participles*. All other attributives, beſides the two ſpecies before, are included together in the general name of adjectives; and thus it is that all attributives are either verbs, participles, or adjectives. Beſides the diſtinctions abovementioned, there are others which deſerve notice. Some attributes have their eſſence in motion; ſuch are *to walk, to fly, to ſtrike, to live*. Others have it in the privation of motion; ſuch are *to ſtop, to reſt to ceaſe, to die*. And laſtly, others have it in ſubjects which have nothing to do with either motion or its privation; ſuch are the attributes of *great* and *little*, *white* and *black*, *wiſe* and *fooliſh*, and in a word the ſeveral *quantities* and *qualities* of all things. Now theſe laſt are *adjectives;* thoſe which denote *motions* or their privation are either *verbs* or *participles*."

" Of all the conſtituent parts of ſpeech," ſays the writer in the Encyclop. Britannica, 58, " none has given the grammarians greater trouble than the verb. The vaſt variety of circumſtances which it blends together in one word, throws very conſiderable difficulties in the way of him who attempts to analyſe it and aſcertain its nature; at the ſame time that by its eminent uſe in language, it is entitled to all the attention which can be beſtowed upon it. It ſhould ſeem that the firſt object of our inveſtigation ought to be the *characteriſtic* of the verb, or that which all theſe words have in common, and which conſtitutes them verbs, diſtinguiſhing them from every other ſpecies of words. Now it is obvious to the ſlighteſt attention, that every verb, whether active, paſſive, or neuter, may be reſolved into the ſubſtantive verb *is*, and another *attributive:* for *loveth* is of the ſame import as *is loving;* and *amat* with *amans eſt*.

" But *loving* and *amans* are not verbs; whence it follows that the characteriſtic of the verb, that which conſtitutes it what it is, and cannot be expreſſed by other words, muſt be that which is ſignified by the word *is;* and to us that appears to be neither more nor leſs than *aſſertion*.

" Aſſertion therefore, or predication, is certainly the very eſſence of the verb, as being that part of its office, and that part only, which cannot be diſcharged by other kinds of words. Every other circumſtance which the verb includes, ſuch as *attribute, mode, time*, &c. it may be poſſible to expreſs by adjectives, participles, and adverbs; but without a verb it is impoſſible to *predicate*, to *affirm*, or *deny*, any one thing of any other thing. The office of the verb, when ſtripped of all accidental circumſtances, ſeems to be merely this: to join together the ſubject and predicate of a propoſition; its powers are analogous to thoſe of the ſign + in algebra, which does not affect the ſeparate value of the quantities between which it is placed, but only indicates their *union* or *coaleſcence*." The writer then, in illuſtration of this theory, takes the examples uſed by Mr. Harris, and then adds, "in reſolving every verb, whether active, paſſive, or neuter, into the ſubſtantive verb *is*, and another attributive, we have the honour to agree with all the grammarians."

We reſpect the opinion of other grammarians, and that of this writer in particular, but we cannot think it an honour to agree with him and his predeceſſors on this ſubject; but we rather think it an honour to differ with them, becauſe we conceive them to be in an error. Now the moſt ſure way to aſcertain the characteriſtic of a verb, or that which conſtitutes its eſſence, is to attend to that operation of the human mind by which verbs have been formed. But as the affirmative *is* is thought eſſential to all others, we ſhall begin with this. And Mr. Harris thus explains it, p. 88, "Previous to every poſſible attribute, whatever a thing may be, whether black or white, ſquare or round, wiſe or eloquent, writing or thinking, it muſt *firſt* of neceſſity *exiſt*, before it can poſſibly be any thing elſe. For exiſtence may be conſidered as an *univerſal genus*, to which all things, of all kinds, are at all times to be referred. The verbs, therefore, which denote it, claim precedence of all others, as being eſſential to the very being of every propoſition, in which they may ſtill be found either expreſſed or by implication; expreſſed, as when we ſay "the ſun is bright;" by implication, as when we ſay "the ſun riſes;" which means, when reſolved, "the ſun is riſing."

According to this explanation *exiſtence* is the primary idea of *is*; and Mr. Harris is little conſiſtent with himſelf when, in reſolving active verbs into this and another attributive, he ſuppoſes it to mean *aſſertion*. But let us deduce a more adequate idea of it from examples—*God is good; His food was locuſts and wild honey; If we be virtuous we ſhall be happy*. In the firſt of theſe examples *is* connects *good* with *God*; ſo in the ſecond *was* connects *locuſts and wild honey* with *food*, and aſſerts, that with regard to John they were the ſame. In the third inſtance, happy is, by *ſhall be*, repreſented a quality of *we*. For this reaſon the following terms would be more appropriate than any other. The leading noun the *ſubject*, the thing connected the *predicate*, and the verb connecting them the *connecting verb*. Thus, *God* is the ſubject, *is* the connecting verb, and *good* the predicate; and ſo in all other inſtances.

If then *is* be the characteriſtic or eſſential idea of every verb, and if farther, as appears from fact, the primary idea of *is* denotes *connection*, it follows that not *aſſertion*, as the grammarians have hitherto ſuppoſed, but *connection*, is that which conſtitutes verbs, or that which diſtinguiſhes them from other ſpecies of words. But the connecting verb itſelf will not appear *neceſſary*, if we judge of its uſe in the ancient languages, the *juxtapoſition* of the ſubject and predicate being ſufficient to ſupply its place. Thus μακαριοι ὁι ελεημονες, *bleſſed the merciful*. Here μακαριοι, being placed by the ſide of ὁι ελεημονες, ſuggeſts that it belongs to it, and by virtue of this ſuggeſtion conveys to the mind as full and complete a propoſition as though the connecting verb had been inſerted. Thus too in Latin, *Homo præcipuum opus Dei*, man the principal work of God, meaning man *is* the principal work of God. Thus alſo in Hebrew, "And Moſes ſaid unto the Lord, I not eloquent, *i. e.* I *am* not eloquent, Exod. iv. 10. And Moſes ſaid unto God, who I, that I ſhould go unto Pharaoh; and God ſaid, certainly I will be with thee, and this token unto thee, *i. e.* this *ſhall be* a token unto thee," iii. 11, 12. In this tongue, indeed, the ſubſtantive verb is comparatively of rare occurrence, and its place is ſupplied by the collocation of the terms to be connected, a principle in itſelf extremely ſimple, and ſuggeſted by the great law of the human mind. In Greek and in Latin its uſe indeed is more frequent; and it is remarkable that where it does occur, it generally occurs either in the beginning or the end of the clauſe, and not in the middle, a circumſtance which aroſe from a deſire of keeping together words that are related as ſubject and predicate. Now Mr. Harris and other grammarians, overlooking the force of juxtapoſition, and judging of the importance of the ſubſtantive verb from its frequent uſe in modern ſpeech, have hence ſuppoſed that it is abſolutely neceſſary to the exiſtence of language, and that no propoſition can be communicated without it. And what is more remarkable ſtill, "they have repreſented a word as eſſential to a verb, which, ſo far from being neceſſary to a verb, is not neceſſary even to language."

Verbs expreſs the operations or the active qualities of things; and as the growth of words correſponds to the growth of our ideas, it follows that verbs originally were the names of things; but by combining them with the perſonal pronouns, they became, in conſequence of the aſſociation of ideas, to expreſs not *things*, but their *operations*.

The converſion of nouns into verbs we will illuſtrate by an example in the Greek tongue. Mr. Jones, in his Grammar of that language, has ſhewn that the perſonal terminations of the Greek verbs are but corruptions of the perſonal pronouns, and all the variations of mood, tenſe, number, and perſons have originated in theſe ſix elementary principles, thus:

εγω ω, *I*, ἡμεις ομεν, *we*,
συ εις, *thou*, ὑμεις ετε, *ye*,
ὁυ ει, *he*, ὁυτοι ουσι, *they*.

Now let theſe in their corrupted ſtate be annexed to any noun, for inſtance to οινο-ς, *wine*; and we ſhall have οινο-ω, *wine I*; οινο-εις, *wine thou*; οινο-ει, *wine he*; οινο-ομεν, *wine we*; οινο-ετε, *wine ye*; οινο-ουσι, *wine they*. When the attention of the ſpeaker or hearer was fixed on the firſt of theſe combinations, the union of the two words which ſignified *himſelf* and *wine* could not fail of bringing to his mind the circumſtances which he had *previouſly experienced* or *obſerved* in regard to that liquid; and hence he neceſſarily recalled the idea of *making* or *taſting wine*, or *drinking wine*. Conſequently, the two terms thus combined he naturally employed to expreſs one of thoſe notions. A ſimilar proceſs took place with regard to the remaining five combinations. And thus have we in Greek, and other languages, verbs diverſified by *ſix perſons*. This extenſion of the names of things to ſignify the actions which thoſe things have been obſerved to perform, is, it is obvious, founded on the law of aſſociation, and may be illuſtrated by many inſtances in all languages. But the principle is not ſo clear in any tongue as it is in Hebrew, where the perſonal pronouns annexed to the verb are preſerved with little variation from what they are in their independent ſtate.

In the above, and ſimilar other examples, the agent, and that which is the effect or object of the action, combine to expreſs that action; but in other inſtances, the name of the agent alone is ſufficient to expreſs its operation. Thus, "the ladies *fan* themſelves;" "the plumy people *eye* the falling verdure." Now having previouſly obſerved the uſe or action of the *fan*, and learnt in ourſelves the *effect* of the eye, being alſo previouſly aware that in a ſimple direct propoſition, the ſecond uſually denotes operation, we ſhould immediately infer that *fan* and *eye* here expreſs not the things meant by them but their active qualities; in other words, our previous aſſociations would inſtantly convert thoſe nouns into verbs, though we had never ſeen them ſo uſed before.

From this account of the deduction of verbs from *nouns* and *pronouns*, we may aſcertain their nature and properties. A verb is a word borrowed from a thing to expreſs the action of that thing. It implies *connection*, the connection of an agent and its object, or more generally the connection of cauſe and its effect. But this connection is not expreſſed by an independent word but by the juxtapoſition, or the combination into one word of the agent and its object. On the other hand, it does not imply *affirmation* or *aſſertion*, as grammarians have hitherto ſuppoſed, becauſe no word expreſſive of this enters into its compoſition. The operation of a verb is indeed poſitive; and therefore that implication which writers on this ſubject call *aſſertion* may be conſidered to belong to it, but this is rather an inference formed by the mind than a property inherent in the verb; and is confined to a certain mood or form of it. We underſtand the *indicative* to aſſert, but this aſſertion is loſt in the *imperative*, *ſubjunctive*, and *infinitive*. So that if *aſſertion* be eſſential to a verb, a verb ceaſes to be a verb in theſe moods.

A verb implying an abſtract idea, and therefore often indefinite and obſcure, may be aſcertained in regard to its meaning by recurring to the noun from whence it has been derived. This noun, which probably is the name of ſome ſenſible object, ſuggeſts its *primary ſenſe*, a circumſtance of great importance in the conſtruction of a *philoſophical dictionary*, a work exiſting in no language, and much wanted in every language. "The moſt neceſſary verbs," ſays Dr. Crombie in his Engliſh grammar, p. 81. in every language, are thoſe, the ſignification of which is the moſt extenſive, and which would originally be of moſt general uſe, ſuch as verbs denoting exiſtence, poſſeſſion, acting and being acted upon. Of this kind in our language, are the verbs *to be, to do, to have.*"

We will take theſe, which this grammarian has cited, as examples to illuſtrate our theory. In the Great Indian language, *baa-o* is *air*, and *air* is the medium of exiſtence; it gave birth to the verbs of *being* in moſt languages. Hence *bodan* in Perſian; *be* in Anglo-Saxon and Engliſh; βιοώ in Greek, and the digammated *vivo* in Latin, and *bwy* in Celtic. On the ſame principle the Hebrew אור, *awr, light, air*, is the parent of our words *are, were, was*, and of the Latin *ero, eram*. *To do* is to put forth power: and this, with other verbs of the ſame kind, are borrowed from ſuch objects as put forth their fruits, ſuch as herbs, trees, the earth. Thus, ποιη, *the graſs*, gave birth to ποιεω, *to produce*. Hence ſuch phraſes as ποιειν καρπον, *to produce fruit*; δρυς, *is the oak*; and hence δραω, *to bring forth as the oak*; φαγος, *the beech*, hence *facio*, to yield fruit as the beech; פרח, *pharag*, means *a flower*; hence πραγω or πρασσω, *to effloreſce* or *fructify*. In Chaldee ארק, *aruk*, is *the earth*; hence in Greek εργον, εργαζω, and our verb *work*. In the ſame way δοω, *do, to give, yield*, is the real ſource of the Engliſh *to do*.

Now, it is very evident that the principle which converted one of theſe nouns into a verb, is that which converts all other nouns into verbs. If this be the caſe, Dr. Crombie and other followers of Mr. Horne Tooke are miſtaken, when they ſuppoſed that the junction of one of theſe verbs to a noun, cauſed that noun in proceſs of time to aſſume the character of a verb. And here we may obſerve that an infinitive verb, as ſeparated from its agent or ſubject, is in reality an *abſtract noun*. In this ſtate the prepoſition *to* is prefixed to it, and its uſe is to be aſcertained from its etymology. In Arabic אתא is a verb which ſignifies motion to a place or object. Hence in Celtic (*atto*, it) became a prepoſition denoting an *end*, or the point to which motion tended. In paſſing to Perſia it dropped the initial vowel, and in the form of *taa* it denotes, in Perſian, the interval in which motion reaches its object, or that object itſelf, and thus became the parent of our *to*, which it perfectly reſembles in ſound and ſenſe. *To* then denotes that point of time or place to which motion or action tends, and in which it terminates; and prefixed to an infinitive verb, thus converted by abſtraction into a ſpecies of verbal nouns, holds it forth as the object to which the preceding verb is directed; thus, *I deſire to learn*, I deſire, and the object or end of that deſire is *learn* or *learning*. He commanded me to tell you, he commanded, and the object which that command reſpects, is, that I ſhould tell you. This explanation appears juſt, from the circumſtance that when the infinitive verb is the immediate ſubject of action rather than a more remote object to which an action tends, the prepoſition *to* is dropped; as *I do plow, i. e.* I uſe the plough, or act the plough.

Let us next ſee what Mr. Tooke ſays on this ſubject. "The prepoſition *to*," ſays he, vol. i. p. 350, "is the Gothic ſubſtantive *taui*, or *tauhts, i. e. act, effect, reſult, conſummation*. Which Gothic ſubſtantive is, indeed, itſelf no other than the firſt participle *tauid*, or *tauids*, of the verb *taugan, agere*. And what is done is *terminated, ended, finiſhed*. After this derivation, it will not appear in the leaſt myſterious or wonderful that we ſhould, in a peculiar manner in Engliſh, prefix this ſame word *to* to the infinitive of our verbs. For the verbs in Engliſh not being diſtinguiſhed, as in other languages, by a peculiar termination, and it being ſometimes impoſſible to diſtinguiſh them by their place, when the old termination of the Anglo-Saxon verbs was dropped, this word *to, i. e. act*, became neceſſary to be prefixed, in order to diſtinguiſh them from nouns, and to inveſt them with the verbal character. For there is no difference between the noun *love*, and the verb *to love*, but what muſt be comprized in the prefix *to*." And he goes on, p. 355, "*Do*, the auxiliary verb, as it has been called, is derived from the ſame root, and is, indeed, the ſame word as *to*. The difference between a *t* and a *d* is ſo very ſmall, that an etymologiſt knows by the practice of languages, and an anatomiſt by reaſon of that practice, that, in the derivation of words, it is ſcarce worth regarding. And, for the ſame reaſon that *to* is put before the infinitive, *do* uſed formerly to be put before ſuch other parts of the verb which likewiſe were not diſtinguiſhed from the noun by termination. As we ſtill ſay—I do love, inſtead of I love. And I *doed*, or *did* love, inſtead of I loved. But it is worth our while to obſerve, that if a diſtinguiſhing termination is uſed, then the diſtinguiſhing *do* or *did* muſt be omitted, the *termination* fulfilling its office. And, therefore, we never find—*I did loved*, or he *doth loveth*. But I did love, *he doth love*."

It is neceſſary briefly to expoſe what we conceive to be the fallacy and abſurdity of this reaſoning. *To*, in ſound and ſenſe, is the fartheſt poſſible from the Gothic *taugan*, which is only the Greek τευχω, *to fabricate*, the true origin of *to* being the Perſian *taa*, which has preciſely the ſame meaning with it. It is altogether unneceſſary to prefix the *to*, in order to diſtinguiſh the verb from its correſponding noun, becauſe this is done by the context, or the collocation of the verb; and what is moſt remarkable, when *to* is prefixed, the verb loſes its verbal character, and becomes a noun by abſtraction. That an infinitive verb has the nature of an abſtract noun, is manifeſt from this. In all languages it may be made the ſubject or object of diſcourſe; and, in Greek, it admits of the article before it, as nouns do; and in all inſtances whatever, an abſtract noun, where ſuch exiſts, may be ſubſtituted for it.—I deſire to learn, *i. e.* I deſire learning.—To excel in learning is honourable, *i. e.* excellence in learning is honourable. So then, according to Mr. Tooke, *to* is put before a verb to diſtinguiſh it as a verb when it has ceaſed to be a verb—when, from a verb, it is become a noun. And the reaſon why we ſay *he doth love*, inſtead of *he doth loveth*, is not that the termination ſupplies the place of *to*, but becauſe *loveth* and *love* are one a verb, the other a noun, which laſt does not admit ſuch a termination.

The converſion of *to* into *do*, ſo as to become a verbal index, is a conceit of this writer, equally unwarrantable. *Do*, as we have ſhewn, is the *identical* Latin *do, to give, to place, to produce*, or *put forth*, where it has ſuch meaning, in the following phraſe—*dare operam*, to put forth exertion, *i. e.* to exert, endeavour. And yet Mr. Tooke has been followed and ſupported by all ſubſequent grammarians in the above incorrect and inconcluſive reaſoning. "The form," ſays Dr. Crombie, p. 83, "of the infinitive *to love*, is, doubtleſs, the ſame as *do love*, thus denoting the ſimple energy of the emotion, ſignified by the noun, *d* and *t* being kindred letters, and eaſily convertible. To love, therefore, means *act love, do love*, the word *do* or *to* inveſting the noun with a ſort of verbal character. The infinitive, then, expreſſes ſimply the action or energy of that attribute which is denoted by the verb, uncompounded with the various accidents of mood, tenſe, number, and perſon." This laſt ſentence is a juſt deſcription of the infinitive mood which Dr. Lowth very properly calls the *ſubſtantive mood;* and it is a correct deſcription of an abſtract verbal noun. How then can *to* or *do* inveſt the noun with a ſort of verbal character; when, if it be an index of any thing, it is an index of a verb changed into a noun? A reſpectable writer on grammar, in the New Britiſh Encyclopædia, p. 31, following the tract which Horne Tooke has pointed out, thus adds: "The infinitive mood, as it is commonly called, is the verb diveſted of its peculiar force, *viz.* of affirmation, and uncompounded with thoſe words which render it expreſſive of perſon, number, &c. and in the modern languages of time: but it ſeems erroneous to conſider this as the fundamental form of the verb, where it has any diſtinguiſhing termination; it is then the *noun ſtate* of the word, with a termination added to it, to ſhew that it is to be employed as a verb. Thus, in the Anglo-Saxon *thean, the* is the fundamental form of the verb, and *an* is the *verbalizing adjunct*. Now, as the imperative form of the verb is nothing more or leſs than the ſimple verbal name, unattended with the inference of affirmation, this may be conſidered the fundamental form: and in the Latin in particular the variations of flexion are traced with the greateſt advantage from this ſource."

It is curious to obſerve the contradictions and abſurdities into which writers plunge themſelves, when they have adopted erroneous poſitions to account for the phenomena of language. Mr. Tooke, aſſenting to the ancient Stoics, thinks the pureſt ſtate of the verb to be the infinitive, and yet agrees with his followers in making *affirmation* or *aſſertion* to be the eſſence of a verb. But it is allowed that a verb drops its affirmation in the infinitive; ſo that, according to this reaſoning, a verb is in its pureſt ſtate when without its eſſence. Again, the infinitive is here not improperly called the *noun ſtate, i. e.* an abſtract noun, with the prefix *to* in our tongue; but in the Anglo-Saxon with the affix *an*, to ſhew that it is a verb: and as this is a new idea, *an*, in a new language, is called the *verbalizing adjunct*. But what evidence is there for ſaying that *an* performs this office? No evidence at all, but a falſe aſſumption. We have already ſaid that the Gothic and Anglo-Saxon *an* is but the Greek infinitive ειν, or (in verbs in αω), αν, which is the ſame without the change of a letter. We have this further evidence of the derivation of the Northern language from the Greek, in this reſpect, that in this latter the imperative, inſtead of being the fundamental form of the verb, is, by corruption, derived from the infinitive. Thus, γραφειν was the old infinitive; γραφειν was alſo the imperative; but the final ν being, by degrees, dropped, it became γραφε. And it is remarkable, that in the Anglo-Saxon the imperative is derived from the infinitive, in the ſame manner preciſely as the imperative is from the infinitive in Greek; and this correſpondence, added to the identity of the termination, we deem a ſufficient proof that the Northern, in this reſpect, is no other than the Greek tongue. The Latin imperative is borrowed from the Greek, as is evident on inſpection;—γραφε, γραφετω; *ſcribe, ſcribeto.* And the poſition, that the variations of inflexion may be traced with advantage from the Latin imperative, is a fancy, which is contradicted by that broad analogy by which the Latin verbs are formed from the preſent tenſe. It is worthy of remark, that the old Greek accords with the Hebrew, where the imperative is the ſame with the infinitive, and ſucceeds it in the paradigm of verbs. We ſhall only, on this ſubject, expreſs our ſurpriſe that, if theſe ſenſible men were deceived by adopting the notions of Mr. Tooke, they were not repelled by what appear to us to be contradictions. This grammarian gravely tells us that deliberate art had no concern in the formation of language: yet, in examining its phenomena, he recurs to minute mechaniſm and petty artifices, which, as being unwilling to allow the agency of a rational law in the human mind, he calls the *contrivances of language*.

We now proceed to conſider briefly the uſual diviſions of verbs into *active, paſſive*, and *neuter:* and this diviſion of verbs we pronounce to be extremely unphiloſophical. And firſt, as the expreſſion of active qualities is eſſential to verbs, there is no ſuch thing as a *neuter* verb. There are, indeed, verbs which denote *reſt*, or the ceſſation of *motion;* but we cannot uſe even theſe without connecting with them poſitive ideas: and as action is neceſſary to deſtroy or ſupport action, we can reſolve all apparent neuter into active verbs. Thus *to ſtand*, is *to cauſe to ſtop; to ſleep*, is *to enjoy repoſe; to ſit*, is *to hold one's ſeat.* Secondly, the diviſion of verbs into active and paſſive, though convenient in ſome languages, is incorrect and even abſurd in our own tongue. For all active verbs imply paſſion; while all paſſive verbs on the other hand imply action. Hence the one may aſſume the form of the other without altering its nature. Thus, *ille amat parentes*, he loves his parents, is the ſame in ſenſe as *parentes amantur ab illo*, his parents are loved by him. The only difference is that, in the firſt inſtance, the agent is nominative, and the object accuſative: in the ſecond, the object, becoming the ſubject of the verb, is put in the nominative, and the agent in the ablative. An agent, while it acts, is acted upon. Every active verb, therefore, has the compound ſenſe of active and paſſive. Thus, in the above ſentence, *he loves his parents*, the firſt part, *he loves*, is active; the laſt, *loves his parents*, is paſſive. In the ſame ſentence, converted into the paſſive form, *his parents are loved by him:* the firſt part is paſſive, and the laſt active. In the infancy of language, the diſtinction of active and paſſive was in all probability not known. In Hebrew, the difference but imperfectly exiſts, and in the early periods of it probably did not exiſt at all. In Arabic, the only diſtinction which obtains, ariſes from the vowel points, a late invention, compared with the antiquity of that language. And in our own tongue the names of active and paſſive would have been unknown, if they had not been imported from the Greek and

Latin grammars. In Engliſh the paſſive form of the verb is expreſſed by the connecting verb *to be*, and the perfect participle; and in converting an active into a paſſive propoſition, we need only change the verb to its perfect participle, and ſubjoin it to the connecting verb in the ſame mood and tenſe, and annexing the agent with its correſpondent prepoſition in the ablative caſe. Thus, we worſhip God, becomes *God is worſhipped by us*. Hence it appears that verbs which are tranſitively active can be made paſſive, becauſe they have an object, which, in the paſſive form, is made the ſubject of diſcourſe; and that verbs intranſitively active cannot have a paſſive form, becauſe they have no object.

The paſſive voice, in all languages, is expreſſed by the connecting verb, and the perfect participle for its predicate; and it is curious to obſerve, that this combination is its origin in the Greek tongue, the ſubject of diſcourſe being combined with the perſonal pronouns in the dative caſe. Thus, οικος μοι, *houſe for me*, which do not, as before, coaleſce as a ſubject with an agent; but as a ſubject with the perſon to whom it belongs, and for whom it was intended. Hence their combination came to convey the idea *I am houſed*, *I am built*: for the auxiliary *am* ſerves only to aſſert that *houſed* or *built* belongs to the pronoun preceding it, and to cement their union in the mind as ſubject and predicate. In the ſame manner, if σοι, τοι, be annexed to the word οικος, we have οικος σοι, οικος τοι, *houſe for thee*, *houſe for him*. And theſe contractions, by ſlight changes, became οικιζομαι, οικιζεσαι, οικιζεται, *I am built*, *thou art built*, *he is built*.

A verb, if its operation paſs over to another thing, or if it have an object to expreſs the effect of that operation, may be called *tranſitive*; but if its influence do not paſs over, or if it have no object, it is *intranſitive*. Verbs, on the other hand, not expreſſing action, but *being*, *poſture*, *continuance*, and ſerving to aſſociate two things, as a ſubject and predicate, may with propriety be called *connecting* verbs. Of this claſs is *am*, with all its branches, or the correſponding verbs in Latin and Greek. And here it is proper to obſerve that verbs of motion came in all languages to ſignify *continuance*, *poſture*, and the like, becauſe we can meaſure *duration*, or even *reſt*, and privation of motion, only by ideas conſequent on motion. Thus, in our own tongue, "a diligent boy will *become* a learned man." "By thee diſpoſed into congenial ſoil, *ſtands* each attractive plant," *i. e. is diſpoſed*. So in Latin, "Quum placidum ventis *ſtaret* mare," when the ſea *ſtood* (*i. e. was* continued) tranquil from the winds. Veniet lenior, ſhe will come milder, *i. e.* will *be* or *become* milder. Vixiſſet immundus ſus, he would have lived, *i. e.* he would have become a filthy pig. Ego incedo regina, I walk a queen, *i. e.* I am a queen. Theocritus, ſpeaking of the iraſcibility of *Pan*, writes Και οι αει δριμεια χολα ποτι ῥινι καθηται, keen anger always *ſits* in his noſe, *i. e.* the breath of anger always continues in his noſtrils, or, he is ever iraſcible. On this principle it is that εχω, in Greek, as implying continuance or poſture, came to have the ſenſe of *am*—καλως εχω, *I am well*; and that εω, *I am*, and ιω, *I go*, were originally the ſame. And in Latin *eaco* became, for a ſimilar reaſon, into *eſceo*, which occurs in Lucretius in the ſenſe of *eſt*. From *exire* the Italians have derived *uſcire*, to go out, end, and *uſcio*, *exitus*, a door, or avenue. Hence we have derived *to uſher*. The Italian ſtato, *been*, owes its derivation from *ſto*, to the ſame mode of thinking. All verbs, then, are either tranſitive or intranſitive, or connecting verbs. And this diviſion appears to us obvious, uſeful, and philoſophical.

The properties of verbs are mood, tenſe, number, and perſon. On theſe properties, as they are diſcuſſed in all grammars, (ſee L. Murray's valuable Grammar of the Engliſh Tongue: Dr. Crombie on Etymology and Syntax; Dr. Prieſtley's Philoſophical Grammar, and particularly Mr. Pickbourn's excellent Diſſertation on the Engliſh Verb,) we ſhall content ourſelves with a few obſervations. Mr. Tooke, vol. ii. 473, ſays that mood, tenſe, number and perſon are no parts of the verb. But this opinion will appear to be erroneous, if we reflect on the manner in which verbs are derived from nouns. For the perſonal pronouns in each number enter into the compoſition of a verb in the ancient languages, where it is diſtinguiſhed by perſonal termination; though we acknowledge the aſſertion to be juſt in Engliſh, where the verb is known only from the annexed pronoun, or its connection with the agent and object. Again, if we reflect on a verb in its formation, we perceive it to contain an idea, the reſult of obſervation and experience, which, as *paſt*, is *certain*, *abſolute*, and *unconditional*. This certain, abſolute, and unconditional form is eſſential to the verb, and it conſtitutes that *mode* or *manner* called the indicative mood. As the indicative mood reſpects the paſt time; ſo the ſubjunctive, in reſpect to it, regards the future. And as all future events, at leaſt with reſpect to man, are *uncertain*, *relative*, and *conditional*, all verbs, expreſſing an uncertain, relative, or conditional ſenſe, are in the *ſubjunctive*, ſo called from its being *ſubjoined* to a verb in the indicative. All verbs, moreover, expreſſing an *end* or *intention*, as being from their nature uncertain, are uſed in the ſubjunctive; and for this reaſon it might be called the *final mood*. In this view it has a cloſe affinity to the *infinitive*, which, as we have already obſerved, is only an abſtract noun with the prepoſition *to*, denoting the end or object to which the preceding verb is directed. Accordingly, they may be ſubſtituted one for the other, in all inſtances. Thus, *I deſire to learn*; I deſire, the object of my deſire being learning; I deſire that I ſhould learn; I deſire, *that* being my end, I ſhould learn. Hence it follows that the ſubjunctive mood is not eſſential to language, and for this reaſon it does not exiſt in Hebrew and ſome other tongues. As a command is neceſſarily given in the time *now*, the imperative has no tenſe but the preſent, nor can it, in ſtrict propriety, have a firſt perſon, ſingular or plural; becauſe it would be abſurd in a perſon to command himſelf. *Let me love*, then, is not the *firſt* but the *ſecond* perſon, as may appear by ſubſtituting *permit* for its equivalent *let*, *Permit thou me to love*.

Finally, if we reflect on the verb in its element, we ſhall find that *time paſt* is eſſential to it, becauſe the converſion of a noun and the annexed pronoun into a verb is in conſequence of paſt experience or obſervation. But as preſent feeling or conſciouſneſs coaleſces with our reflection on the paſt, the verb, which owes its exiſtence to the paſt, comes to ſignify alſo the preſent. And this is the reaſon why in Hebrew, the moſt ancient language, the ſame form of the verb expreſſes the paſt and the preſent time; and this, too, appears to be the reaſon why in Engliſh and all other languages a verb in the preſent tenſe is often uſed, in an extended ſenſe, to comprehend all time, preſent and paſt. As, *the ſun riſes every day*; *birds fly*; *truth is always one*. In theſe and ſimilar inſtances no reference is made to the *future*; unleſs the future, by aſſociation, inſenſibly in our minds coaleſces with the paſt. But men ſoon became ſenſible of the neceſſity of limiting the verb in regard to time. They ſoon acquired a diſtinct notion of the three diviſions of time into preſent, paſt, and future; and in order to vary the terminations of the verb, ſo as to correſpond to theſe diviſions, nothing more was neceſſary than to follow the impulſe of aſſociation acting on accidental corruptions. Hence the origin of tenſes, which, as the word implies, are the *extenſion* of the verb by diſtinguiſhing terminations to expreſs the diviſions of time. And here we cannot help obſerving, how improper it is to call tenſes, and ſimilar contrivances, *abbreviations,* (as is done by Mr. Tooke,) a name, the very reverſe of what a tenſe purports to be. The formation of the tenſes in Hebrew is worthy of attention, and ſhews that the human mind, under the influence of a rational law, without perhaps the expreſs exertion of reaſon, may produce a contrivance for its beauty and ſimplicity truly admirable. In that language the diſtinguiſhing termination is the perſonal pronoun, annexed or prefixed. Now, ſuppoſe תִי, *ti,* a fragment of the firſt perſonal pronoun, to mean *I.* It will alſo become a natural index of the time now, whenever the ſpeaker uſes it in connection with a verb, becauſe he meaſures the preſent moment by the uſe of it, or by reflecting on himſelf when uſing it. This being the caſe, a verb *preceding* TI will be a paſt verb, by pointing, as it were, the attention backward, as *Pegod-ti, viſited I,* or *I viſited;* while a verb *ſucceeding* the ſame particle expreſſes the *future* time: the pronoun, being the index of the preſent time, points now the attention forward, as *ti-pegod, I viſit,* (meaning *I will viſit).* But for *tia,* the other fragment of the perſonal pronoun, is uſed *apegod.* In modern languages which have no diſtinguiſhing terminations, the notification of time future is but an inference drawn from verbs of volition or deſire, in conſequence of the conſtant aſſociation of the object of that volition or deſire with time to come: as *I will learn,* which meant, at firſt, *I am reſolved to learn,* and then the time when the reſolution is to be performed. Thus *ſhall* and *will,* which are the Hebrew שאל, *ſhaal,* and the Greek βουλω, *volo,* in a ſecondary ſenſe become indices of time to come. It is here of importance to remark, that though *ſhall, will,* with *do, may, have,* &c. are called auxiliaries, they are ſtill leading verbs, and govern thoſe, which they are ſuppoſed to ſubſerve, in the infinitive mood.

The Greek has been repreſented as very like the Shanſcrit; but in truth, the old Æolic dialect, whence the Latin is derived, claims a much cloſer affinity with the great Indian language; and in that dialect of it which is ſpoken in Bengal, the mark of the future tenſe is *bo.* Thus *hoibo, I ſhall be,* is the future of *hona;* juſt ſo is the Latin *amabo,* the future of *amo; abo* being originally *awo,* a form of the verb denoting *cauſative,* and thence *ſucceſſion,* or tranſition in regard to time. Mr. Tooke, indeed, in his uſual manner, ſuppoſes *amabo* to be an abbreviation of *amaboule, amaboul, amabo,* ſee vol. ii. 434. But the primary ſenſe of βουλω is *to will,* or *deliberate;* and upon the ſame principle that this verb became an index of future time, any other verb or form of a verb would be made an index of it by aſſociating its object with futurity. The ideas which this grammarian had of language are altogether mechanical; and by rejecting the principle of mind, while continually hunting after blind mechaniſm, he ſeems to us not to have ſuſtained the character of a philoſopher in explaining its phenomena.

The Origin and Properties of Participles.

Mr. Harris's account of participles is as follows: Every complete verb is expreſſive of an *attribute of time,* and of *an aſſertion.* Now if we take away the aſſertion, and thus deſtroy the verb, there will remain the attribute and the time, which make the eſſence of a *participle,* p. 184. This ſtatement has conciſeneſs and ſimplicity to recommend it, though we do not regard it as correct. Mr. Tooke gives us the following account of participles. "This ſort of word is by no means the ſame with a *noun adjective.* The participle has all that a noun adjective has; and for the ſame reaſon, *viz.* for the purpoſe of *adjection.* But it has likewiſe ſomething more than a noun adjective has; becauſe the *verb* has ſomething more than the noun. And that ſomething more (as Perizonius proceeds to aſſert) is not only the adſignification of time, for every verb has a ſignification of its own, diſtinct from *manner* and *time.* And language has as much occaſion to *adjective* the diſtinct ſignification of the verb, and to adjective alſo the *mood,* as it has to adjective the time. And it has, therefore, *adjectived* all three—the diſtinct ſignification of the ſimple verb, and the verb with its moods, and the verb with its tenſes. I ſhall at preſent notice only ſix of theſe verb-adjectives, which we now employ in Engliſh, *viz.* the ſimple verb, itſelf adjective; two adjective tenſes, and three adjective-moods.

"We had formerly in Engliſh only the ſimple *verb-adjective,* and the paſt tenſe adjective. In addition to theſe two, we have now the convenience of four others, which I muſt call the *potential mood active adjective;* the potential mood paſſive adjective; the official mood paſſive adjective; and the future tenſe active adjective. As the noun adjective always ſignifies *all* that the unadjectived noun ſignifies, and no more, except the circumſtances of adjection; ſo muſt the verb adjective ſignify *all* that the unadjectived verb ſignifies, and no more, except the circumſtance of adjection. But it has been uſual to ſuppoſe, that with the indicative mood, as it is called, is conjoined alſo the ſignification of the preſent time, and, therefore, to call it the indicative mood preſent tenſe. And if it were ſo, then indeed the word we are conſidering, beſides the ſignification of the verb, muſt likewiſe adſignify ſome manner and the preſent time; for it would be then the preſent tenſe adjective as well as the indicative mood adjective. But I deny it to be either. I deny that the preſent time, or any time, or any *manner,* is ſignified by that which is called improperly the indicative mood preſent tenſe. And, therefore, its proper name is merely the verb—*indicative,* if you pleaſe, *i. e. indicative* of being merely a verb."

Our readers, we are ſure, will not be able to peruſe this account without ſurpriſe; and we ſhall endeavour to ſet it aſide by a more ſimple and rational account of the participle. The *preſent participle* denotes the operation of a verb without regard to any agent; the *perfect participle* denotes the ſtate, power, or habit, generated by that operation in a perſon or thing which is the object of it. If this ſtatement be juſt, the participle in its genuine ſtate is rather a verbal *noun* than a verbal *adjective,* and has a cloſe affinity to the infinitive mood. Hence, we can account for the origin and uſe of the participle. The Hebrew, and more eſpecially the Arabic, form their verbal nouns by what is called *nunnation,* or the ſyllable *on* added to the verb; and this is the Greek participle in ων, which the Latins have converted into *ens;* but which we, by giving *n* a naſal ſound, have corrupted into *ing.*

As the participle is a verbal noun, we ſee the reaſon why in all languages it is either uſed as a noun, or gives birth to various claſſes of abſtract nouns. The preſent participle, as expreſſing an operation, naturally coaleſces with an agent, and this is the reaſon why in Hebrew, in Greek, and ſometimes in Latin, it denotes a doer, or a perſon who acts; as ὁ γραφων, *he writing, the writer; amans, he loving, the lover.* From its facility to coaleſce with a noun, the participle loſes its nominal character, and becomes an *adjective;* and as it denotes an active quality, or a power in energy, it forms, with the connecting verb *to be,* the three active compound tenſes—*I am writing—he was writing—they ſhall be writing.*

Farther, as all operations are in *time,* and we acquire the idea of time preſent by reflecting on ſucceſſive operations, the preſent participle implies *time* unlimited, and in its aſſociated

ciated effect *time preſent, i. e.* time preſent, not abſolute, but *relative.* Thus, *I am writing, i. e.* I am *now* writing; I was writing, *i. e.* I was writing *at the time then* preſent. And, in general, the participle is defined by the concomitant verb in the ſentence which may be either preſent, paſt, or future. If the verb be paſt, it marks the paſt time as then preſent; if future, it marks the future as hereafter preſent. And thus is refuted the opinion of Mr. Tooke, that there is no *adſignation of time* in the preſent participle. But as he may pronounce this argument a mere evaſion, I will illuſtrate it by a parallel inſtance in Greek. The ſubjunctive verb τυψω, τυψῃς, &c. is thought to be the *firſt aoriſt;* but it is really the *firſt future,* and this is proved by its ſignification as well as by analogy, for in all inſtances this expreſſes a *future* time, not indeed abſolutely ſo, but future in regard to another verb connected with it in the ſentence. For example, "and they aſked him, ſaying, if it be lawful to heal on the ſabbath-day, that they might accuſe him," ἱνα κατηγορησωσιν. To accuſe him was their end in aſking, and in regard to that act was *future,* though now long paſt. Finally, things which act in conſequence of acting, acquire a *diſpoſition* to act, juſt as bodies when moved have a tendency to move. Repetition, moreover, imparts to the acting quality additional ſtrength, protenſion, and permanence. To expreſs it with the propenſity and vigour thus attained by uſe the participial termination ων in Greek is added to a noun or to an adjective, which, as receiving an additional meaning, is called an *augmentative.* Thus, ειρων, *ſpeaking,* means alſo one who is prone to ſpeak, which is the character of the ſcoffer or diſſembler; απατων, *deceiving,* one given to deception, a great deceiver; κακος κακιων, *more wicked, increaſing in wickedneſs.* And from this the Italians have derived one way of augmenting their nouns. Hence, our *ſaloon,* (a great hall), *balloon,* and, perhaps, *poltroon,* the augmentative of *paltry.*

The perfect, or paſt participle, is certainly derived, as Mr. Tooke repreſents, from the paſt tenſe.—*Amavit, amavitus, amatus;—docuit, docuitus, doctus;—legit, legitus, legtus, lectus;—audivit, audivitus, auditus. Us,* which is the Greek ος, is added to the third perſon as the analogical termination of nouns, to ſhew that the verb is now abſtracted into a verbal noun, denoting the effect of the action. Accordingly *amatus, doctus, lectus, auditus,* and the like, are every one either abſtract nouns of the fourth declenſion, or verbal adjectives coaleſcing with another noun. And here we ſhall quote a paſſage from the Encyclopædia Britannica, (p. 86.) to ſhew into what errors grammarians have fallen, by not having attended to the *nominal character* of the participle: "From theſe obſervations and examples," ſays the writer, "we ſhall be able to underſtand the two uſes of the adjective. It is either employed to *reſtrict* or *modify* a *general term;* or the abſtract ſubſtantive contained in the adjective is modified by the noun with which, in the concrete or adjective form, that abſtract ſubſtantive is joined. The firſt may be called the *direct,* the ſecond the *inverſe* acceptation of adjectives. Livy, ſpeaking of the abolition of the regal authority at Rome, ſays; "Regnatum eſt Romæ ab urbe *condita* ad *liberatam* annos ducentos quadraginta quatuor:" Monarchy ſubſiſted at Rome, *not* from the city built (which would convey no meaning,) but *from the building* of the city, to its deliverance. Both the participles *condita* and *liberatam* are here uſed inverſely, *i. e.* the abſtract ſubſtantives contained in *condita* and *liberatam* are modified and reſtricted by the ſubſtantives *urbe* and *urbem,* with which they unite. Again, Ovid, ſpeaking of the conteſt between Ajax and Ulyſſes for the arms of Achilles, has theſe lines:

> "Qui licet eloquio fidum quoque Neſtora vincat
> Haud tamen efficiet, deſertum ut Neſtora crimen
> Nullum eſſe reor."

Here alſo the adjective or participle *deſertum* is taken inverſely, and the general notion of *deſertion* contained in it is modified or rendered particular, by being joined with the ſubſtantive *Neſtora.* The meaning of the paſſage is, "I will never be induced to believe, that the deſertion of Neſtor was not a crime." Were *deſertum* to be taken directly as an adjective, modifying its ſubſtantive, the ſentence muſt be tranſlated, "I cannot believe that Neſtor deſerted was not a crime." But it is evident that this is nonſenſe; as Neſtor, whether deſerted or not deſerted, could not be a crime."

This writer was led by Mr. H. Tooke to conſider every adjective as a noun in its nature: he then makes a diſcovery in which he ſeemingly blames himſelf, which is this: inſtead of the adjective qualifying its noun; the noun inverſely qualifies its adjective! This able writer would not have uſed this language, if he had truſted to his own underſtanding, and had not allowed himſelf to be miſled by his guide. The participles *condita* and *liberatam,* though they here coaleſce with another noun, ſtill retain their original character of a ſubſtantive, and the hiſtorian has apprized his readers of this character by the *collocation,* where *condita* is rendered prominent and emphatic by ſucceeding the qualified *urbe.* The ſame obſervation applies to *deſertum Neſtora,* which is equivalent to *deſertionem Neſtoris.*

As the paſt participle expreſſes the effect of an operation, it has been called the *paſſive participle;* but when the ſubject of an operation is a moral agent, that effect is *habit,* or a voluntary principle of action. And thus it is, that the perfect participle often expreſſes or implies action; as, *admiratus, having admired; locutus, having ſpoken.* Sometimes in Greek and Latin it conveys a reflex ſenſe; as *ſtratus membra, having proſtrated his limbs;* πεπιστευμενος ευαγγελιον, *having the goſpel entruſted to me.* And laſtly, as the perfect participle is derived from a paſt verb, and, as it ſignifies an effect already produced, it points to time paſt; nevertheleſs, as that effect is a habit or power capable of action, it implies time preſent, and thus the paſt participle, comprehending both times, anſwers to the denomination of *perfect preſent.*

The Origin and Properties of Prepoſitions.

Mr. Harris defines a prepoſition to be a part of ſpeech, devoid itſelf of ſignification, but ſo formed, as to unite two words that are ſignificant, and refuſe to coaleſce or unite of themſelves. This definition is undoubtedly erroneous, and has been juſtly cenſured by Mr. H. Tooke. We venture, however, to affirm, that the account given by the laſt-mentioned writer, is by no means ſuch as a philoſopher, who accurately underſtood his ſubject, would give of prepoſitions. "As the neceſſity, ſays he, vol. i. p. 319, of the article, or of ſome equivalent, follows from the impoſſibility of having in language a diſtinct name or *particular term* for each particular individual idea; ſo does the neceſſity of the *prepoſition,* (or of ſome equivalent invention) follow from the impoſſibility of having in language a diſtinct complex term for each different *collection of ideas,* which we may have occaſion to put together in diſcourſe. The addition or ſubtraction of any one idea, to or from a collection, makes it a different collection: and if there were degrees of impoſſibility, it is ſtill more impoſſible to uſe in language a different and diſtinct complex term for each different and diſtinct collection of ideas, than it is to uſe a diſtinct particular term for each particular and individual idea. To ſupply, therefore, the place of the complex terms which are wanting in a language, is the prepoſition employed, by whoſe aid complex terms are prevented from being infinite or too numerous, and are uſed only for thoſe collections of ideas which we have moſt frequently occaſion to mention in diſcourſe. And this is obtained in the moſt ſimple manner in the world. For having occaſion, in communication, to mention a collection of ideas, for which there is no one ſingle complex term in the language, we either take that complex term which includes the greateſt number, though not *all* of the ideas we would communicate, or elſe we take that complex term which includes all, and the feweſt *more* than thoſe we would communicate; and then, by the help of the prepoſition, we either make up the deficiency in the one caſe, or retrench the ſuperfluity in the other. For inſtance, " A houſe *with* a party wall," " A houſe *without* a party wall." In the firſt inſtance, the complex term is deficient. The prepoſition directs to add what is wanting. In the ſecond inſtance, the complex term is redundant. The prepoſition directs to take away what is wanting."

Now this ſtatement appears to us to be more properly deſcriptive of *conjunctions* than of prepoſitions, it being made altogether in reference to *with,* which has, in the above inſtance, only a *conjunctive* ſenſe; as, a houſe *and* a party wall, *i. e.* a houſe *add* a party wall, or, as Mr. Tooke explains, *with* a houſe *join* a party wall. The following we deem a more juſt repreſentation. Prepoſitions expreſs the relations of things; and, as our ideas of relations are aſſociated effects, ariſing from our ideas of things, ſo the words expreſſing relations are borrowed from the things related, that is, prepoſitions originated in nouns and verbs. But we have ſeen, that the relations of things are alſo expreſſed by *caſes.* Caſes, therefore, and prepoſitions, have the ſame meaning; the former, indeed, being no other than the latter combining with nouns, and thus giving them different terminations, bearing diſtinct ſenſes. The three leading relations we have farther ſeen expreſſed by caſes, are *beginning, inſtrument* or *medium,* and *end.* Thoſe prepoſitions, then, which ſignify *beginning,* require the noun ſucceeding them to be in the *original* ſtate or poſition, or, agreeably to the uſual language, govern the *genitive* caſe. Thoſe ſignifying *inſtrument* or *medium* govern their dependent nouns in the *inſtrumental* or *medial,* or, as it is commonly called, the *ablative* caſe; while thoſe denoting the object or end to which an action or motion relates, to which it tends, and in which it terminates, have their governed nouns in the *final* or *dative* caſe.

We now proceed to aſcertain the meaning of the leading prepoſitions, by deducing them from their origin. And we ſhall find that Mr. Tooke, as his ideas are unſatisfactory and unappropriate in regard to the uſe of prepoſitions, is miſtaken in almoſt every inſtance, in reſpect to the ſources in which they originated. And here we muſt premiſe, that our ideas of beginning, medium, and end, are ſo palpable and diſtinct, and ſo eſſential to diſtinctneſs in our other conceptions, that they are nearly *coeval* with our ideas of things and of motions; and conſequently muſt have exiſted in the language of men, as ſoon as it reached a form deſerving of that name. And as we maintain, that all the varieties of human ſpeech which now exiſt, or have ever exiſted, are but branches propagated by various cauſes, (like the human race itſelf,) from a few parental ſtems in the one primeval language of mankind; ſo we maintain, that moſt prepoſitions in different languages, are but the ſame original words, differently corrupted, agreeably to the genius of the people who borrowed them from their anceſtors; and that the Engliſh prepoſitions, in particular, are antecedent to Anglo-Saxon and Gothic corruptions, or, as Mr. Tooke would ſay, *abbreviations,* and originated in oriental words, derived in many inſtances through the medium of Greek and Latin. The derivation of the conjunctions and prepoſitions is, indeed, the moſt ſpecious part of Mr. Tooke's ſyſtem; and not only in his own opinion, but in the opinion of the public, he lies ſo ſtrongly fortified, that no adverſary can diſlodge him. We ſhall, however make an attempt for this purpoſe.

" I imagine, ſays he, p. 367, that *of* (in the Gothic and Anglo-Saxon *af*) is a fragment of the Gothic and Anglo-Saxon *afara* or *afora, poſteritas, offspring,* that it is a noun ſubſtantive, and means always *conſequence, offspring, ſucceſſion,* or *follower.*" Now as to *afora* it is nothing but the Greek φορον, *produce,* from φερω, and the meaning of *of* is quite the reverſe of *conſequence,* &c. Thus, in the phraſe *rays of the ſun, of* points to the ſun as the origin of rays. It means, therefore, *ſource, origin,* and its derivation is אב, *ab,* root, ſtem, απο, αφ, *ab.* The genitive caſe, which correſponds to *of,* further proves this, *Solis radii,* where *is,* annexed to *ſol,* ſurely does not mean that the ſun is a conſequence of the rays, but that it is the origin of the rays. The ſource or cauſe of a thing is before that thing in the order of nature. Hence, according to the uſual arrangement in Latin, the noun in the genitive is put *before* that which proceeded from it, and this is the reaſon why in Engliſh we always ſay *father's houſe,* (*father is houſe,*) and never *houſe father's,* having copied not only the genitive termination of the third declenſion, but alſo the collocation of the noun affected by it. Moreover, not *of* but *after* came from the Gothic *afara,* becauſe this, meaning *offspring,* came alſo to denote *ſucceſſion,* or that which comes after thoſe who gave it birth. And in the Gothic it is uſed as a prepoſition ſignifying *paſt, after,* where the *t* is introduced to humour the pronunciation, as δ is inſerted in ανδρος for ανερος, or ανρος.

As *of* means beginning, it has the ſame ſenſe with *from*: which laſt Mr. Tooke derives from the Gothic and Anglo-Saxon *frum,* meaning *firſt, beginning.* This may be admitted. But whence did *frum* originate? The Latins, it is well known, converted the Greek termination ν into *m.* Thus the accuſative ιν became *im* or *em*; the genitive plural ων, *um,* and the neuter ending ον, is alſo *um* in Latin. On this principle πριν is the parent of *primus.* This laſt the Goths of Wallachia, where, as Michaelis obſerves, a Latin colony had been eſtabliſhed, and whoſe language, after thus blending with the Latin, is the only ſpecimen of the Gothic preſerved in modern days, have borrowed and corrupted in the form of *frum,* which retains the original ſenſe of *initium, principium.* But we are not yet arrived at the origin of the word. The Arabic פרע, *phra,* among other meanings, denotes *the head of a family*; which being rendered more general and abſtract, gave birth to the Greek πριν, πρὶν, to the Latin *præ,* to *fra* in the Icelandic, Norſe, Daniſh, Swediſh, to *fry* in Friſch, and *frae* in Scotch. And thus the Arabic origin of the word accounts for the different forms of *from, fra, fry, frae,* in the Northern dialects, the firſt being derived through the medium of Greek and Latin; the others immediately from Aſia. Mr. Tooke happens to be right in the meaning of *from,* merely becauſe the Gothic corruption of *frum* has correctly retained the original ſenſe of *primus.* He thus illuſtrates its ſignification. Figs came from Turkey; lamp falls from cieling; lamp hangs from cieling. Figs came, beginning Turkey, that is, Turkey the place of beginning to come. Lamp falls, beginning cieling; cieling the place of beginning to fall. Lamp hangs, beginning ceiling; ceiling the place of beginning to hang. This explanation is rational and juſt: but when he adds came is a complex term for one ſpecies of motion; falls is a complex term for another ſpecies of motion; hangs is a complex term for a ſpecies of attachment, though very true, this is nothing to the purpoſe. *Came, falls, hangs,* imply each motion or direction, and *from* points to the origin of the motion or direction in each, without any reference whatever to their peculiar meaning.

To the prepoſitions *of* and *from*, ſtand oppoſed *to*, *till*, and *for*. Mr. Tooke might, with equal propriety, derive *to* from his own name, as derive it from the Gothic *taugan*, to act, which is but the Greek τευχω, *to fabricate.* Equally abſurd is it to ſay, that the Latin *ad* is from *actum.* The parent word, as we have ſeen, is the Arabic אתא, *ata*, to move to a thing. In Celtic, the word has preſerved its original form *(atto,)* in the exact ſenſe of *to.* But in Perſian, loſing the initial vowel, it became *taa*; whereas, in Latin, retaining the firſt and dropping the laſt, it exiſts under the form of *ad*, and in Engliſh under that of *at*. *To* and *at* have a ſignification correſponding to their kindred origin, the former denoting the object of motion, the latter coaleſcence with that object after its reaching it. "That *till* ſhould be oppoſed to *from*, ſays he, only when we are talking of time, and upon no other occaſion, is evident for this reaſon, *viz.* that *till* is a word compounded of *to* and *while*, *i. e. time.* And you will obſerve, that the coaleſcence of theſe two words *to*, *while*, took place in the language long before the preſent wanton and ſuperfluous uſe of the article *the*, which, by the prevailing cuſtom of modern ſpeech, is now interpoſed. So that when we ſay, "From morn *till* night," it is no more than if we ſaid, "From morn to *time* night." When we ſay, "From morn *to* night," the word time is omitted as unneceſſary. So we might ſay, "From Turkey to the place called England, or to *place* England," p. 363. But *while*, or, as it is in the Anglo-Saxon, *hwile*, does not mean time but a *period*, or *revolution* of time, ſuch as a day, week, &c. and is derived from the Hebrew גול, *gul* or *geel*, to revolve, and *year*, or, as our anceſtors ſpelled it, *gear*, is derived from גור, *gure*, or in Greek γυρεω. The Hebrew *geel* is alſo the parent of our *wheel. To* points to a final object either in place or time, while *till*, in ſtrict propriety, is applied to time only, and is derived from τελλω, *to riſe*, and was at firſt expreſſive of the riſing ſun. Thus, "I will wait *till* morning," *i.e.* I will wait the riſing morning. As *till* denotes time, riſing, or alternation of time, the word is always underſtood to be followed by ſome change implied in the context, but never expreſſed: thus, "We are always inſenſible of a bleſſing, *till* (or *until*) we loſe it," then, "we *are* ſenſible of it," is a clauſe implied. "They will ſtay *till* morning;" and they will then depart, is to be underſtood. *Till* exiſts in the Cimbric language, and this is an additional proof, that the uncouth compoſite to *while* is a mere fiction of Mr. Tooke.

Mr. Tooke takes *for* to ſignify *cauſe*, as oppoſed to *of*, ſignifying conſequence, from the Gothic ſubſtantive *ferina*, *a cauſe*, p. 367. He thus illuſtrates them, I am ſick *of* my huſband, and *for* my gallant. Love makes her ſick *of* and ſick *for*. Here *of* and *for* ſeem almoſt placed in oppoſition. At leaſt their effects in the ſentence are moſt evidently different: for by the help of theſe two prepoſitions alone, and without the aſſiſtance of any other words, ſhe expreſſes the two contrary affections of loathing and deſire. Her diſguſt was the offspring of her huſband, proceeded from her huſband. Her gallant was the *cauſe* of her love. But if her diſguſt proceeded from her huſband, he was the *cauſe* of her diſguſt: and *of* and *for*, inſtead of being oppoſed to each other, as they certainly are, mean juſt the ſame thing, namely, *cauſe*, and not *cauſe* and *conſequence.* But in truth, the matter is juſt the reverſe of what our grammarian repreſents. *Of* means *cauſe* or *origin*, and *for* means *conſequence* or *end.* She is ſick of her huſband—ſhe is ſick, her huſband is the ſource of it—ſhe is ſick for her gallant, and the object to which ſhe looks with deſire is her gallant. Accordingly, *for* always ſuppoſes the attention not directed *backwards*, as to the cauſe, but *forwards*, as to ſome end; and its etymology is this, περαω, to *paſs* over, περ, or *per*, the medium of paſſing to an object; the French *pour*, *for*, the object or end to which paſſage is made. Johnſon gives *for* forty-ſix different meanings. But there is not one inſtance in which it does not bear a ſenſe deducible from its primary ſignification of *end* or *object.* Thus, Chriſt died *for* us; Chriſt died, *us*, (*i.e.* our redemption,) being the end or object of his death. To fight *for* the public good; to fight, the public good being the end or object of fighting. He does all things *for* the love of virtue. He does all things, the love of virtue being the end or motive of all his actions, and ſo in all other inſtances.

By (in the Anglo-Saxon *bi*, *be*, big) is the imperative of *byth* of the Anglo-Saxon verb *beon*, to be. And our anceſtors wrote it indifferently *be* or *by*. So then, according to this, our auxiliary *be* and the prepoſition *by* are of the ſame origin: and what analogy in the name of common ſenſe is there between them, excepting the accidental reſemblance of ſound. Let us apply this etymology to the ſolution of ſome example, "He was ſlain *by* the ſword," *i. e.* he was ſlain *be* a ſword, or, "let a ſword be." We might aſk let a ſword be what? Mr. Tooke has anticipated the queſtion by ſaying this prepoſition is frequently, but not always, uſed with an abbreviation of conſtruction: ſubauditur, *inſtrument*, *cauſe*, *agent*, &c. Really it appears to us ſurpriſing, that a man of taſte and underſtanding ſhould write thus. In Hebrew בא, *baa*, is *to paſs*, and is the parent of βαω in Greek. In Arabic and Perſian it became a prepoſition, ſignifying the medium of motion. In this ſenſe it gave birth alſo to the Latin *via* and to the Engliſh *way*, *bye*, and alſo to the Anglo-Saxon prepoſition *bi* or *be*, and the Engliſh *by*, which laſt was uſed by our old writers to ſignify the interval of time during which motion is continued; as, "By ſo long a time," *i. e.* for ſo long a time—By his life. *i. e.* during his life.

Then it came to ſignify the medium or inſtrument by which any action in general was performed. He was ſlain *by* the ſword—He was ſlain, the ſword being the medium or inſtrument of his ſlaughter. The derivation of *with* from *wyrthan* is no leſs abſurd. What has *with* to do with *wyr*, or, as we have it, *were*? The parent of this verb, which ſignifies *to exiſt*, is the Hebrew אור, *awar*, *light*, *air*, the medium of exiſtence. The Greek μητα, denoting *connection*, *concomitance*, *inſtrumentality*, has paſſed into the Anglo-Saxon in the form of *mid*, where it is corrupted into *with*, and exiſts in the ſame ſenſe in both forms. The letters *m*, *v*, *w*, are of the ſame organs, and often change one for another. Many Greek words are borrowed from the Hebrew, by changing מ into β; as משל, *maſal*, is βασιλευω, *to rule*; and all the Welſh words borrowed from Latin have *m* corrupted into *v*, *arma arve*; *mare voer*; *me ve.* Inſtances of this ſpecies of corruption occur in Anglo-Saxon and Gothic. Thus, the Gothic *weis* is the Greek ἡμεις: and hence the Anglo-Saxon, and the Engliſh *we*. Even *withan*, from which Mr. Tooke alſo derives *with*, is only the Latin *mitto*, *to ſeat*, *to put.* And not *withan*, as he ſays, but *ga withan* ſignifies *to join* or *put together.*

"The Engliſh prepoſition *through*, ſays our author, is no other than the Gothic ſubſtantive *daura*, or the Teutonic ſubſtantive *thurub*, and like them means *door*, *gate*, *paſſage*, p. 334." And he adds in the next paſſage, "After having ſeen in what manner the ſubſtantive *houſe* became a prepoſition in the French, you will not wonder to ſee *door* become a prepoſition in the Engliſh; and though in the firſt inſtance it was more eaſy for you to ſee the nature of the French *chez*, becauſe having no prepoſition correſponding to it in Engliſh; yet I am perſuaded you will not charge this to me as a fantaſtical or far-fetched etymology, when I have placed before you at one view the words employed to ſignify the ſame idea in thoſe languages to which our's has the neareſt affinity." After doing this, he adds, "Though it is not in Aſia or its confines that we are to ſeek for the origin of this part of our language, yet is it worth noticing here, that the Greek, to which the Gothic has in many particulars a conſiderable reſemblance, employs the word Θυρα for *door.*" All this is very ſpecious, and being confidently advanced, it has the aſpect of truth, though it be miſrepreſentation. The prepoſition *through* exiſts, as Mr. Tooke has ſhewn, in all the collateral languages; and it may be obſerved, what he has not, that there is a guttural annexed to the word *in all.* Thus in Engliſh *through*, Anglo-Saxon *thurub* or *thurb*, Gothic *therb*, German *durch*, Teutonic *duruc* or *durub*, &c. This uniformity in retaining a guttural, ſhews that a guttural was an original part of the word. And it is no other than the Hebrew דרך, *dark, road, paſſage,* which has given birth not only to this prepoſition, but to a multitude of other words in all languages. He came *through* Greece, he came, Greece being the *road,* a *paſſage* of his coming. The genial ſun warms *through* the air; the genial ſun warms; the *medium* or *paſſage* by which it does this, is the air. We ſhall only add on this ſubject, that the prepoſitions *down, neath, beneath,* exiſt in the Arabic, with little or no variation, and in the ſame ſenſe; while *among* is the Perſian *mecan, in the midſt,* the ſame with the Celtic *mewn.* In the Hindooſtanic it is ſounded with a naſal guttural, as if written *meng*, and by the ſame analogy that *mid* became *amid*; *bove, above; bout, about; meng* became *among.* The correſponding word in Hebrew is בין, *bin* or *been,* which means *ſeparation, diſtinction,* an idea the very reverſe of that contained in *mengan, to mix,* from which Mr. Tooke derives it. From ſignifying *ſeparation,* it came to ſignify the *interval* between two things ſeparated, and hence the Hebrew *bin* (or written with the *nunnation binon*) is the parent of the Anglo-Saxon *binnon, between, within.* The Greek περθα, *to overturn,* is in Latin *verto, to turn,* which the Anglo-Saxons have further corrupted into *weard-an, to turn to.* Hence, in the form of *ward* it came to ſignify the object to which the attention is directed; as *eaſtward, i. e. eaſt proſpect.* We add only the genealogy of *over,* Anglo-Saxon *ofer*; Greek ὑπερ; Hebrew עבר, *ober, to paſs over.*

We have already obſerved, that Mr. Tooke's deſcription of the nature and uſe of prepoſitions belongs more properly to the conjunctions. But we ought rather to ſay that it belongs to neither. Prepoſitions expreſs the relation of things, and thoſe relations are the ſame, whether things or the complex names of things are few or many: and the neceſſity of prepoſitions ariſes not from the impoſſibility of having a diſtinct complex term for each different collection of ideas, but from the neceſſity of thoſe ideas we have of things and their operations. It is therefore utterly erroneous to ſay, that the prepoſition is employed to ſupply the place of complex terms. On the other hand, the conjunctions ſerve to propoſe or to compare our ideas, to combine or to ſeparate them: and this uſe is entirely independent of the number or variety of complex terms. If the complex terms of a language be few, they cannot be ſo few as not to need being ſeparated; and if they be ever ſo numerous, they cannot be ſo numerous as not to need being joined in compoſition. Indeed what Mr. Tooke ſays on this ſubject is indiſtinct, inappropriate, and even nugatory; though ſome ſubſequent grammarians have gravely copied his reaſoning as oracular wiſdom.

The prepoſitions and conjunctions in Engliſh exiſt in the Anglo-Saxon and Gothic. But this circumſtance Mr. Tooke has kept out of ſight. He knew it would appear ſtrange to deduce words of this kind from verbs and nouns in the parent tongue, while the very ſame words exiſted in that tongue coeval, and in many inſtances antecedent to the nouns and verbs repreſented to be their origin. But whence came thoſe conjunctions and prepoſitions to the northern language? We have anticipated this queſtion by proofs from fact. Theſe branches of the northern tongue, as the northern tongue itſelf has done, originated in the oriental languages. The ſtructure of thoſe languages is ſuch, that the verb is the leading part of ſpeech, and not only the ſubordinate parts, but even the noun is derived from it. This doctrine is inculcated and ſupported by the moſt extenſive and obvious analogies, and taught in the popular grammar, ſo that no learner, who has made any progreſs in them, can be ignorant of the true origin whence thoſe particles including adverbs, prepoſitions, and conjunctions, are derived. The verbs, from ſignifying in the Aſiatic dialects the *actions* of things, degenerated to expreſs the *relations* and *connections* of thoſe things; and with ſome neceſſary variations incidental to ſounds, paſſed into Greek, Latin, and other tongues, in the form of prepoſitions and conjunctions; and they were thence propagated, with ſtill farther corruptions, into the Gothic, Anglo-Saxon, and other European dialects. Loſing much of their primary forms, and changed in ſignification, European grammarians ſoon conſidered them as diſtinct parts of ſpeech. And much uncertainty, confuſion, and obſcurity, hung for ages on the ſubject, till Mr. Tooke roſe and diſſipated the miſt, by aſſerting their true origin to be nouns and verbs. This he acknowleges, or rather boaſts to have been a mere *conjecture* at firſt; and it has this ſingular fate, that, while the conjecture itſelf is perfectly juſt, almoſt every inſtance alleged to ſupport it is erroneous and futile. Having no acquaintance with the oriental tongues, and ſeemingly little acquaintance with Greek and Latin, but endowed with a powerful mind, as we conceive, under ſome wrong biaſſes, and actuated by a deſire of opening new paths of ſpeculation, he boldly imputes the dignity of an ancient and independent language to oral corruptions, chiefly made by a barbarous people, ſo late as the dark ages. On ſome of theſe corruptions he lays his hands, and holds them forth to the public as the parents of thoſe words which long exiſted antecedently to thoſe corruptions. This we believe to be a juſt repreſentation of the queſtion, and our readers will hence be able to appreciate the merits of his ſyſtem. The following is the table of genealogy, which he gives of the leading conjunctions.

If	are the imperatives of	Gif	of their reſpective verbs	Gifan, *to give*
An		An		Au-an, *to grant*
Unleſs		Onleſs		Onleſan, *to diſmiſs*
Eke		Eac		Eacan, *to add*
Yet		Get		Gettan, *to get*
Still		*Stell*		Stellan, *to put*
Elſe		Ales		Aleſan, *to diſmiſs*
Though		Daf		Dafian, *to allow*
Bŭt		Bot		Botan, *to boot*
Būt		Beutan		Beon-utan, *to be put*
Without		Wyrthatan		Anan-ad dare congeriem.
And		An-ad		

We will briefly examine theſe. Skinner, before Mr. H. Tooke, has derived *gif* from the Anglo-Saxon *giſan, dare;* and perhaps this very word is the foundation of his theory, though he has not mentioned (and he may have forgotten) the circumſtance which gave birth to his conjecture. It is, however, important to obſerve, that the uſe of *gif,* as a prepoſition, is not of a late origin: for the Anglo-Saxons uſed it in that ſenſe, and derived it in common with the verb *giſan* from the Hebrew, Arabic, and Perſian word כף, *kaph, the palm*

palm of the hand. Now the action of the hand is two-fold, *to give* or *to receive.* In the latter ſenſe it has paſſed into Latin, and produced *capio, cæpio,* and even *habeo,* meaning *to hold;* in the former it has given birth to the Anglo-Saxon verb *gif,* which ſignifies the action of the hand in imparting. Our word *keep* is apparently of the ſame origin, meaning *to hold.* Mr. Tooke obſerves, that *gin* is uſed in our Northern countries, and by the Scotch in the ſenſe of *if,* and he juſtly ſays, that it is only a contraction of the participle *given.*

An, uſed by old authors, means *if,* as in the following lines, quoted by Johnſon:

> "An honeſt mind and plain: he muſt ſpeak truth
> *An* they will take it ſo; if not, he's plain:"

That is, *if* they will take it ſo. This Mr. Tooke derives from *anan,* to grant, which is only the Latin *annuo, to aſſent to;* whereas *an* is the Arabic particle אן, *an,* which is pronounced as if written *in,* when meaning *if.* We borrowed it from the Gothic, where it is employed, as it is alſo in Latin, to mark an interrogation. The derivation of *unleſs,* or, as it was formerly written, *onles,* from *on-les,* ſeems at firſt ſight not to be diſputed. The application of the Anglo-Saxon *onles* does not appear forced; as Troy will be taken, *onles* the palladium be preſerved, *i. e.* Troy will be taken, diſmiſs the palladium be preſerved, or, diſmiſs that circumſtance, namely, the preſervation of the palladium, and Troy will be taken. And yet we are perſuaded that this is not the true interpretation of *unleſs.* Mr. Tooke is not fair in explaining the words from which he would derive this and other particles; but, in order to anſwer his own purpoſe, gives them a meaning which they really do not bear. *Onleſan* is interpreted by *lye, un-leeſe ſc. un-looſe, ſolvere,* and it has no other meaning: and in this ſenſe it is incapable of ſolving the difficulty.—"Troy will be taken, *unlooſed* the palladium be preſerved," which is hardly ſenſe. Mr. Tooke acknowledges that the Anglo-Saxon writers have not given us inſtances of *onles* in a conjunctive ſenſe: "but, inſtead of it," adds he, "they frequently employ *nymthe* or *nemthe,* which is evidently the imperative *nym* or *nem* of *nyman* or *neman,* to which is ſubjoined *the, i. e. that;* and *nymthe, take away that,* may very well ſupply the place of *onles the,* expreſſed or underſtood, *diſmiſs that.* But *nyman* ſignifies not merely *to take,* but *to take counſel,* it being derived from the Greek νομιζω, to *conſult* or *deliberate;* while the Latin *nempe* is νομω πω, *by law, by right, rightly, truly: leaſe* is a ſecurity by law, and *unleſs,* we conceive, is a corruption of *unleaſed, i. e. unprovided, unſecured.* Thus, Troy will be taken, *unleſs* the palladium be preſerved, *i. e.* it being unprovided, or it being not provided, that the palladium be preſerved; or, provided that the palladium be not preſerved, Troy will be taken. This author adds *les,* the imperative of *leſan,* which has the ſame meaning with *on-leſan,* is likewiſe uſed by old writers inſtead of *unleſs;* as, "But will not bide there *leſs* yourſelf do bring him." To this he ſubjoins, in a note, p. 173, "It is this ſame imperative *leſs,* placed at the end of nouns, and coaleſcing with them, which has given to our language ſuch adjectives as *hopeleſs, reſtleſs, deathleſs, motionleſs,* &c. *i. e.* diſmiſs hope, reſt, death, motion." But *les,* we think, which, though not in a comparative form, conveys a comparative idea, is the offspring of the Greek λις, (as *little* is of λιτος) both ſignifying *ſmall, ſlender.* From denoting ſomething minute, it came, as the Latin *minus,* to expreſs *negation.* On this principle, *a ſleepleſs night,* meant at firſt not abſolutely a night without ſleep, but a night having leſs ſleep than is neceſſary, or leſs than uſual, though in time it came to convey abſolutely a negative idea. *Hopeleſs* without hope; *bottomleſs,* having no bottom: and we appeal to our readers, whether this explanation be not more ſimple and natural than *diſmiſs the bottom.* If this derivation be juſt, *leſt* or *leaſt* is not the paſt participle *leſed* of *leſen,* to diſmiſs, but a contraction of *leſſeſt,* the analogical ſuperlative of *leſs,* and it means the leaſt degree of ſome conſequence that follows the preceding clauſe; as, "Let thoſe who ſtand take heed *leaſt* they fall;" which means, let thoſe who ſtand take heed; if not, they will fall, and that is the leaſt that may happen.

Eke, and, in the Latin *ac,* is ultimately derived from the Greek αεξω, or as it is in Latin *augeo,* to increaſe, though it may come more immediately from *eacan,* the Anglo-Saxon offspring of αεξω. An obſervation of Mr. Tooke goes certainly to prove the latter, if we can depend on its correctneſs. "In each language," ſays he, "where this imperative is uſed conjunctively, the conjunction varies juſt as the verb does. In Daniſh, the conjunction is *og,* and the verb *oger.* In Swediſh, the conjunction is *och,* and the verb *oka.* In Dutch, the conjunction is *ock,* from the verb *oecken.* In German, the conjunction is *auch,* from the verb *auchon.* In Gothic, the conjunction is *auk,* and the verb is *aukan.*" This example ſerves to ſhew how nearly allied theſe languages are one to another, and how a large portion of them is derived from the Greek and Latin.

Yet is aſſuredly the Anglo-Saxon *get* or *gut, adhuc, etiam,* though Mr. Tooke has referred it to the verb *to get.* This grammarian ſeems not to have ſufficiently ſtudied thoſe analogies by which the genius of a language is formed. The Anglo-Saxon, delighting in gutturals, forms many of its words by prefixing the particle *ge,* or the letter *g.* Thus, *gefryn, pridem,* is only the Greek πριν, with *ge;* and *gemang* is our *among.* This peculiarity gave birth to the German mode of prefixing *ge* to the perfect participle, and is the principle on which the Greek ετι, in Anglo-Saxon is corrupted into *geta, get,* or *gut.* The Anglo-Saxon *ſtellan,* the German *ſtellen,* the Swediſh *ſtalla,* the Daniſh *ſtiller,* originated in the Greek ϛελλω, which denoted firſt *to lay down the ſails of a ſhip.* Hence in the above mentioned modern tongues, it came to ſignify, *to place, compoſe,* or *adjuſt:* but the general conſequence of putting down the ſails is to give *ſtillneſs* or *tranquillity* to the ſhip. Hence ϛελλω gave birth alſo to the Anglo-Saxon *ſtillan,* and the Engliſh *to ſtill,* and to the conjunction *ſtill.* The Anglo-Saxon and Gothic uſed it conjunctively in the form of *ſtille* or *ſtylle,* and its immediate parent undoubtedly is *ſtillan,* and not *ſtellan,* as Mr. Tooke would have us believe.

Elſe, with no leſs certainty, is the Anglo-Saxon *elles,* the Latin *alias,* and the Greek αλλως, and has nothing to do with *aleſan, to diſmiſs,* and it means not *exception* or *diſmiſſion,* but a change or difference in the conſequence, or in the condition of what is expreſſed in the preceding clauſe. Thus, let the derivation be juſt, *elſe* it will not be received, *i. e. otherwiſe* it will not be received: let the derivation be juſt; if otherwiſe than juſt, it will not be received. On Mr. Tooke's principle the ſolution ſtands thus: let the derivation be juſt, *diſmiſs* it will not be received, an interpretation at once unnatural and unmeaning; and in order to give it the appearance of ſenſe and coherence, he is forced to ſuppoſe a *clauſe underſtood.* Let the derivation be juſt, diſmiſs the derivation being juſt, or diſmiſs that circumſtance, it will not be received: ſee his reſolution of ſuch examples in vol. i. p. 247. The conjunction αλλα, like αλλως, is a modification of the pronoun αλλος, *another;* and may be reſolved in the ſame way as *elſe* in Engliſh. Ουκ ηλθον καταλυσαι, αλλα πληρωσαι, I came not to deſtroy, *but* to fulfil—I came not to deſtroy, another thing, (*i. e.* I came for another thing,) I came to fulfil.

Mr. Tooke derives *but* from two different words *botan*, to *boot*, and *butan*, or *be utan*, *to be out*, or *to except*, and accordingly aſſigns the word two different ſenſes, as it is taken from the one or the other. In oppoſition to this, we maintain that *but* is the Anglo-Saxon *buton*, or *butan*, and has the ſenſe which it bears in that language of *except*, *without*, and no other but this, or one reſolvable into this. We farther maintain, that the Anglo-Saxon *buton* is the Arabic and Hebrew בת, *bata*, *to cut*, which, as it exiſts in the former with the *nunnation*, is *button*; and the principal idea implied in it is *ſeparation*. With *but* have flowed from the ſame ſource *bit*, a morſel ſeparated; *bite*, to ſeparate with the teeth. Let us apply the word thus explained. I ſaw none but two plants—two plants being ſeparated I ſaw none, or two planted being excepted or taken away, I ſaw none.

In ſuch inſtances as theſe, the negative is often omitted for the ſake of brevity; but it muſt be ſupplied before the ſentence can be explained. Again, "I have much to ſay on this ſubject, *but* I muſt proceed to another." Mr. Locke obſerved, that in ſuch inſtances, *but* intimates a ſtop of the mind, in the courſe it was going. But, ſays our grammarian, the truth is, that *but* itſelf is the fartheſt of any word in the language from intimating a ſtop. On the contrary, it intimates ſomething *more*, ſomething to follow. And, therefore, whenever any one in diſcourſing finiſhes his words with *but*, the queſtion always follows, but what? p. 205. Now, we heſitate not to ſay that Locke, though not right, is nearer the truth than Mr. H. Tooke. "I have much to ſay on this ſubject, let that however be ſeparated, or that being ſeparated or laid aſide, I proceed to another." Here then *but* denotes the *removal* of the thing which already occupied the mind, and the ſucceeding word or words mark that which is introduced to fill its place. On ſuch a removal the mind naturally looks forward to the introduction of ſomething elſe; and its expectation in this reſpect forms no part of the meaning expreſſed by *but*, but is a habit formed by experience or aſſociation. Knott having remarked, that the Catholics prayed, conferred places, and conſulted the originals; Chillingworth replies, "you pray, *but* it is not that God would bring you to the true religion, *but* that he would confirm you in your own. You confer places, *but* it is that you may confirm or colour over with plauſible diſguiſes your erroneous doctrines; not that you may judge of them and forſake them, if there be reaſon for it. You conſult the originals, *but* you regard them not, when they make againſt your doctrine or tranſlation." In all theſe places, *but* does not, as Mr. Tooke aſſerts, direct ſomething to be *added* or *ſupplied*, but denotes a ſeparation or removal of ſomething that ought not to be ſeparated or removed. You pray not that God would bring you to the true religion; you pray, motive being apart, that he ſhould confirm you in your own. You confer places, the right object is ſeparated, and you confer them that you may confirm, &c. You conſult the originals, and regard them when they make for your doctrine; this regard is ſeparated when they make againſt your doctrine or tranſlation. Thus, whatever ſenſes may be aſcribed to *but*, they are all reſolvable into one original ſignification. Nor have we need with this celebrated grammarian to trace it into two diſtinct verbs, a thing in itſelf very improbable and contrary to all analogy, nor would he have adopted ſo unlikely an hypotheſis, if it were not neceſſary for ſupporting his ſyſtem.

On the conjunction *although*, or *though*, we quote the following remark from the learned Dr. Jamieſon, in his Etym. Dictionary. "Mr. Tooke derives *though* from the Anglo-Saxon *thafian*, or *thafigan*, to allow. But there is not the ſame evidence here, as with reſpect to ſome other conjunctions illuſtrated by this acute and ingenious writer. It certainly is no inconſiderable objection to this hypotheſis, that it is not ſupported by analogy in the other northern languages. In Anglo-Saxon, *theah* ſignifies *though*, Alemannic *thach*, Icelandic *tho*. I ſhall not argue from Moes G. *thau*, in *thaujaba*, which Junius views as ſynonymous with *though*; becauſe this ſeems doubtful. In old Engliſh *thah* was written about 1264, ſee Percy's Reliques, ii. 210. which nearly approaches to the Anglo-Saxon *theah*. Inſtead of *thoch* in our oldeſt MSS. we generally find *thocht*, *althocht*. This might ſeem allied to the Icelandic *thoett*, quamvis, which, according to G. Andr. is per ſyncop. for *tho*, *at*, from *tho*, licet, etſi; Lex. p. 266. But it is more probable, that our term is merely Anglo-Saxon *thohte*. Moes G. *thahta*, cogitabat, or the participle paſt of the verb from which Engliſh *think* is derived; as in latter times *provided*, *except*, &c. have been formed. Reſolve *althocht*, and it literally ſignifies "all being thought of," or taken into account; which is the very idea given by the conjunction. The Synon. in German exhibits ſome analogy; *dachte*, being the imperfect and participle paſt of *denken doch*, although, may have been formed from the ſame verb." Though this etymology be plauſible, we do not agree with it, merely becauſe a more juſt and ſimple one may be pointed out. *Although* is *though* combined with *all*, as in the verbs *albeit*, *alone*, (for all one,) *atone*, at one. And *though* means not *thought*, but *conceſſion* or *allowance*, and is derived from the Greek obſolete δωκω, *to give*, *to grant*; and as this verb is δοω, or δωκω, (which gave birth to the firſt aoriſt εδωκα,) ſo this derived conjunction is *tho* or *though*. Its reſolution may thus be illuſtrated: "Though the book be long and tedious, I will read it with attention: be it granted, that the book be long and tedious, I will read it with attention." It is obſervable, that in its ſimple form the word is hardly capable of being explained on Dr. Jamieſon's principle. "Be it *thought* that the book is long and tedious, I will read it with attention;" whereas, on our hypotheſis, the compound form is eaſily ſuſceptible of illuſtration. Be it all granted, that the book, or grant that the book be all long and tedious, &c. It is obſervable that the word has ſpread as is ſeen above, from the ſame root into all the kindred northern tongues. So has indeed *to think*, but this comes from φθεγγω, to expreſs, which in its derived form was naturally employed to denote the operation of the mind in ſupplying the materials of diſcourſe, *i. e.* in thinking. The noun φθεγγος is alſo the parent of our word *thing*, which ſignifies any object that is the ſubject of thought. We only add that the Anglo-Saxon *thafian* is certainly of the ſame origin with *though*, the guttural *gh* being corrupted into the labial *f* in the orthography, as well as in the pronunciation.

Skinner's account of *and* is this. "Neſcio an a Lat. *addere* q. d. *add* interjecta per epentheſin *n*, ut in *render* a reddendo;" which we think a more proper etymology than that of Mr. Tooke, who derived it from *annan-ad congeriem dare*, a combination and a ſenſe of his own invention. But this word exiſts in Anglo-Saxon and Gothic, not only as a conjunction but as a prepoſition combined with words. In theſe characters it ſignifies *connection*, *union*, *reciprocation*, or *oppoſition*; and theſe ſignifications demonſtrably ſhew that its origin is the Greek αντι, ſo ſimilar to it in ſound, and preciſely the ſame with it in ſenſe. When one perſon or thing meets another to unite or co-operate, αντι, expreſſing this union, or co-operation, is the copulative *and;* but when a perſon or thing oppoſes or counteracts another, αντι, in the form of *and,* is combined with another word to expreſs *againſt* or *in return;* as *andwyrd, a word in return for a word, i. e. an anſwer; andſælis, againſt the ſun,* ſee Hicks's Anglo-Saxon Grammar, p. 87. When objects act upon the organs of ſenſe, the mind is ſuppoſed in return to act upon the impreſſions of thoſe objects in order to perceive them, and the perception ſo acquired is called in Greek αντιληψις. Hence, in Anglo-Saxon *andgit,* if we attend to the compoſition of the word, means that ſenſe which the mind *acts* or acquires by a reciprocal action on its own organs.

The conjunction, according to Mr. Harris and other grammarians, connects not *words* but *ſentences,* ſo as out of two to make one ſentence. Thus, you and I and Peter rode to London, is one ſentence made of three. But this notion Mr. Tooke refutes by the following example: two *and* two are four, A B *and* B C *and* C A form a triangle. John and Jane are a handſome pair. Does A B form a triangle, B C form a triangle? Is John a couple? Is Jane a couple? Are two four? p. 221. In truth, conjunctions as well as prepoſitions affect words and not ſentences, and their office is to combine the words ſucceeding to the words going before them, *i. e.* to combine a verb coming after with a preceding verb; a noun coming after with a preceding noun, an adjective coming after with a preceding adjective, &c.

Mr. Tooke has not given the etymon of *than,* though it exiſts only in Anglo-Saxon under the form of *thonne,* and in Gothic under that of *thana.* But in order to come at its origin, we muſt attend to the effect which external objects produce on the organs of ſenſe. When two qualities, unequal in degree, are compared, that which exceeds appears to receive by means of the contraſt an immediate augmentation; while on the other hand, the leſs ſeems to diminiſh. This being the caſe, and human nature being the ſame in all ages and countries, the ſame form of expreſſing the degrees of compariſon has obtained in all languages. Thus in Hebrew *tub min kheruſt,* good from gold, *i. e.* better than gold. The Arabs borrowed the Hebrew *min* to expreſs their comparative; and the Perſians denote it by *az,* a word of the ſame import. The Latin tongue in this inſtance is founded on the ſame general principle—*Clarior ſole,* brighter from the ſun. The French *de* and the Italian *di* are taken from the Latin *de*; and as the uſe of caſes in theſe languages has for the moſt part given way to prepoſitions, they expreſs their degrees of compariſon by theſe particles in the ſenſe of *from.* In our own tongue the mode of expreſſing the comparative ſeems alone unintelligible. But by tracing *then* to its root the myſtery vaniſhes; and we recognize the ſame great principle of nature. The imperative of the Hebrew נתן, *nattan,* which has given birth to correſponding verbs in all other languages, is תן, *than,* which is preciſely our Engliſh *than,* retaining not only its original ſound, but moreover its original ſenſe of *give, put, place.* Thus, his face was brighter *than* the ſun. *Put* the ſun (namely by the ſide) his face was brighter. Lighter *than* gold. *Put* gold, it is lighter: From the juxtapoſition of gold it becomes lighter; or as in other languages lighter *from* gold. I ſhall only add that *von, from,* of the Germans, is a corruption of the Hebrew מן, *min* or *mon, m, b, v,* being interchangeable letters. Accordingly the Germans ſay in the ſuperlative, der beſte *von* ſeinen brudern, the beſt *from* his brothers, the beſt *of* his brothers.

It ſtill remains that we notice the *adverbs* and *interjections,* but as we have already occupied ſo much of our readers attention in diſcuſſing the other parts of ſpeech, we ſhall diſpatch theſe by one or two general remarks. Adverbs, or as Mr. Harris deſcribes them, attributes of a ſecondary kind, are corruptions from nouns, adjectives, pronouns, and verbs. The name of *adverbs* given to ſuch corruptions is not, it ſhould be obſerved, deſcriptive of their nature, as diſtinct parts of ſpeech, but of their uſe in modifying the verb or adjective to which they are annexed. An adverb is often a ſubſtitute for a whole clauſe, as *here,* for *in this place; then,* for *at that time.* In this view, adverbs are the only words which properly come under the denomination of *abbreviations,* a term of which Mr. Tooke is ſo fond, and to which he ſo improperly refers ſeveral other parts of ſpeech. As to *interjections,* it may be queſtioned whether or not they can be conſidered as *articulate* ſounds, though they have been uſually honoured with a diſtinct department in language. One conſideration, however, is calculated to leave them in poſſeſſion of their hitherto enjoyed honours. Interjections, it is true, are not diſtinct names of our feelings and paſſions, and therefore they have not, like other words, derived articulation from the aſſociation of ſenſe with ſound; nevertheleſs they conſiſt of certain *expreſſions* or *cries,* which, as founded in nature, are as well calculated to recal to our minds ideas of certain emotions, as if, like other words, they had been by common conſent made the ſigns of thoſe emotions.

Grammar is alſo uſed for a book concerning the rules of grammar, which obtain in any language. See Language.

The ancient grammars are: for the Hebrew, that of rabbi Juda Chiug, which is commonly held the firſt Hebrew grammar that appeared; though it is certain, rabbi Saadias Haggaon, who lived before rabbi Juda, compoſed two works of the ſame kind: one expreſsly of grammar; and the other of the elegancies of the Hebrew tongue.

For the Greek, the oldeſt grammar is that of Gaza: the Latin ones are the works of Martianus Capella, Priſcian, and Aſconius Pedianus.

The modern grammars are; 1. For the Hebrew, that of Pagninus, the edition of Hen. Stephens, or le Preux; at Geneva, in 1592; that of Petrus Martinius at Rochel 1592; that of Buxtorf; that of Ludovicus Deus, in three languages; that of Sixtinus Amama, which is a collection from Martinius and Buxtorf; that of Bellarmine, with the notes of Muis; thoſe of F. Sglanther, of W. Schickard, and of Vict. Bythner, to the latter of which is annexed a brief account of the Chaldee, are uſeful for beginners; and thoſe of Gronovius, Schultens, Schroeder, Bayly, Bennet, Robertſon, &c.; and for the Hebrew, without the Maſſoretic points, the excellent grammar of Maſclef, to the ſecond edition of which, publiſhed at Paris in 1743, are annexed Chaldee, Syriac, and Samaritan grammars; thoſe of Sharp, Wilſon, Bates, Parkhurſt, &c. 2. For the Chaldee, the beſt are thoſe of Martinius, Buxtorf, and Lud. Deus, in three languages. 3. For the Syriac, thoſe of Amira, Myricæus, Waſerus, and Beveridge; with the Chaldee and Syriac ones of Buxtorf, of Lud. Deus in three languages, and that of Lembden. 4. For the Coptic, the Prodromus Coptus, and Lingua Ægyptiaca Reſtituta of Kircher. 5. For the Arabic, that of Erpenius, and that of Golius, which is only Erpenius's a little augmented. 6. For the Ethiopic, that of J. Ludolphus. 7. For the Perſian, that of Lud. Deus, and that of ſir William Jones. 8. For the Sancrit, thoſe of Wilkins and Carey. 9. For the Armenian, thoſe of Schroeder and Galanus. 10. For the Greek, thoſe of Mart. Rulandus Sylburgius, F. Moquet, Voſſius, Gaza, Herman, Buſby, Port Royal, Manutius, Bell, Milner, Moor, Parkhurſt, Valpy, Jones, &c. 11. For the Latin, thoſe of Diomedes, Deſpauter, the Minerva of Sanctius, thoſe of Voſſius, Ward, Clarke, and Sprat; that of Port Royal, which is only a collection from the reſt; thoſe of Lowe, of Eton, of Jones, &c. 12. For the Italian, thoſe of Berger, Lanfredini, Port Royal, and Veneroni, Baretti, &c. 13. For the Spaniſh, thoſe of Salazar, Port Royal, the abbot de Vairac, &c. 14. For the Portugueſe, that of Pereira. 15. For the French, thoſe of the abbé Regnier, and F. Buffier, &c. 16. For the High Dutch, thoſe of Claius, Hertſburgenſis, Schottelius, Boedicher, and Steinbach. 17. For the German, that of Wendeborn, &c. 18. For the Engliſh, thoſe of Wallis, Brightland, Greenwood, Lowth, Prieſtley, Murray, Crombey, &c.

GRAMMAR is alſo uſed in the ſame ſenſe with elements; as geographical grammar.

GRAMMAR, *Philoſophical*, is that which, without regarding the ſeveral idioms of particular languages, only reſpects thoſe principles that are eſſential to them all. One of this kind was propoſed by lord Bacon; not upon the analogy of words, but ſuch as ſhould diligently examine the analogy or relation between words and things. He diſapproves too curious an enquiry about the original impoſition and etymology of names. This he thinks an elegant, and, as it were, a waxen ſubject, that may be handſomely wrought and twiſted, but is attended with little truth and advantage. But, ſays he, it would be a noble kind of grammar, if any one well verſed in languages, both the learned and the vulgar, ſhould treat of their various properties, ſhewing wherein each of them excel and fall ſhort: for thus languages might be enriched by mutual commerce, and one beautiful image of ſpeech, or one grand model of language, for juſtly expreſſing the ſenſe of mankind, be formed like the Venus of Apelles, from the excellencies of ſeveral. And thus, at the ſame time, we ſhould have ſome conſiderable marks of the genius and manners of people and nations, from their reſpective languages. See Bacon's Doctrine of Delivery, § 7. and De Augm. Scient. vi. 1.

The object of philoſophical or univerſal grammar is ſpeech or language, as divided into its conſtituent parts, as a ſtatue may be divided into its ſeveral limbs; or elſe, as reſolved into its matter and form, as the ſame ſtatue may be reſolved into its marble and figure: and thus it is diſtinguiſhed from the art of logic, which conſiders ſpeech as combined or compounded; ſo that by this ſyntheſis, ſimple terms are combined to produce a truth, and two truths are combined to produce a third, &c. In this kind of grammar, the deſign is to point out the ſeveral powers and modes of expreſſion which ſounds are capable of, to trace their connections with, or relation to the ideas they repreſent; and to ſhew the actual variety of the external expreſſions of the ſame mental conceptions which different languages exhibit. By this compariſon we ſhall be enabled to judge which is the moſt adequate and convenient method of expreſſion, what is defective and what is redundant in the ſtructure of any particular language, and direct to the moſt proper method of ſupplying the defect, or leſſening the inconveniencies ariſing from the ſuperfluity. (See LANGUAGE.) See an excellent and well-known work of this kind, by the ingenious and learned Mr. Harris, called the Hermes, or a Philoſophical Enquiry concerning Univerſal Grammar, 2d ed. 1765. See alſo Tooke's Diverſions of Purley, and the preceding article GRAMMAR,

GRAMMAR, *Characters in.* See CHARACTER.

GRAMMARIAN, GRAMMATICUS, a perſon well verſed in grammar; or who teaches grammar.

The denomination grammarian is, like that of critic, frequently, though unjuſtly, uſed as a term of reproach; a mere grammarian; a dry, plodding grammarian, &c. The grammarian is conceived as a perſon wholly attentive to the minutiæ of language; induſtriouſly employed about words and phraſes; and incapable of perceiving the beauties, the delicacy, fineſſe, extent, &c. of a ſentiment.

Scaliger, however, conſidered grammarians in another light. "Utinam eſſem," ſays he, "bonus grammaticus? ſufficit enim ei, qui omnes auctores probe vult intelligere, eſſe grammaticum."

The title grammarian, it is certain, was anciently a title of honour; being given not only to ſuch as applied themſelves to grammar, or excelled in philology; but to all who were reputed learned in any art or faculty whatever, as is ſhewn by Ger. Voſſius, in his book of grammar.

The word was properly a title of literature and erudition, and was frequently given to perſons who excelled in all, or many arts, called alſo *polyhiſtores*.

Thus, Philoponus, a famous philoſopher in Juſtinian's time, remarkable for the extent and variety of his knowledge, was ſurnamed *Grammaticus*, as appears from Photius's Bibliothec.

So Saxo, the Daniſh hiſtorian, in the 13th century, got the appellation *grammaticus*: and as late as the year 1580, Thomas d'Averſa, a celebrated Neapolitan lawyer, was ſurnamed the Grammarian.

The title grammarian was anciently beſtowed on thoſe we now call *critics*, men of learning, erudition, letters, &c. and particularly ſuch as wrote well, and politely, in every kind.

It is in this ſenſe that Suetonius intitles his book which he wrote on the beſt Latin authors, "Of the celebrated Grammarians;" and that Cornelius Nepos calls the commentators on the orators and poets, grammarians; and laſtly, it is in this ſenſe the appellation is attributed by the ancients to Apion, Philoponus, and Solinus.

The moſt celebrated grammarians of the ſecond century were Aper, Pollio, Eutychius, Proculus, Athenæus, Julius Pollux, Macrobius, and Aulus Gellius: the works of theſe laſt authors are an aſſemblage of abundance of very different things, and ſubjects relating to the criticiſm of the ancient writers, and the polite literature.

If the name have loſt its ancient honour, it is through the fault of thoſe who have aſſumed it; by their treating of grammar in a low, pedantic, dogmatic manner; reducing it to words and ſyllables; and dwelling altogether on trifling puerile remarks and cenſures: whereas its ancient office was to make an accurate and thorough examen of an author; to enter into all his views; to point out the beauties, and the defects thereof; to diſtinguiſh the true beauties from the falſe; and the genuine productions of an author, from the ſuppoſititious; that is, a grammarian was then, what we call a critic now.

Thoſe who only taught to read, underſtand, and explain authors, were called grammatiſts, grammatiſtæ; in contradiſtinction from grammatici; though, in courſe of time, the grammatiſtæ have riſen in the place of grammatici, who are now preferred to that of critici.

GRAMMATICAL, ſomething relating to grammar.

We ſay, grammatical conſtruction; grammatical ſignification, &c. Idioms, as Angliciſms, Latiniſms, Greciſms, Galliciſms, &c. deviate from grammatical ſtrictneſs. Such a phraſe is not grammatically juſt; it is an idiom.

GRAMMATICAL *Criticiſm.* See CRITICISM.

GRAMME, in the new weights of France, is the weight of a centimetre of diſtilled water at its maximum of denſity, = 18.8247 French grains = 15.444 Engliſh grains = .0022063 Engliſh avoirdupoiſe pounds.

This weight is the ſtandard, or unit, of the new ſyſtem of weights; 10, 100, 1000, and 10,000 times its weight, being expreſſed by the prefixes, *deca*, *hecto*, *kilo*, and *myria*, reſpectively; and $\frac{1}{10}$th, $\frac{1}{100}$th, and $\frac{1}{1000}$dth, by the prefixes *deci*, *centi*, and *milli*. Thus, hectogramme ſignifies 100 grammes, and centigramme ſignifies the 100dth part of a gramme.

GRAMMELOUC, in *Natural Hiſtory*, the name of an Eaſt Indian ſhrub, very common in the woods and foreſts. It grows to five or ſix feet high: its leaves are very long and narrow, and terminate in a point; they are of a lively green; the fruit is carried in a bag of a triangular ſhape, of the ſize of a hazel-nut, but ſomething longer; on opening this there appear three cells, in each of which is contained one fruit, reſembling the ſeed of the palma Chriſti, but covered with a tranſparent pellicle, and a black one under that: the inſide of the fruit is white, and is of a ſharp and pungent taſte. It is a very violent medicine, operating both by ſtool and vomit, and that often, ſo as to endanger the life of the perſon who has taken it. They allay its operation by eating betel. Mem. Acad. Par. 1609.

GRAMMICA, in *Botany*, from γραμμικος, *linear*, alluding to its ſlender thread-like form, Loureir. Cochinch. 170, appears evidently by his deſcription to be a ſpecies of *Cuſcuta*, or Dodder. See CUSCUTA *chinenſis*, n. 6, which is probably the very plant.

GRAMMITIS, from γραμμα, *a line*. Swartz. Fil. 21. Claſs and order, *Cryptogamia Filices*; ſect. *Annulatæ*. Nat. Ord. *Filices*.

Eſſ. Ch. *Capſules* in ſtraight ſcattered lines. *Cover* none.

This genus differs from *Polypodium*, in having its capſules diſpoſed in ſtraight continued lines, inſtead of round dots. The *involucrum* is wanting in both. Dr. Swartz defines twelve certain ſpecies. Of theſe ſuch as have a ſimple undivided frond, like G. *lanceolata*, Swartz. t. 1. f. 4, form the moſt natural aſſemblage. The genus has, however, the advantage of admitting ſome ferns, which preceding writers did not well know how to diſpoſe of, as G. *Ceterach*, (Aſplenium Ceterach; Linn. Sp. Pl. 1538. Scolopendrium Ceterach; Sm. Fl. Brit. 1134. Engl. Bot. t. 1244.) and G. *leptophylla*, Swartz. t. 1. f. 6, which Linnæus and other botaniſts had heſitated whether to reckon a *Polypodium* or an *Aſplenium*.

Dr. Swartz mentions two doubtful ſpecies; the *Polypodium gramineum* of Lamarck, perhaps his own *Grammitis linearis*; and the *Aſplenium ſubſeſſile*, of Cavanilles lectures, n. 627, a native of the Philippine iſlands.

GRAMMONT, in *Geography*, a town of France, in the department of the Scheldt, and chief place of a canton, in the diſtrict of Audenarde, built at the foot of a mountain by the Goths, and thence called "Gotteghem." When Baldwin de Mons, count of Flanders and Hainaut, purchaſed the lordſhip of one Gerard, in 1068, he built a town, calling it after the name of the former lord, Gerardmont; and hence, by corruption, Grammont. It is partly ſituated on a hill; and the river Dender, which runs through it, divides it into the Higher and Lower Town; 20 miles W. of Bruſſels. The place contains 5948, and the canton 16,000 inhabitants, on a territory of 92½ kiliometres, in 17 communes.

GRAMMUM, a town of Hindooſtan, in Myſore; 44 miles N. of Seringapatam.

GRAMPIAN HILLS, a range of mountains, extending from E. to W. through almoſt the whole breadth of the kingdom, from Loch Lomond to Stonehaven, and deriving their name from one of them, the "Mons Grampius" of Tacitus, where Galgacus waited the approach of Agricola, and where was fought the battle ſo fatal to the brave Caledonians. This chain of hills forms the ſouthern boundary of the Highlands; though four or five counties on the N.E. of that chain have, in their eaſtern and northern parts, the name of Lowlands. The tranſition to the Grampians is gradual; the firſt chain, according to general Roy, conſiſting of the Sadley-hills on the E., the Ochills in the middle, and Campſy-hills on the W. To the Grampian chain belong Ben Lomond, 3262 feet high; Ben Ledy, 3009; Ben More, 3903; Ben Lawres, the chief ſummit, 4015; Schehallien, 3564; Ben Verlich, 3300; and other leſs conſiderable elevations on the eaſt.

GRAMPOUND, a ſmall borough and market town, in the hundred of Powder, and county of Cornwall, England, is ſituated on the banks of the river Fal or Fale, in the pariſhes of Creed and St. Probus, the eaſtern part of the borough being in the former pariſh, and the weſtern in the latter. Grampound is ſuppoſed, by Borlaſe, to ſtand on the ſcite of the Voliba of Ptolemy. Extenſive privileges were conferred on this town by king Edward I., particularly a freedom from toll throughout Cornwall: and the remains of a Caedeſula, or Felon Wood, granted with all the lands in it by this monarch, are ſtill extant. The right of holding a market was a grant from John of Eltham, earl of Cornwall, and brother to Edward III., who, after the death of earl John, confirmed the firſt charter, and made the town a borough: but no repreſentatives were returned to parliament till the reign of Edward VI. Two members are now elected by the magiſtrates and inhabitants paying ſcot and lot; but the whole number of voters is only 25. The corporation conſiſts of a mayor, eight magiſtrates, a recorder, and a town-clerk. The church is about half a mile from the town, in the pariſh of Creed; but a ſmall chapel of eaſe ſtands near the centre of the borough. Grampound is 263 miles S.W. from London; has three annual fairs, and a weekly market on Saturdays. In the return under the late act, the inhabitants amounted to 525, the houſes to 80. Polwhele's Hiſtory, &c. of Cornwall. Beauties of England and Wales, vol. ii.

GRAMPUS, in *Ichthyology*, the DELPHINUS *orca* of Linnæus; which ſee.

GRAMZOW, in *Geography*, a town of Brandenburg, in the Ucker Mark; 8 miles S.E. of Prenzlow.

GRAN, or ESZTERGON, or *Strigonia*, a town of Hungary, ſituated near the conflux of the rivers Gran and Danube; the ſee of an archbiſhop; 55 miles S.E. of Preſburg. N. lat. 47 44′. E. long. 18°.

GRAN, a ſmall iſland on the W. ſide of the gulf of Bothnia. N. lat. 62 1′. E. long. 17° 22′.

GRANA, a ſea-port of Spain, in Galicia; 2 miles W. of Ferrol. N. lat. 43° 29′. W. long. 8° 15′.

GRANA *Figlia*, in the *Materia Medica*, the fruit of a ſpecies of ricinus.

GRANA *Paradiſi*, or *Greater Cardamoms*, are the ſeeds of the amomum of Linnæus.

GRANA *Regia*, the ſeeds of the common ricinus, called by ſome palma Chriſti.

GRANADA, or GRENADA, ſometimes called *Upper Andaluſia*, in *Geography*, a kingdom or province of Spain, occupying half of the eaſtern extremity, and all the ſouthern part of Andaluſia as far as the ſtraits of Gibraltar, has the form of a pyramid with its baſe to the eaſt, on the kingdom of Murcia, and its apex to the ſouth-weſt towards the Straits. Its length is 58 leagues from the E. to the S.E; the breadth at its apex ſeven from the S.W. to the N.E., and at its baſe 28 from S. to N.. To the E. and N.E., it is bounded by the kingdom of Murcia; to the S. and S.E. by the Mediterranean; to the W., by the kingdom of Seville; to the W. and N.W. by that of Cordova;

and to the N.W. and N., by that of Jaen. It lies between 36° 20′ and 38° N. lat. and between 5° 5′ and 1° 30′ W. long.; and contains about 661,600 inhabitants. This province has three ſea-ports on the Mediterranean; *viz.* that of Amunécar, defended by three forts of little importance; that of Almeria, which was celebrated under the Arabs; and that of Malaga, now the moſt flouriſhing and moſt frequented. Its principal towns are Granada, the capital, Malaga, Almeria, Guadix, Motril, Marbella, Velez-Malaga, Baza, Vera, Ronda, Loja, Santa-Fé, Hueſca, Antequera, and Alhama. Its rivers are the Verde, Xenil, Las Feguas, Guadalentia, Guadavar, Guadalmeja, Rio de Almeria, Rio Frio, Guadalmerina, Darro, Andaraye, Guadix, Bravata, Marehan, Almancara, Aguas, Culebras, and Guadalete. This province is very mountainous; its chief mountains being the following, *viz.* the Sierra Vermella or Vermeja, *i. e.* red mountain, ſo called from the colour of the ſoil, the Sierra de Filabre, the Sierra de Bujo, the Sierra Blanquilla, or white mountain, denominated from its appearance at a diſtance, and the Sierra de Javal-Cohol. The Sierra Nevada is a grand and beautiful mountain ſituated nearly in the centre of the province: it takes its name from the ſnow that remains on it through the year. It is very lofty, can be ſeen at a very great diſtance, and is well known to mariners, who diſcover it far out at ſea. The Sierra Alpuxara, likewiſe in this province, is formed by the contiguity of ſeveral lofty mountains, and generally called the Alpuxaras. Theſe afforded a retreat to a conſiderable number of Moors driven from Granada, who remained there 120 years, till their total expulſion from Spain. The Sierra de Ronda lies on the ſouthern and eaſtern part of the province of Granada; ſtretching N. and E. in that of Seville, and running S. towards the ſtraits of Gibraltar. Granada, although mountainous, contains plains of conſiderable extent, and pleaſant valleys abounding in ſprings.

Granada, as a part of Andaluſia, was firſt known to the Phœnicians and then to the Carthaginians, who were expelled by the Romans; and they alſo were expelled, in the fifth century of the Chriſtian era, by the Vandals; and the Goths, led by Euric, afterwards took poſſeſſion of the country. The Arabs entered Spain by Andaluſia in the year 711; and after the battle of Xeres, which decided its fate, as well as that of Spain, it belonged to the caliphs of Damaſcus, and then to thoſe of Bagdad; till at length Abdal-rahman, or Abderame, a prince of the blood-royal of the Ommiades or Almohades, ſeized on the throne of Spain in 755. In the year 1027 the empire of the Moors in Spain was diſmembered; and in 1221 the kingdom of Granada was diſſolved. Soon after this period, *viz.* in 1236, Mahomed Alamir, or Alhamar, founded anew the kingdom of Granada; and his deſcendants preſerved for about 2½ centuries the throne, which he tranſmitted to them. It was reſerved for Ferdinand V. and Iſabella his queen, to give the laſt blow to the power of the Moors, by depriving them of the kingdom of Granada at the end of the 15th century. The capture of Malaga, Aug. 18th 1487, facilitated the ſiege of Granada, the capital of the province, into which the Moors had collected their whole force. They were attacked in 1491, and after a ſiege of upwards of a year, the town was obliged to ſurrender to the Catholic armies; and thus in 1492 the Mooriſh empire in Spain terminated. The extent of Granada at this time was 70 leagues long and 30 broad; it contained, as it is ſaid, 32 great towns, 97 ſmaller ones, upwards of 2000 boroughs and villages, and 3,000,000 of inhabitants. The revenue derived from it amounted annually to 700,000 ducats; and gold and ſilver abounded more in this kingdom than in any other country of Europe. But the aſtoniſhing fertility and wealth of this country paſſed away with its old inhabitants, and were ſucceeded by a deplorable degree of indolence, poverty, and miſery.

Granada, or *Grenada*, the capital of the province above deſcribed, and an archbiſhop's ſee, is a large city, which was entirely built by the Moors in the tenth century; and in 1235, after having previouſly belonged to the dominions of the kings of Cordova, it became the capital of a new empire, and ſoon acquired great celebrity in the Mooriſh annals. This town, which in a ſhort time became important for its extent, population, wealth, and power, and the magnificence of its buildings, became, in proceſs of time, the ultimate reſource and laſt bulwark of the authority of the Moors in Spain. We have already given an account of its ſurrender to the Catholic kings. At that period it was three leagues in circumference, its ramparts were defended by 1030 towers; its walls incloſed 70,000 houſes, and a population of 400,000 inhabitants. It had an army of 60,000 men; and the number that defended its ramparts in 1491 and 1492 amounted to 100,000. It was protected by two fortreſſes, each of which was large enough to contain 40,000 men.

This town ſtands on two hills, at the end of the plain called Vega de Granada, near the Sierra Nevada, on the banks of the Darro which runs through it, and of the Xenil which bathes its walls. The two fortreſſes juſt mentioned are on the ſummits of the hills on either ſide, thus commanding the town, which itſelf commands the beautiful adjacent country ten leagues round; and its ſituation is delightful. The plain, at the extremity of which it ſtands, is ſomewhat ſloping; its diameter is from nine to ten leagues, and its circumference 30: on the N. it is bounded by the Sierra Nevada and the mountains of Elvira, and on the other ſides by ſucceſſive and varied amphitheatres of hills agreeably planted with vines, olives, mulberry, lemon, and orange trees, &c.; it is watered by five rivers, interſected by various canals, ſupplied from limpid rivulets with a number of ſprings; and it is covered with meadows, foreſts of oak, woods of orange-trees, orchards, ſugar-canes, corn, flax, and in ſhort all kinds of fruits and vegetables.

Granada was formerly divided into four quarters, *viz.* Granada, Alhambra, Albayzin, and Antiquerula. Of theſe, the firſt, or Granada, is the handſomeſt, moſt important, moſt agreeable, beſt built, and beſt inhabited part of the town. It occupies the commencement of the plain, and a part of the vallies between the two mountains; it is embelliſhed with a number of fountains, large gardens, handſome ſquares, and fine buildings: it is inhabited by the nobility, clergy, magiſtracy, and the richeſt of the citizens; and the principal markets are ſituated in it. The quarter of Alhambra, properly ſpeaking, is only a great fortreſs, ſituated on a mountain, called Sierra del Sol, or mountain of the ſun; it was the reſidence of the kings, whoſe palace ſtill poſſeſſes great beauties. (See the deſcription of it under ALHAMBRA.) The quarter of Albayzin reſembles a fauxbourg raiſed on a hill, where was formerly a fort, which commanded and protected the town, from which it is ſeparated by a rampart. It contains about 400 houſes. Antiquerula has the appearance of another fauxbourg built upon the plain; it was peopled by ſettlers from Antequera, and is at preſent chiefly inhabited by dyers and ſilk weavers. Among the numerous ſquares of Granada we may ſpecify as the handſomeſt, El Campo, in which is a hoſpital; the Plaza Mayor, which is ſpacious, and uſed for public ſhows, particularly the bull-feaſts; and the Bivarambla, embelliſhed by a beautiful jaſper fountain, and by the two fine edifices of the Alcaxeria, which was uſed by the

Moors as a bazar, and ſtill appropriated to the purpoſe of a market-place, and containing about 200 ſhops; and the palace of the chancery. To theſe two buildings we may add an ancient moſque, now a pariſh-church, the cathedral, two hoſpitals, and the two palaces of the Alhambra. The cathedral is not large, but has a handſome dome, reſting on twelve arches, ſupported by as many large pilaſters; the vault is full of paintings and richly gilt, and two rows of gilded balconies run round it over the arcades. Statues of the twelve apoſtles in bronze, gilt, and as large as life, are placed againſt the twelve columns. The vault of the church of the Chartreux is covered with fine paintings in freſco, by Antonio Palomino. In many of the houſes are found remains of baths, conſtructed by the Moors; and moſt of the houſes are embelliſhed with fountains, which ſupply water not only for domeſtic purpoſes, but for moderating by its coolneſs the heat of a climate extremely warm in ſummer.

Granada is an archbiſhopric, worth 25,000*l.* a year, containing a cathedral chapter, ſix collegiate chapters, and 194 pariſh churches. This city is the ſeat of a royal chancery, divided into ſix chambers, and compoſed of a preſident, twenty-five counſellors, two ſolicitors, and one alguazil mayor. The intendant of the province reſides here; and the town has a criminal judge, two alcades mayors for the adminiſtration of juſtice, a municipality compoſed of a certain number of regidors, a war auditor, and a tribunal of the inquiſition. The Alhambra has a juriſdiction peculiar to itſelf. The city is divided into twenty-three pariſhes, with forty convents, three beatarios, ſeventeen hermitas or chapels, nine hoſpitals, and eight colleges. Granada has an univerſity, founded A. D. 1531; and an academy for painting, ſculpture, and architecture, conducted at the king's expence, and free for all. The extent of Granada is nearly the ſame as it was under the Moors; but its population is very much diminiſhed. In 1614, at the period of the total expulſion of the Moors from Spain, a very conſiderable number of the families of that people left it. The town, which had counted 400,000 individuals within its walls, and which had armed 100,000 warriors in its defence, is now reduced, according to the government returns ſtated by Mr. Townſend, (Travels in Spain, vol. iii.) to 52,325 ſouls; although, upon good authority, he ſays, they may be reckoned 80,000. Under the Moors, Granada carried on a great trade, and was famous for its own productions; it manufactured cloths, various kinds of woollen ſtuffs, and a great quantity of ſilks. Indeed, it is not poſſible to think of manufactures in Granada, without calling to mind the expulſion of the Moors, and pauſing to examine the policy of that ſtrong meaſure. They were numerous, and, in conſequence of their induſtry, accompanied with frugality, they had acquired opulence and power. It is ſaid, (ſee Townſend, ubi ſupra,) that of 100,000, condemned by the inquiſition for apoſtatizing from the Chriſtian faith, 4000 had been burnt without any good effect. Philip III., in the year 1609, baniſhed to Africa 140,000 out of the kingdom of Valencia; and in the three years following, 600,000 from Seville, Murcia, and Granada. If to theſe we add the multitudes that periſhed by famine, and by the ſword, we ſhall be inclined to ſtate the loſs to Spain at one million of its moſt active ſubjects. This loſs, added to what the country had ſuſtained by the previous expulſion of 800,000 Jews, with all their wealth, in the reign of Ferdinand and Iſabella, was, under ſuch a government as that of Spain, irreparable. The Moors are acknowledged by the beſt Spaniſh writers to have excelled in agriculture, particularly in watering their lands, in the cultivation of mulberry trees, the ſugar-cane, rice and cotton, all introduced by them; in their peculiar breed of horſes; and in the manufactures of ſilk, of paper, and of gun-powder, firſt brought into Europe by them. The manufactures of Granada, however, continued to be ſomewhat flouriſhing about the middle of the ſixteenth century. Some regulations, favourable to them, were adopted and eſtabliſhed in 1552. At that time great attention was paid to the production of ſilk in Andaluſia, and the trade in it was proſperous. But, in proceſs of time, as the conſequence of the expulſion of the Moors, the privileges and immunities granted to the hidalgos or knights, bearing in the kingdom of Granada the proportion of 1979 to 652,990, the whole number of inhabitants, and various oppreſſive reſtrictions and burthens, agriculture languiſhed, ſilk was neglected, the manufactures decayed, and in the ſeventeenth century few or none remained. Some attempts have been lately made to revive them; ſome new ones have been eſtabliſhed, in which ribbons and ſilk ſtuffs are made; but they have not been very proſperous. Here is a manufacture of gunpowder on the king's account. In the production of nitre, at the ſalt-works near this town, about 100 men are employed in ſummer, and 26 in winter; and from theſe government obtains 3000 quintals annually. In the vicinity of Granada are ſome conſiderable plantations of the ſugar-cane.

The environs of Granada are delightful; the public walks, of which the moſt frequented are thoſe on the banks of the Xenil with cooling ſhade and refreſhing fountains, and another, more wild and romantic, by the ſide of the Darro, are pleaſant; and the country all round the city appears to be well cultivated. The market gardens appear like a wilderneſs of fruit trees, and yet are covered with the moſt luxuriant crops of all kinds of vegetables. Every cottage has a little court, or bower, formed by a lattice frame, and wholly ſhaded by the vine; under which, in the evening, the peaſant aſſembles his family to take refreſhment; whilſt the nightingale from every tree is uttering his plaintive note. Theſe gardens are all plentifully watered. Granada abounds in marbles, remarkable for their variety, and fineneſs of grain and beauty; and it has alſo a variety of alabaſters, jaſpers, and other precious ſtones. Its mineral waters are alſo various and abundant.

GRANADA, a ſmall town in the province of Nicaragua, ſeated at the S.E. extremity of the lake of Nicaragua. It has conſiderable commerce in indigo, cochineal, hides, and ſugar. In the year 1680, this town, and alſo Leon, the capital of the province, were pillaged by the buccaneers of America. N. lat. 11° 15'. W. long. 86° 15'.

GRANADA, *New*, a viceroyalty of the dominions of Spain, in South America, extending from the river Tumbez to the Caribbean ſea; that is, from S. lat. 3° 30', to N. lat. 12°, or about 930 geographical miles; its medial breadth may be ſtated at 4° or 240 geographical miles. This grand and opulent viceroyalty, though it dates its origin from the year 1718, was, after a long ſuppreſſion, only eſtabliſhed finally in 1740. It is ſometimes called from its capital Santa Fé, and compriſes the following provinces: *viz.* Jaen de Bracamoros, Loja, Cuença, Macas, Riobamba, Guayaquil, Quito, Tacames, Paſtos, Barbacoas, Popayan, Rapuſo, Novita, Antioquia, Santa Fé, San Juan de los Llanos, Merida, Santa Marta, Carthagena, Zinu, Choco, and the Tierra Firmé, including the three diſtricts of Darien, Panama or Tierra Firmé proper, and Veragua. The ample provinces which form this viceroyalty were moſtly diſcovered and annexed to the dominions of Spain about the year 1536, by Sebaſtian de Benalcazar, and Gonzalo Ximenes de Queſada, two of the braveſt officers employed in the conqueſt of America. The former, who commanded at Quito, made an attack from the ſouth, and the latter from Santa Marta on the north. As the original inhabitants of this region were farther advanced in improvement than any people of America, but the Mexicans and Peruvians, they defended themſelves with great reſolution and good conduct. The abilities and perſeverance of theſe two officers ultimately prevailed, after encountering many dangers, and reduced the country into the form of a Spaniſh province. The kingdom of New Granada was at firſt governed by the royal audience founded in 1547, and by its preſident the captain-general. In 1718 this arrangement was changed, and the viceroyalty was eſtabliſhed ; but it was ſuppreſſed in 1724, and finally eſtabliſhed in 1740. When the conquerors firſt took poſſeſſion of this country, it was more populous than the generality of the other ſtates ; and its want of population at this time prevents its being rendered one of the richeſt in America. The government reſembles that of the other viceroyalties ; with a royal audience at Santa Fé, the capital, a tribunal of accounts, a treaſury, and a royal mint. The royal audience ſits in the ſame hall for civil and criminal cauſes ; there being five judges, a fiſcal, a protector of the Indians, amd other officers. The governments, comprehended in the royal audience, are Carthagena, Panama, Santa Marta, Maracaibo, and Porto Bello, with the diſtrict of the river Hacha ; in the interior are Antioquia, Choco, Veragua, Mariquita, Giron, Neiva, and the Llanos. There is alſo a royal audience at Quito, and a governor and preſident, who rules the ſouthern provinces in ſubordination to the viceroy of New Granada. But Quito remains a biſhopric while Santa Fé is an archbiſhopric, founded in 1562, with Popayan and Carthagena as ſuffragans. In 1783 the archbiſhop was named viceroy. There are alſo ſeveral miſſions in the country called Los Llanos, and on the Apari, Meta, and Caſanari, with ſome little villages or ſtations. Thoſe on the Upper and Lower Orinoco, and river Negro, aſſigned to the Capuchins in 1769, belong to the government of Caraccas.

The population of this viceroyalty has not been accurately aſcertained ; but if the general population of Caraccas amounts to 728,000, it is probable, ſays Mr. Pinkerton, that rather more than one million may be allowed for that of Granada. Of the amount of its revenues we have no certain documents ; but from the amount of the annual coinage at Santa Fé and Popayan, and allowing a tenth to the king for the expences of government, they cannot be leſs than 220,000 pounds. The ſtate of the military force is inconſiderable ; nor would it be eaſy in theſe diſtant provinces to collect an effective force of five or ſix thouſand men. The capital of this viceroyalty is BOGOTA, or *Santa Fé de Bogota*, for an account of which ſee thoſe articles. Of the other principal cities and towns notice is taken in the progreſs of this work. The commerce of this viceroyalty has very much ſuffered by the ſuppreſſion of the galeons ; and though it has been encouraged by the freedom granted in 1778, it is not yet recovered. The contraband trade, carried on by the Engliſh on the Muſquito ſhore, and from the Portugueſe ſettlements in Brazil, and the Caribbean ſea, has impeded the exertions of the Spaniſh coloniſts. Its commerce is allowed to be very diſproportioned to the diſtinguiſhing advantages of this territory. Its exiſtence almoſt depends on the gold from the mines, a few manufactures, and ſome native products. The manufactures are carried on chiefly at Tunja, Socorro, Velez, and other towns and villages towards the plains ; and they conſiſt of cotton cloths, carpets, counterpanes, and woollens of various deſcriptions, that ſupport internal trade. The northern provinces produce excellent wood for the conſtruction of ſhips ; and the dyeing woods are ſuperior to thoſe of Campechy. The mahogany of Panama is exquiſitely beautiful, and ſuperior to all others. The chocolate from the banks of the Magdalena is eſteemed equal to that of Caraccas ; and vaſt harveſts of cotton and tobacco might be gathered, while the navigable rivers Magdalena and Atrato, and the ports of Carthagena and Santa Marta, offer eaſy and commodious outlets to the European markets. Its intermediate mart of Havanna preſents another convenience to the traffic of this viceroyalty. The culture of coffee and chocolate is in a proſperous ſtate in the province of Guayaquil. The ſalutary and uſeful vegetable productions of theſe extenſive provinces are ſo numerous and diverſified, that induſtry alone is wanting to open all the ſources of commerce.

The climate of this extenſive viceroyalty preſents great variety ; for though it lies under the equator, and in its vicinity, the enormous and ſublime chain of the Andes, running N. and S. from the Table land of Quito and Cuença to the Caribbean ſea, and environs of Santa Marta, occaſion every diverſity from the ſnow and ice of the poles to the rain and heat of the tropics. The great rivers Magdalena and Cauca riſe and terminate in this province. The animals are in general ſuch as are common to the whole continent of S. America ; and the inhabitants breed a number of horſes and mules which they ſend to Peru. The mineralogy of New Granada cannot be reckoned unimportant ; Alcedo, cited by Pinkerton, obſerves, that gold is here more abundant than in any other part of America. The richeſt provinces in this reſpect are thoſe of Choco and Antioquia ; and they are eaſily acceſſible by the rivers Atrato and Guacuba, which enter the gulf of Darien, and are navigable for a conſiderable extent. Silver is alſo remarkably pure ; and the mines of Marquetones, in the diſtrict of Pamplona are ſo rich, that if they had a ſufficient number of labourers, they might rival thoſe of Potoſi, as they ſometimes yield eight marks of ſilver in the hundred weight. Copper and lead alſo abound, but they are not much valued ; and the various kinds of precious ſtones are plentiful. Platina has been thought to be the peculiar product of Choco. Salt is obtained in great abundance. The natives uſe maize, or the Caſſava root, inſtead of bread. Game is abundant ; and the rivers and lakes furniſh an ample ſupply of fiſh. The natives are tall ; and wear thick, white, or variegated cloaks, which they tie round the waiſt with a ſaſh. They adorn their heads with ſtrings of painted flowers very ingeniouſly made of cotton. Robertſon's America, vol. iii. Pinkerton's Geog. vol. iii.

GRANADIER, GRENADIER, or *Granadeer*, a foot-ſoldier, who is armed with a firelock, bayonet, and in ſome ſervices a hanger, and a cartridge-box that will hold 36 rounds. They wear a high cap, fronted with a piece of braſs, on which the king's arms is generally repreſented, &c. and a piece of cloth upon their ſhoulders, called a wing. In ſome armies they have better pay than a common ſoldier. They were firſt eſtabliſhed in France in 1667, and ſoon after formed into companies : they were firſt known in England in 1685.

GRANADIERS, or *Grenadiers, Horſe*, called by the French *grenadiers volans*, or flying granadiers, are ſuch as are mounted on horſeback, but fight on foot and on horſeback. Theſe were firſt eſtabliſhed in France by Lewis XIV. in 1676, and formed into ſquadrons.

Every battalion of foot has generally a company of granadiers belonging to it ; which generally take the right of the battalion ; and, being the talleſt and ſtouteſt men, frequently are the firſt in attacks.

We have had in England two troops of horſe granadier guards; the firſt raiſed in the year 1693, and the ſecond in 1701.

GRANADILLA, in *Botany*, the diminutive of the Spaniſh name of the Pomgranate, *Granada*, uſed in the Weſt Indies, and retained by Tournefort and Adanſon, for the *Paſſiflora* of Linnæus. This appellation is particularly applied to the fruit of *Paſſiflora quadrangularis*, much eſteemed by Weſt Indians, and ſometimes ripened in England.

GRANADO, GRANADA, or *Grenade*, in the *Military Art*, a hollow ball or ſhell, of iron, braſs, or even glaſs, or potter's earth, filled with gun-powder, and fitted with a fuzee to give it fire.

The name granado takes its riſe hence, that it is filled with grains of powder, as a pomegranate is with kernels.

Of theſe there are two kinds; the one large, the other ſmall: the firſt are to be thrown at the enemy by a mortar, properly called *bombs*, or *ſhells*. The latter to be caſt with the hand, and thence denominated *hand-granados*.

The beſt way, Caſimir obſerves, to ſecure a man's ſelf from the effect of a granado, is, to lie flat down on the ground, before it burſt.

The common, or hand granado, is a little, hollow ball of iron, tin, wood, paſteboard, or other matter, filled with ſtrong powder, lighted with a fuzee, and thus thrown by hand into places where men ſtand thick; and particularly into trenches and lodgments. Theſe are now ſunk into diſuſe.

Their compoſition is the ſame with that of *bombs*; which ſee. For ſize, they are uſually between two and three inches in diameter, about the bigneſs of a common iron bullet, and weigh about three pounds; as to dimenſions, they are commonly in thickneſs one-eighth, one-ninth, or one-tenth of their diameter; their aperture, or orifice, about $\frac{1}{10}$ wide, as preſcribed by Caſimir.

Thuanus obſerves, that the firſt time granados were uſed, was at the ſiege of Wachtendonch, a town near Gueldres; and that the inventor was an inhabitant of Venlo; who, in making an experiment of the effect thereof, occaſioned two-thirds of that city to be burnt; the fire being kindled by the fall of a granado.

Bombs were known long before the invention of granados. The ancients had a ſort of ollæ, or fire-pots, ſomewhat of the ſame nature with our granados, but they were much leſs perfect.

Caſimir mentions a ſort of blind granados, without any aperture, or fuzee, as not needing to be lighted; but being thrown with a mortar, they take fire of themſelves whenever they fall on any hard ſolid object.

GRANARD, in *Geography*, a neat, new built market and poſt town of Ireland, in the county of Longford. Adjoining is a remarkable hill or mount called the *Moat of Granard*, thought to be artificial, and the ſeite of a Daniſh fort, which commands from its ſummit a moſt extenſive proſpect into ſix or ſeven adjoining counties. It is 52 miles from Dublin, and 12 from Longford.

GRANARY, in *Agriculture*, a building contrived for laying up and ſtoring corn, in order to preſerve it for a length of time. They have, near Grand Cairo, magazines or granaries, called "Joſeph's granaries," defended with wooden walls, in which vaſt quantities of grain are annually preſerved; and many parts of Africa abound with granaries of this kind. They are frequently deep pits made in the ſolid rock; the deſcent into them being juſt large enough for a man to go down; but they grow larger as ſoon as the perſon is in, and are uſually ſquare, from thirty to forty feet in diameter. In theſe the great men of the country preſerve their corn; they firſt cover over the floor with ſtraw, then they lay on the corn, ſtill, as the heap riſes, placing a thin bed of ſtraw between the corn and the ſides, as they did at the bottom. In this manner they proceed till the whole cavity is filled: when this is done they cover the mouth or entrance with a ſort of hurdle of green boughs of trees, interwoven one with another. This they cover with about two feet thickneſs of ſand, and over this raiſe a ridge of earth, well beaten together, in order to throw off the rain both ways, that none may ſettle on the place and ſoak into the magazine. The corn thus ſtored up keeps three, four, or more years very good; and, not unfrequently, the proprietor being taken off by the ſeverity of the eaſtern governments, under which they live, the magazine is forgotten, and ſome accident diſcovering it many years afterwards, the corn is almoſt always found perfectly good in it. All the care they take, in regard to the grain, is to expoſe it two or three days to the ſun's heat, to dry it thoroughly, before they carry it into the magazine.

It may be ſtated further, that in the duchy of Lithuania, and in the Ukraine, the people alſo preſerve their corn in the ſame manner, in wells or pits made in dry places: but in theſe countries great care is to be taken in the opening of theſe ſtore-rooms; for, if people deſcend into them before they have had ſufficient communication with the freſh air, they are often killed by the damps; this, however, is eaſily guarded againſt. By theſe, and numerous other inſtances of the practice of other countries, it appears evident that ſubterranean granaries may occaſionally be highly uſeful for the purpoſe of preſerving grain in particular ſituations and circumſtances.

But the common granaries may, with proper care, be rendered much more uſeful than they are at preſent. The grand caution neceſſary to this purpoſe is, to guard againſt the too great humidity, which is often the caſe in places where there is a great number of doors and windows. A too free acceſs of the external air is alſo to be guarded againſt; as this has not only a tendency to produce the above effect, but is liable to bring in with it the ova or eggs of a number of different inſects, which prey upon and deſtroy the corn. A third caution is, when the corn is the produce of the country where it is preſerved, not to fill the place with the crop of one place only, but to mix the harveſts of two as different provinces as may be, the one dry, the other moiſt, or otherwiſe differing as much as may be; thus the contrary qualities of the one may prevent the deſtruction of the other. Theſe are the principal rules to prevent the corrupting of corn: but when the miſchief is once begun, it will be very difficult to ſtop it; all the care that can be employed ſhould, of courſe, be taken in regard to theſe as ſpeedily as poſſible.

It may be obſerved, that the chief points to be attended to in the erecting of granaries, are to make them ſufficiently ſtrong, and to give them ſuch a ſituation as may expoſe them to the moſt drying winds. But in conſtructing a granary merely for the accommodation of a farm, it is unneceſſary, Mr. Bateſon obſerves, in the ſecond volume of Communications to the Board of Agriculture, to attend to all thoſe circumſtances reſpecting ſtrength, ſituation, &c. which ought to be obſerved in building an extenſive granary, where large quantities of grain are ſometimes depoſited. A farmer ſeldom wiſhes to have a great deal of his thraſhed corn on his hands at once; nevertheleſs there ought, on every farm, to be a place of ſecurity, capable of containing, at leaſt, one-third or one-half the grain produced annually on the farm. Where the practice of houſing corn is followed, there is little or no room, he remarks, within the barn for a granary; but where this is not the practice, particularly where there is a thraſhing mill, the granary may be eaſily made over the barn; which, with proper tackle for hoiſting the ſacks from below, is, he thinks, the moſt convenient and leaſt expenſive place a farmer can have it in.

The ordering of the corn in many parts of England, after being ſeparated from the chaff, duſt, and other impurities, and well ſcreened, is this: after bringing it into the granaries, it is ſpread about half a foot thick, and turned from time to time, about twice in a week; once a week they alſo repeat the ſcreening. This ſort of management is continued two months, and after that it is laid a foot thick for two months more, and during this time turned once a week, or twice, if the ſeaſon be damp, and now and then again ſcreened over. After about five or ſix months, it is raiſed to five or ſix feet thickneſs in the heaps, and then turned once or twice in a month, and ſcreened now and then. When it has lain two years, or more, it is only turned once in two months, and ſcreened once a quarter; but how long ſoever it is kept, the oftener the turning and ſcreening are repeated, the better the grain will be found to keep. It is proper to leave an area of a yard wide on every ſide the heap of corn, and other empty ſpaces, into which it may be turned and toſſed as often as there may be occaſion. In Kent they make two ſquare holes at each end of the floor, and one round in the middle, by means of which they throw the corn out of the upper into the lower rooms, and ſo up again, to turn and air it the better. Their ſcreens are made with two partitions, to ſeparate the duſt from the corn, which falls into a bag; and when ſufficiently full, this being removed, the pure and good corn remains behind.

By theſe means corn has been kept in granaries thirty years; and it is aſſerted, that the longer it is kept the more flour it yields, in proportion to the corn, and the purer and whiter the bread is, the ſuperfluous humidity only having been evaporated in the keeping. At Zurich, in Swiſſerland, it is ſaid that corn has been kept eighty years, or longer, by the ſame methods of management.

It is ſtated that the public granaries at Dantzick are ſeven, eight, or nine ſtories high, having a funnel in the midſt of every floor, to let down the corn from one to another. They are built ſo ſecurely, that, though every way ſurrounded with water, the corn contracts no damp, and the veſſels have the convenience of coming up to the walls for their lading. The Ruſſians preſerve their corn in ſubterranean granaries, of the figure of a ſugar-loaf, wide below and narrow at top: the ſides are well plaſtered, and the top covered with ſtones. They are very careful to have the corn well dried before it is laid into theſe ſtorehouſes, and often dry it by means of ovens, their ſummer dry weather being too ſhort to effect it ſufficiently for the purpoſe.

Different contrivances have been propoſed by M. Du Hamel and Dr. Hales, for ventilating or blowing freſh air through corn laid up in granaries or ſhips, in order to preſerve it ſweet and dry, and to prevent its being devoured by weevils or other inſects. This may be done by nailing wooden bars or laths on the floors of the granary, about an inch diſtant from each other, when they are covered with hair-cloth only; or at the diſtance of two or three inches, when coarſe wire-work, or baſket-work of oſier, is laid under the hair-cloth, or when an iron plate full of holes is laid upon them. Theſe laths may be laid acroſs other laths, nailed at the diſtance of fifteen inches, and two or more deep, that there may be a free paſſage for the air under them. The under laths muſt come about ſix inches ſhort of the wall of the granary at one end of them, on which end a board is to be ſet edgeways, and ſloping againſt the wall: by this diſpoſition a large air-pipe is formed, which, having an open communication with all the interſtices between and under the bars, will admit the paſſage of air below forcibly through a hole at the extremity of it, into all the corn of the granary, that will conſequently carry off the moiſt exhalations of the corn. The ventilators for ſupplying freſh air may be fixed againſt the wall, on the inſide or outſide of the granary, or under the floor, or in the cieling; but wherever they are fixed, the handle of the lever that works them muſt be out of the granary, otherwiſe the perſon who works them will be in danger of ſuffocation when the corn is fumed with brimſtone, as is ſometimes done for deſtroying weevils. Small moveable ventilators will anſwer the purpoſe for ventilating corn in large bins or in ſmall granaries, and may be eaſily moved from one bin to another. If the granary or corn-ſhip be very long, the main air-pipe may paſs lengthwiſe along the middle of it, and convey air, on both ſides, under the corn. In large granaries, large double ventilators, laid on each other, may be fixed at the middle and near the top of the granary, that they may be worked by a wind-mill fixed on the roof of the building, or by a water-mill. The air is to be conveyed from the ventilators through a large trunk or trunks, reaching down through the ſeveral floors to the bottom of the granary, with branching trunks on each floor, by means of which the air may be made to paſs into a large trunk along the adjoining croſs walls: from theſe trunks ſeveral leſſer trunks, about four inches wide, are to branch off, at the diſtance of three or four feet from each other, which are to reach through the whole length of the granary, and their farther ends to be cloſed: ſeams of one-tenth or one-twelfth of an inch are however to be left open at the four joinings of the boards, where they are nailed together, that the air may paſs through them into the corn. In ſome of theſe leſſer trunks there may be ſliding ſhutters, in order to ſtop the paſſage of the air through thoſe trunks which are not covered with corn; or to ventilate one part of the granary more briſkly than others, as there may be occaſion. There muſt alſo be wooden ſhutters, hung on hinges, at their upper part, ſo as to ſhut cloſe of themſelves; theſe muſt be fixed to the openings in the walls of the granary on their outſide: by theſe means they will readily open to give a free paſſage for the ventilating air, which aſcends through the corn, to paſs off, but will inſtantly ſhut when the ventilation ceaſes, and thereby prevent any dampneſs of the external air from entering: to prevent this more fully, the ventilation ſhould be made only in the middle of dry days, unleſs the corn, when firſt put in, is cold and damp.

But in ſmaller granaries, where the ventilators muſt be worked by hand, if theſe granaries ſtand on ſtaddles, ſo as to have their lower floor at ſome diſtance from the ground, the ventilators may be fixed under the lower floor, between the ſtaddles, ſo as to be worked by men ſtanding on the ground without or within the granary. A very commodious and cheap ventilator may be had for ſmall granaries, by making the door of the granary ſerve the purpoſe, which may be eaſily done by making a circular ſcreen, of the ſize of a quarter of a circle, behind it; but in order to this, the door muſt open not inwards but outwards, of the granary, ſo that, as it falls back, it may be worked to and fro in the ſcreen; which muſt be exactly adapted to it in all parts of the circular ſide of the ſcreen, as well as at the top and bottom. But there muſt be a ſtep at about eight or ten inches diſtance from the wall, to prevent the doors falling back farther, that there may be room for a valve in the ſcreen to ſupply it with air: which air will be driven in by the door, through a hole made in the wall near the floor, into the main air-trunk, in which there muſt be another valve over the hole in the wall, to prevent the return of the air from within.

But with the view of facilitating the labour of frequently ſtirring and ventilating the grain, and of leſſening the expence of ſuch buildings, a member of the Society for the Encouragement of Arts, Manufactures, and Commerce, in a letter to Dr Templeman, recommends a new-invented granary, of which the following deſcription is given. It conſiſts, he ſays, of ſeven ſtories of floors, and may be built of any dimenſions, provided proper proportions are adhered to. The form of it is ſquare, ſuppoſe fourteen feet ſquare within the rooms or cells. The diſtance from the floor of one cell, to the floor of that above, is five feet; and the whole building ſhould ſtand on ſtrong poſts, more or leſs in number, according to the dimenſions, at the diſtance of ſix feet from the ground. The ſmall ſtairs, or rather ladder, to go to the ſeveral cells, muſt be fixed on the outſide of the building ſideways, with a leading rail, or rope, to prevent falling. The whole granary to be built of what is generally called brick noggin; that is, it is firſt framed in ſtrong timber work, and the interſtices filled up with brick. The floors, beams, and joiſts, are to be made ſtrong to bear the weight of the corn; and the inſide of the cells well lined with dry oak-board, cloſe jointed, and the outſide weather-boarded, the boards being ſtrongly nailed to the timber-work of the frame, and afterwards payed over with pitch. The floors of the cells are to be ſo contrived, as to ſhelve towards the middle, in which part is to be an aperture ſix inches ſquare, to be opened or cloſed by means of a ſliding ſhutter, which muſt have a long handle, reaching in a groove, without the granary. On three ſides of the rooms there ſhould be windows ſtrongly latticed, covered with wire, to keep out large inſects and birds, and with ſtrong ſhutters, to defend the corn from the weather. On the fourth ſide is a door to each room, to open from without. The windows are to be ſmall, and as cloſe as poſſible to the cieling. Over the upper room or cell is a loft, on the outſide of the door of which is fixed a crane, to be worked within by a winch and fliers. The uſe of the windows in the ſides of the rooms, is to give the corn all the benefit it can receive from the wind and freſh air. The door, when the cell is empty, admits the workman to ſweep, duſt, and clean it. The method of managing corn in this ſort of granary is as follows: when the wheat is properly cleaned, it is hoiſted in ſacks to the loft above, and emptied through a hole for that purpoſe in the floor. The apertures in the floors of the cells being all open (except the two undermoſt, which are cloſed by the ſliding ſhutters), the grain falls through till it reaches the undermoſt cell but one: when this is filled to the height of about two feet, which may be ſeen through the windows, the aperture in the floor of the next cell above is ſhut by its ſlider. This being filled in the ſame manner, the next above it is alſo ſhut, and ſo on till the whole are filled, if required, except the undermoſt, which is left empty. In this condition the corn is left for a week or more, if it was got in very dry. When it is to be ſtirred, the floor of the undermoſt cell is to be ſwept very clean, the door is again ſhut, and the ſlider in the floor above drawn back, which allows the corn to fall through into that cell. When the cell above is empty, the ſlider is again ſhut, the floor ſwept very clean, and the ſlider in the next floor over that is opened. In this manner they are all managed, till at laſt the uppermoſt cell remains empty; and the windows having all been open while the corn was falling from one cell to another, render great benefit thereto, by admitting a current of air to paſs through. Under the aperture in the floor of the lower cell, a proper ſcreen is fixed; at the end of this ſcreen is fixed a conductor or ſpout, to which a ſack is hung, its bottom reſting on a miller's hand-barrow; the ſlider is then drawn, and the corn let fall on the ſcreen, from which it runs into the ſack: when the ſack is full, the ſlider is for a moment ſhut, till another ſack, on another barrow, is put under the conductor; the workman then wheels the firſt ſack to the outſide of the granary, and, faſtening the crane rope to it, it is drawn up by another workman in the loft. The ſame method is purſued till the lower cell is emptied. If it is neceſſary to ſcreen all the corn at this time, a ſmall ſcreen is fixed under the aperture of the next cell to be emptied, ſo contrived, as to have a box at the back of it for receiving all the duſt, ſeeds of weeds, &c. that paſs between the wires; and this ſcreen is ſucceſſively fixed under every aperture as the cells are ſucceſſively emptied. After the firſt month, the corn need be ſtirred in this manner only once a fortnight, and after the firſt ſix months, only once a month, unleſs the weather ſhould prove in autumn very hot and damp. The advantages of this granary, as deſcribed by the inventor, are, that it is built at a ſmall expence; that it contains a great deal of grain in a ſmall compaſs; and that the grain is eaſily ſhifted and ventilated, without the tedious mode of turning it with ſhovels, or other ſimilar means.

However, the plan of a granary, taken from one built on his own eſtate, by a very reſpectable and intelligent gentleman in Cheſhire, who has found it to anſwer extremely well, it is conceived, by an able writer, will perhaps be preferable to the above, not only from its cheapneſs, but from its ſimplicity, and the eaſy mode by which the whole body of grain is ſtirred, and the air conveyed and circulated through every part of it, at whatever thickneſs or depth it is laid, and one floor only is neceſſary, however high the building may be. There can be no doubt, but that a granary of this nature may be very uſeful and convenient in many caſes.

This ſort of granary is ſhewn in *Plate Granary* on *Agriculture*, in which *fig.* 1. diſplays the front elevation of the building: *a* is the door into the lower part; *b*, the door into the loft above, to aſcend to which a ladder is neceſſary; *c*, a crane for hoiſting ſacks up from below; *d*, *d*, *d*, are air-holes for ventilation. At *fig.* 2. is ſeen a ſection or view of the inſide of the building; *a*, *a*, *a*, *a*, *a*, are wooden ſpouts, which reach from the air-holes on one ſide of the granary to thoſe on the other. Theſe ſpouts are formed of inch deal, about ſix inches broad, and made with an angle ſimilar to thoſe ſpouts that are employed to convey off the rain water from the eaſings of houſes. They are placed acroſs the granary with the angle upwards, as repreſented at *fig.* 3; *b*, *b*, *b*, are the ends of ſimilar ſpouts, which croſs the others, and alſo reach betwixt the air-holes on the other two ſides of the building, as ſeen at *fig.* 4; *c*, *c*, *c*, are half ſpouts, extending in the ſame manner to air-holes on each ſide. It is neceſſary that the air-holes ſhould decline outwards, in order to prevent the entrance of rain or ſnow in ſtormy weather; and they ſhould likewiſe be ſecured from inſects and vermin by wire cloth; *d d*, the floor of the granary, which is three yards ſquare, and divided each way into three hoppers, *e*, *e*, *e*, of one ſquare yard each, making in the whole nine hoppers, as ſeen at *fig.* 5; *f* is a large hopper, that encompaſſes all the reſt, and has a ſlider at *g* for opening occaſionally, as may be neceſſary in taking out the grain. And there is another ſmaller hopper *i*, which is ſuſpended to this by four iron haſps *k*, *k*, *k* *k*, that may be readily unfaſtened when required, from the ſquare deal box *o o*, fixed to the large hopper. Through the ſide of this box, the handle *h* of the ſlider muſt extend. This hopper is principally uſed for the convenience of taking out a ſmall quantity of grain, but is removed when a large quantity is to be taken from the granary; *m* is a ſmall loft into which the ſacks of grain are hoiſted, and emptied over the ſides or rails *n*, *n*, from which it falls down, and paſſes through the hopper *e*, *e*, till *f* is filled (the ſlider *g* being cloſed); and as the corn continues to be emptied from the loft, the granary is gradually filled until it is up to the top if neceſſary. The ſpouts being all inverted, as noticed above, and open below, it is obvious that, although the granary be filled to the top, the corn will not, like a fluid, riſe within the ſpouts above the level of their lower edges; and thus there will be a vacuum left within every ſpout, through which the air will freely paſs. Theſe ſpouts are placed three feet diſtant from each other, horizontally from angle to angle, and eighteen inches vertically; that is, from thoſe in one tire, to thoſe in another, which is the next, and croſſes it. The holes in the bottoms of the hoppers *e*, *e*, *e*, ſhould be ſo proportioned, that one may not give vent to the grain faſter than another; for which reaſon, the aperture of the middle one *a*, *fig.* 5, ſhould be the ſmalleſt, becauſe there is the leaſt obſtruction there. The apertures *b*, *b*, *b*, *b*, ought to be ſomewhat larger, as the grain will meet with ſome little obſtruction there; by the ſides of the large hopper; and the apertures or openings *c*, *c*, *c*, *c*, ſhould be the largeſt, as the obſtruction in the angles will be greater than in any other part of the work.

GRANASUOLA, in *Geography*, a town of Italy, in the department of the Amona; 6 miles N. of Faenza.

GRANATAN, a town of Saxony, in the circle of Erzgeburg; 12 miles N. E. of Freyberg.

GRANATARIUS, in *Middle Age Writers*, an officer in monaſteries who took care of the proviſions.

GRANATE, popularly called garnet, in *Natural Hiſtory*. See Garnet.

Granate *Paſte*. The counterfeit garnet in paſte, is formed with three different proportions of the ingredients, which are theſe:

Take prepared cryſtal two ounces, common red-lead ſix ounces, mangeneſe ſixteen grains, zaffer three grains; mix all well together; and put them into a crucible: cover it with a lute, and ſet it in a potter's kiln for twenty-four hours.

Or, take cryſtal two ounces, minium five ounces and a half, manganeſe fifteen grains, zaffer four grains; mix them well together, and leave room for their ſwelling in the pot; bake them twenty-four hours in a potter's kiln.

The laſt method is this: take cryſtal prepared two ounces, minium five ounces; mix them, and add manganeſe fifty-two grains, zaffer ſix grains; mix them well together, and let all be baked, in a pot well luted, in a potter's kiln for twenty-four hours.

The firſt of theſe makes a very handſome garnet of the common tinge; the ſecond, a deep one, with ſomething of a violet tinge, as many of the natural garnets have; but the third makes much the fineſt and brighteſt. Neri's Art of Glaſs, p. 134. See Glass and Paste.

GRANATINE, a name given by Kirwan to ſeveral triple compounds, profeſſedly of the granitic kind; but as it includes alſo combinations that have no more than one eſſential ingredient of granite (ſuch as the combination of quartz, jade, and garnet), it is obvious, that many rocks, thus united into one claſs, are far from having all the characters of granitic compounds.

GRANATITE. See Staurolite.

GRANATRISTUM, in *Surgery*, denotes a boil, or a carbuncle.

GRANATUM, in *Botany*, and the *Materia Medica*. See Punica.

GRANBY, in *Geography*, a townſhip of America, in Eſſex county, Vermont, containing 69 inhabitants.—Alſo, a townſhip in Hampſhire county, Maſſachuſetts, E. of S. Hadley, about 94 miles W. of Boſton; incorporated in 1768, and containing 768 inhabitants.—Alſo, a townſhip in Hartford county, Connecticut, on the line which ſeparates Connecticut from Maſſachuſetts; 18 miles N. of Hartford, and containing 2735 inhabitants.—Alſo, a ſmall town on the Congaree, in South Carolina; a place of conſiderable commerce, having a curious bridge, the arches of which are ſupported by wooden pillars, fixed by iron-work, in the ſolid rock, 40 feet high above the level of the water, with the centre arch 40 feet in the clear, for admitting the paſſage of large trees brought down by the flood.

Granby *Bay*, a bay on the N. coaſt of the iſland of Dominica. N. lat. 15° 42′. W. long. 61° 25′.

GRANCEY-en-Montagne, a town of France, in the department of the Coté-d'Or, and chief place of a canton, in the diſtrict of Dijon; 21 miles S. E. of Chatillon-ſur-Seine. The place contains 687, and the canton 4071 inhabitants, on a territory of 210 kiliometres, in 11 communes.

GRAND, a term rather French than Engliſh, though uſed on many occaſions in our language. It has the ſame import with *great*, being formed of the Latin *grandis*.

In this ſenſe we ſay, the grand maſter of an order, the grand maſter of Malta, of the free-maſons, &c.

So alſo, the grand ſignor, the grand viſier, &c. grandfather, grand-mother, &c.

In the French polity and cuſtoms there are divers officers thus denominated, which we frequently retain in Engliſh; as grand almoner, grand ecuyer, grand chambellan, grand voyer, &c.

Grand, Anthony Le, in *Biography*, who flouriſhed in the 17th century, was a native of Douay, and is denominated by ſome writers the "abbreviator of Deſcartes." He was author of many works on the ſubject of philoſophy, the chief of theſe are, "Inſtitutio Philoſophiæ ſecundum Principia Ren. Deſcartes," 4to. "Curioſus Naturæ Arcanorum Perſcrutator." Notes on the Phyſics of Rohault, which have gone through many editions; and "Hiſtoria Sacra a Mundo condito ad Conſtantinum magnum," which is ſaid to be his beſt performance. Moreri.

Grand, Joachim Le, a French political and hiſtorical writer, was born in 1653 at Thorigny, in Normandy. In early life he entered into the congregation of the Oratory, which he quitted in 1676, and went to Paris, where he engaged in the education of two young men of rank, and at the ſame time applied himſelf with all diligence to the ſtudy of hiſtory under the direction of father Le Cointe. He firſt appeared as a writer in the year 1688, in "A Hiſtory of the Divorce of Henry VIII. and Catharine of Arragon," in three vols. 12mo. The main object of this work is to refute certain facts and arguments contained in the two firſt books of Burnet's Hiſtory of the Reformation. This produced a controverſy between Le Grand and the Engliſh prelate, which has long ſince ceaſed to be intereſting. In 1691 he addreſſed three letters to the biſhop, on his critique of Boſſuet's Hiſtory of the Variations of Proteſtants. After this Le Grand was taken from his literary purſuits by the appointment of ſecretary to the abbè d'Eſtrees, in his embaſſy to Portugal. In this ſituation he continued till the year 1697. The leiſure which his diplomatic functions allowed was employed in tranſlations of Voyages and Travels from the Portugueſe. In 1702 he accompanied the ſame miniſter in Spain, where he remained about two years as ſecretary. Soon after this the marquis de Torci, miniſter of ſtate, took him into his ſervice, and employed his pen in drawing up ſeveral memorials concerning the Spaniſh monarchy, and other political topics, in which he was of great uſe to his patron, and acquitted himſelf with great ability. As an author his laſt printed work was a treatiſe "On the Succeſſion to the Crown of France." This was given to the world in 1718, and is reckoned a curious and uſeful performance. He died at the age of 80 in the year 1733. He had been poſſeſſed of church preferment, and had held, for a time, the office of cenſor royal of books. Moreri.

Grand, in *Geography*, is a denomination applied to a variety of places, as in the following inſtances.

Grand *Anſe*, or *Jeremie*, a well-built town in the weſtern part of the iſland of Hiſpaniola; the road of which is ſo bad, that veſſels, in order to eſcape the wind, are compelled to take ſhelter behind Cape Donna Maria. N. lat. 18° 15′. W. long. 74° 5′.

Grand *Bay*, a bay on the S.W. coaſt of Newfoundland, ſomewhat S. of Cape Ray.

Grand-*Bourg-Salagnac*, a town of France, in the department of the Creuſe, and chief place of a canton, in the diſtrict of Guéret. The place contains 2525, and the canton 7828 inhabitants, on a territory of 215 kiliometres, in eight communes.

Grand *Canal*, in Ireland, is an eſtabliſhment of which we have given ſome account in our article Canal, and have here to correct an error which crept into that account, in ſtating that the canal terminates in the Shannon at Tarmonbury, inſtead of Shannon-harbour, two miles above Banaghar. The branch to the Barrow joins that river at Athy; with a collateral branch from Low-town near Monaſtraven to Portarlington.

When the new part of the canal was finiſhed in 1804, from Tullamore to the Shannon, a general repair and deepening of the old parts took place, in which 3000 men were employed for expedition, and the whole line was ſcoured out, ſo that 60 ton boats might paſs. At Tullamore there are wharfs and warehouſes for goods, and alſo at Shannon-harbour, with inns and other accommodation for perſons on buſineſs.

The Doonare and Boulavoneen collieries in Queen's county, belonging to this company, were in February 1809 worked by 100 men, and they advertiſed for 200 more, in order to work 100 acres of a coal three feet four inches thick, which had then recently been laid dry: the canals and river navigations admitting of their being conveyed to Dublin, Limerick, Waterford, Athlone, &c.

Kildare aqueduct, eight miles from Dublin, is 100 feet high, according to M. De Luc, Geology, p. 320.

Grand-*Champ*, a town of France, in the department of Morbihan, and chief place of a canton, in the diſtrict of Vannes; ſeven miles N.N.W. of Vannes. The place contains 4139, and the canton 7850 inhabitants, on a territory of 202 kiliometres, in four communes.

Grand-*Couronne*, a town of France, in the department of the Lower Seine, and chief place of a canton, in the diſtrict of Rouen. The place contains 8000, and the canton 12,795 inhabitants, on a territory of 182½ kiliometres, in 13 communes.

Grand-*Fathers*, ſeveral large detached mountains of America, in the S.E. corner of Teneſſee, in which are the head-waters of French Broad, and Cataba rivers.

Grand *Forò*, a town of Africa, on the Slave Coaſt.

Grande *Iſland*, an iſland in the Atlantic, on the coaſt of Brazil; 16 miles long and two broad. S. lat. 23° 15′.

Grand *Iſland*, an iſland of America, in lake Superior, on the N. ſide of the lake.—Alſo, an iſland in Niagara river, about ſix miles long and three broad; its S. end is four miles N. of Fort Erie.—Alſo, an iſland at the mouth of lake Ontario, within the Britiſh territories; 20 miles long and at its greateſt breadth four miles.

Grand *Iſle*, a new county of America, in the N.W. corner of the ſtate of Vermont, incorporated in 1802, and including the towns of North Middle and South Hero, Vineyard (late iſle Motte), and Alburgh.

Grand *Iſles*, two large iſlands in lake Champlain, each about eight or ten miles long, and forming a townſhip belonging to Vermont.

Grand *Junction Canal.* To the full account which we gave of this very important inland navigation in our article Canal, we have here merely to add a few particulars which have occurred ſince that account was printed. The act of the 50th Geo. III. for the Grand Union canal provides, that a canal with locks is to be ſubſtituted for the railway-branch from Gayton to Northampton, in order to open a communication by water, from the head of the new navigation, the deſign for the continuation of the Leiceſterſhire and Northamptonſhire Union canals further ſouth than Market Harborough, where it now terminates, being dropt, in conſequence of the adoption of the Grand Union above-mentioned, which will connect the above canal with the Grand Junction. The three aqueduct arches over the Ouſe at Wolverton having been made flat elliptical, inſtead of the curves of equilibration, and the foundation alſo inſufficient, they gave ſigns of great inſecurity immediately on their centres being ſtruck, and in February 1808 two of them actually fell in and emptied the canal, as far as the ſtop-gates: fortunately, the old line of locks acroſs the valley had not been diſturbed, and the trade has ſuffered no interruption in conſequence. A caſt-iron aqueduct on brick and ſtone piers is now ſubſtituting for theſe three arches, under the direction of Mr. Benjamin Bevan, who is now the engineer to the company. In 1807 a new reſervoir was compleated near the ſide-ponds on the northern ſide of the Tring ſummit, for ſupplying water to the locks below the ſide-ponds in dry ſeaſons.

In examining the ſtrata and ſprings on the north ſide of the chalk ſummit, between Tring and Wendover, with a view to better ſupplying the Wendover branch and ſummit-level with water, Mr. Bevan diſcovered, that different water-tight beds in the lower chalk held up ſprings a conſiderable height above the canal, owing to their dip to the ſouthward; and in order to avail himſelf of this water, a ſough or tunnel was began in the upper bank of the canal near Wendover, and has been driven about half a mile ſouthward, interſecting different ſtrata of chalk from beneath, and increaſing in its ſupply of water as it proceeded; but obſerving that the principal vent of this water was in the winter and early ſpring months, when the other ſources were more than ſufficient for the ſupply of the canal, it occurred to that ingenious gentleman to place a ſtrong and water-tight valve in the moſt favourable part of this tunnel, which, as ſoon in the autumn as the canal is amply ſupplied from its other feeders, is ſhut, and kept ſo, until theſe begin again to ſlacken in their ſupply; the water in the immenſe planes of theſe beds of chalk, in the mean time accumulating, as in a vaſt ſubterranean reſervoir, the ſprings riſe to the level which they originally did before this tunnel was begun, about 20 feet above the canal; and for many weeks after the opening of the valve, in the beginning of ſummer, they pour forth a moſt ſurpriſing ſtream of water into the canal, which otherwiſe would have vented miles off in the chalk vallies, or ſlowly have made its way down through the joints and fiſſures in the ſtrata to ſprings at the bottom of the chalk, which vent below the level of the canal.

In 1808 a twelve-horſe ſingle Bolton's ſteam-engine was erected near Naſh-mill, in Hertfordſhire, to lift the water again, the riſe of four locks, for better ſupplying the mills during ſeven or eight months of the year. The company, in 1806, cauſed boats to be fitted up for conveying fat ſheep alive, in tiers one above another, from diſtant places in the county, to the London markets, inſtead of fatiguing them by driving along the roads, the ſcheme of thus bringing oxen having been previouſly tried, and found not to anſwer; but after a fair trial, the expences were found to over-balance the advantages expected from this alſo; we are ſorry alſo to add, that the cattle-market at Paddington has failed, and that the pens erected for it by the company have been ſold and removed.

The limited quantity of coals brought to Paddington, or within 20 miles of London by this canal, now pay a duty of 10*s.* 9¾*d* per ton (of 20×112lb.), which is equivalent to the duty on Newcaſtle coals in the Thames: in conſequence of this heavy and oppreſſive duty, many waggons and carts are employed in fetching coals by land, from the next wharf beyond the limited diſtance, near Watford. The Grand Union canal above-mentioned is begun, and is to join this canal near the S.W. end of the Braunſton tunnel. The deſign of a branch from near Tring, through Ayleſbury and Thame, to the Thames and Iſis navigation and Wilts and Berks canal near Abingdon, has been again revived, and it ſeems probable, that an act for that purpoſe will paſs in the enſuing ſeſſions of parliament (1811).

Towards ſupplying water to the inhabitants near Paddington, a transfer of the company's rights has been made to a ſeparate water-company, which is expected to be confirmed by parliament in the enſuing ſeſſions.

In November 1806, the company declared the firſt half yearly dividend of 1½ *per cent.* on the original ſhares, which has regularly increaſed to 3 *per cent.* half-yearly, excluſive of property tax. The affairs of the company ſeem now faſt retrieving from the effects of their great miſmanagement for many years after its eſtabliſhment, and to be now in a very proſperous ſtate; the ſhares (of 100*l.*) were, in September 1810, reported to be currently ſold at 302*l.* each! although, at one period, the ſame could with difficulty be diſpoſed of at 65*l.* to 70*l.* each: ſuch are the effects of good or bad management, and of abilities and integrity in thoſe entruſted with the direction and management of an immenſe concern like this, in inſpiring confidence in commercial men to enter into trade and ſpeculations connected with the canal, and in capitaliſts to inveſt their money in the company's ſhares. A reſolution of the general aſſembly of proprietors, on the 7th of June 1803, for appointing a general ſuperintendant of their concerns, principally led to this beneficial change. On the 11th of June following, Charles Harvey, eſq. was appointed to this office by the committee, and, after much oppoſition from certain powerful individuals, was, on the 11th of July, confirmed therein, by a general aſſembly called for the ſpecial purpoſe.

GRAND *Key*, a ſmall iſland among the Bahamas. N. lat. 26 54′. W. long. 77° 48′.

GRAND *Lake*, a lake of Louiſiana. N. lat. 32°. W. long. 93° 5′.—Alſo, a lake in the province of New Brunſwick, near the river St. John's, ſaid to be 30 miles long, eight or ten broad, and in ſome places 40 fathoms deep.

GRAND *Luce, Le*, a town of France, in the department of the Sarthe, and chief place of a canton, in the diſtrict of Saint-Calais; 14 miles S.E. of Le Mans. The place contains 2045, and the canton 10,493 inhabitants, on a territory of 227½ kiliometres, in 8 communes.

GRAND *Manen Iſland*, an iſland of the Atlantic ocean; 6 miles S. by S.E. of Campo Bello iſland, oppoſite to Papamaquoddy bay on the eaſtern border of the United States.

GRAND *Ridge*, is a term often uſed, (ſee our article CANAL,) for the water-head, or ſummit line, acroſs an iſland or continent, from whence the rain waters fall by oppoſite courſes to the ocean. It reſults from the admirable ſyſtem of vallies, which the great Creator has ſpread over the whole face of the earth, leaving no part, perhaps, originally of the ſurface, without a deſcent and out-fall to the ſea; that the ridges, or ſummit-lines, form a ſyſtem not leſs beautiful and perfect than the vallies; and whence it happens, that, from any hill whatever, it is practicable to mark on a good map, and to travel to every other hill in the ſame iſland or continent, however large, without croſſing any running water, however ſmall, but conſtantly to paſs along a ridge or waterſhead; whence the waters on the ſurface fall oppoſite ways from your route. It ſeems ſurpriſing, that no one has attempted to illuſtrate this ſubject by a good map, ſhewing all the connections and windings of theſe ridges in England, or even any local diſtrict, until of late, that Mr. Farey has prepared a ſquare of map, including Derbyſhire, ſhewing the ridges, and the ſituation of all the hills and principal eminences upon them, which is intended to accompany his report to the Board of Agriculture on that intereſting diſtrict.

The triangular form of the Britiſh iſland, and the ſituation of the two principal rivers, the Thames and the Severn, (or rather the Briſtol channel,) occaſion the grand ridge of England to divide into two branches on the Chalk Downs, a few miles N.E. of Devizes; one of which, (the ſouth-weſtern,) proceeds to Rundaway-hill, and croſſes the deep cutting of the Kennet and Avon canal, near to Devizes, near Eaſt Lavington, Warminſter, Wincanton, Beaminſter, Crewkerne, Chard, &c. by a moſt circuitous route, paſſing almoſt to the north and to the ſouth coaſts alternately, until it reaches the Land's End in Cornwall: having, in this long route, probably deſcended to no lower ſtrata than the red ground or marle, of which we ſhall ſpeak further preſently.

The other, or ſouth-eaſtern branch of the grand ridge, proceeds along the chalk and the clays and ſands above it, acroſs the deep-cutting of the Kennet and Avon canal, near Burbage, by High-clerc, (near which it probably occupies the higheſt ſtratum in the whole Britiſh ſeries,) near to Alton and Haſlemere, when it ſoon deſcends off the chalk into the great ſouthern denudation, (ſee Philoſophical Magazine, vol. xxxv. p. 130.), and purſues the under meaſures, through the wealds of Suſſex and Kent, by Alford, Leith-hill, Hands-croſs, (on the London and Brighton roads, being there on the loweſt ſtratum but one which appears in that road,) by Turner-hill, Nutley, Crowborough, Rotherfield, Wadhurſt, Tenterden, Shadoxhurſt, Lympe (near Hythe), where it again aſcends the edge of the chalk, and proceeds on it by Paddleſworth, Swingfield, and Lydden, to the coaſt at King's Down, near Walmer caſtle.

From the point of branching, N.E. of Devizes, as above deſcribed, the grand ridge follows the chalk northward by White-horſe hill, near Cherhill, &c. till within a few miles of Swindon, when it turns to the N.W., and deſcends to the marle, and other ſtrata below the chalk, croſſing the Woburn ſand ſtratum, not far from Wooton-Baſſet: and, paſſing to the Bath free-ſtone range, it croſſes the Salperton tunnel, on the Thames and Severn canal, and proceeds near to the weſtern edges of the ſame ſtrata, by Charlton-Kings, near Cheltenham, Stanway-hill, Broad-way-hill, Lemington-hill, Long-Compton-hill, and Epwell; ſoon after which, the grand ridge begins to leave the free-ſtone, and take to the dark blue clays, &c. under it, except croſſing ſome points of the ſtone, and traverſes the Fenny-Compton tunnel, on the Oxford canal; thence by Hellidon, and near Daventry, it croſſes the Braunſton tunnel, on the Grand Junction canal, at Weſt-Haddon, and at Huſband's-Boſworth, the tunnels of the Grand Union canal; when, turning north-weſt, the ridge paſſes Gilmorton; and not far from Lutterworth it croſſes the Lias clays and lime-ſtone ſtrata, and deſcends to the red marle (above mentioned), and quickly, by a great fault, or ſudden lift of the ſtrata, is brought upon the coal-meaſures of the Bedworth-field, and croſſes the deep cutting of the Coventry canal, through Bedworth town, acroſs the late ſir Roger Newdigate's canal, and ſweeps round to the weſt, ſouth-weſt, and ſouth, to Kenilworth; when, having croſſed another fault, and got again upon the red marle, it croſſes the deep-cutting of the Warwick and Birmingham canal, near Baddeſley-Clinton, and of the Stratford canal, near Hockley; thence by Aſhley-heath, and croſſes the Weſt-heath tunnel of the Worceſter and Birmingham canal, and the Lapal tunnel of the Dudley canal: after which, the grand ridge croſſes the baſaltic hills between Rowley and Dudley, (which belong to the red marle ſtrata,) and, deſcending to the coal-meaſures, croſſes the Dudley tunnel N.W. of that town, and proceeds by Sedgley; then croſſing an erect and denudated patch of the yellow lime-ſtrata, it croſſes the deep-cuttings of the Old Birmingham canal, the Wyrley and Eſſington canal, and of the Staffordſhire and Worceſterſhire canal, all near Wolverhampton town; then by Taterhall, Wrotteſley, Blimhill, Cowley, Wooton, (near Eccleſhall), Broughton, Aſhley, Maer, Madeley-park, to Keeſe, (near Newcaſtle-under-line,) where it has again got upon coal-meaſures, by Bignole-hill, and acroſs the Harecaſtle tunnel, on the Trent and Merſey canal, by Golden-hill, Wickinſtone rocks, and, croſſing an immenſe fault, deſcends to the lime-ſtone ſhale, (ſee Mr. Farey's ſection in *Plate* II. vol. xxxi. of the Philoſophical Magazine,) on Biddulph Moor; thence paſſes the top of the Great Rudyard reſervoir, to Gun-hill, and croſſing to High Roches rocks, it there aſcends the firſt grit; then croſſes a ſmall trough of the firſt coal-ſhale and ſecond grit, and deſcends again to the firſt grit, or Ramſhaw rocks, and ſtill further, on the lime-ſtone ſhale, at the Royal Cottage, along which it proceeds to the N.W. ſide of Flaſh, and then aſcends the firſt grit again, on South-Axe-edge-hill; it again deſcends to the ſhale lime-ſtone in croſſing Middle and Great Axe-edge-hills; from whence it aſcends acroſs the firſt grit and firſt coal-ſhale, and aſcends the ſecond grit on Thatch Marſh; this it purſues to the north of the Macclesfield and Buxton road, and then turning N.E. again deſcends to the lime-ſtone ſhale, and follows it acroſs the Mancheſter and Buxton road; ſoon after, it aſcends the firſt grit, and firſt coal-ſhale, on Comb's-moſs, and again deſcends to the ſhale, paſſes Sitting-low, (1½ mile S.E. of Chapel-en-le-Frith,) when, turning eaſtward, it croſſes the Great lime-ſtone fault, (N. of Dove-holes,) and is found upon the third lime-ſtone, on which it croſſes the quarries and rail-way of the Peak-Foreſt canal; ſoon after, it paſſes over the baſſet-edge of the third toad-ſtone, and deſcends to the great fourth lime-ſtone in Peak-Foreſt, which is probably the *loweſt* ſtratum, to which the grand ridge paſſes in its route through England; this lime-rock having been eſtimated to be four miles at leaſt of perpendicular thickneſs below the top of the chalk, from whence we commenced our deſcription; much the greater part of this vaſt ſeries of ſtrata having in this route along the grand ridge been loſt ſuddenly by perpendicular lifts of the ſtrata or faults, which, in proceeding to this point by more favourable routes, might have been ſeen baſſeting in ſucceſſion. For about one and a half mile the ridge proceeds upon the fourth lime, then again aſcends a point of the third toad-ſtone and third lime, to the village called Sparrow-pit, in the Mancheſter and Caſtleton road, where it again croſſes the great fault and aſcends to the lime-ſtone-ſhale on Ruſhop-edge, whence it proceeds northward, and after croſſing the Bridle-road from Hayfield to Edale-chapel, it aſcends the firſt grit on Edale rock, and proceeds acroſs the moſſes on Kinder-ſcout hills; theſe it leaves at their N.W. corner, and croſſes the moſſes on the ſhale, and the ancient Bridle-road called Doctor-Gate, from Gloſſop to Aſhop-Dale; it then aſcends the firſt grit again on ſhelf-ſtones, and follows the ſame to Wain-ſtones and Blakelow-ſtones, which ſeems to be the higheſt land in Derbyſhire, it then paſſes N. E. by Round-hill, and aſcends to the firſt coal-ſhale, croſſes the Mancheſter and Peniſtone-road at Lady-croſs; where, turning N. W. it aſcends the ſecond grit rock, and proceeds by Dean and Bretland Edges, to croſs the Gloſſop and Huddersfield road, on the bogs upon this rock on Holme moſs; from hence the ridge, after ſome diſtance, again deſcends to the firſt coal-ſhale, the firſt grit, and to the limeſtone-ſhale, croſſing the Stanage funnel on the Huddersfield canal near Marſden; the ridge then proceeds acroſs Black-ſtone-edge, and croſſes the deep-cutting of the Rochdale canal, near the village of Huddersfield, (which has improperly been ſaid in the population accounts of 1801, to be a *town* containing 10,671 perſons!) the ridge then paſſes Holme on the Burnley and Halifax road, whence it proceeds, and near Colne comes again upon coal-meaſures, which are, however, loſt again at the great fault, in which part of the Foulridge tunnel on the Leeds and Liverpool canal was driven, and which occaſioned the extraordinary trouble and expence attending that tunnel, which is mentioned in our article CANAL. From hence the grand ridge proceeds, by Barnoldſwick, Weſt Marton, near the Cold-Coniſtora, E. of Settleton lime-ſtone, over Pennigant-hill, Snays-fell, Nine-ſtandards, Kelton-fell, Lune-foreſt, Scordal-head, Milborn-foreſt, Aldſtone-moor, (lime,) Hartſide-croſs, Geltſdale-foreſt, Talkin, and croſſes the Roman or Picts wall on the E. ſide of Upper Denton, and ſoon after it enters Roxburghſhire in Scotland; through which it is much eaſier to trace this grand ridge than in England, it forming often the boundaries between the Scotch counties, to which this ridge and its collateral ridges are much better adapted than the rivers and brooks, which have generally been choſen as boundaries, both as being more permanent, and not liable to the changes which ſtreams of water are undergoing in the bottoms of vales, and avoiding thoſe diſputes reſpecting, and the delay of making and improving bridges, fords, navigations, mills, &c. owing to the rivers being part in one county and part in another, and by which alſo many of the moſt conſiderable towns are ſplit into two or more counties, to the no ſmall inconvenience of their inhabitants, in judicial and other county matters.

GRAND *River*. See OTTAWA and OUSE.—Alſo, a river of Africa which runs into the Indian ſea, S. lat. 2° 8′.

—Alſo, a river of Sicily, which runs into the Mediterranean on the N. ſide of the iſland, N. lat. 38° 3′. E. long. 14° 54′. —Alſo, a river of America, which runs into the Miſſouri, N. lat. 38° 56′. W. long. 93° 25′.—Alſo, a broad river of America, which diſcharges itſelf into lake Michigan, N. lat. 43° 25′. W. long. 85° 35′.—Alſo, a river of America, which runs into lake Erie, N. lat. 41° 55′. W. long. 81° 8′.—Alſo, a river of Canada, which runs into the Detroit, N. lat. 42° 34′. W. long. 82° 42′.—Alſo, a river of Canada, which runs into the St. Laurence. N. lat. 47° 3′.

GRAND *River*, or *Rio grande*, a river of Africa, which runs into the Atlantic, near the Biſſagos iſles, N. lat. 11°. W. long. 14° 30′.

GRANDE *Seaux*, an Indian nation, inhabiting a territory of the Miſſouri, and able to furniſh 800 warriors.

GRAND *Surry-Canal.* This canal is yet in the ſame ſtate, nearly, as when our account of it in the article CANAL was written, in 1805, except, that about two miles in length of it, at its N. E. end, has been brought into uſe, ſince the Croydon canal has been completed; and that the dock for ſhips, at its entrance from the Thames, was completed and opened in June 1807, and has anſwered ſo well to the proprietors, that in the laſt ſeſſions of parliament, they made an unſucceſsful attempt to obtain power for a further extenſion of them. In February, 1809, this company determined on erecting a ten-horſe ſteam engine on the banks of the canal, by the Deptford road, for ſupplying the neighbouring inhabitants with water, intending to let the ſurplus power of this engine to ſome manufacturers.

GRAND *Traverſe*, a range of iſlands, conſiſting of huge rocks in lake Michigan.

GRAND *Trunk Canal*, is a name commonly applied to the Trent and Merſey canal, which ſee in our article CANAL.

GRAND *Union Canal.* In the ſeſſions of parliament, 1810, (50 Geo. III.) an act paſſed for making the Grand Union canal, the general direction of which is about S.W. 23½ miles, in the counties of Leiceſter and Northampton, being conſiderably elevated, and croſſing the grand ridge of the iſland twice, by tunnels, its middle part for about half its length ſkirting near to the ridge on its weſtern ſide, and the two ends being on the eaſtern ſide of the ridge. Its objects are the completing of the long-deſired water-communication between the Trent river and the many canals which connect therewith, in Derbyſhire, Nottinghamſhire, and Leiceſterſhire, and the Grand Junction canal, and through it to the metropolis, without making the enormous circuit by Burton, Fradley-heath, near Litchfield, Tamworth, Atherſtone, Nuneaton, and Braunſtone, which at preſent goods, coming by water from Leiceſter, Nottingham, and Derby muſt do; it is intended alſo to ſuperſede the neceſſity for the ſouthern part of the Leiceſterſhire and Northamptonſhire Union canal, between Market-Harborough and Northampton, which on account of its difficulties has never been attempted; the preſent rail-way branch between the Grand Junction and Northampton is intended to be changed for a canal with locks, by which means the people of Northampton will have a water-communication with Market-Harborough, Leiceſter, &c. with only about 14 miles longer diſtance than the Leiceſterſhire and Northampton Union would have been, if the ſame had been completed according to its original act. Market-Harborough and Daventry are the only conſiderable towns near the line of this canal, which commences in the Leiceſterſhire and Northamptonſhire Union canal near Gumley, and terminates in the Grand Junction canal near Buckby-wharf, near the S. E. end of the Braunſtone tunnel. From Gumley in ¼ mile is a riſe of 76 feet by 12 locks; and thence to Watford, 20 miles are level, then in ¼ mile is a fall of 53 feet by eight locks, and thence to the Grand Junction canal about three miles are level; near Huſband's Boſworth is a tunnel of about 1120 yards long, and near Crick another of about 900 yards long. Near Crick it is propoſed to make a reſervoir of 60 acres above the canal, but below its level, ſo that the ſurplus water collected from other parts of the canal in rainy ſeaſons can be here reſerved, to be pumped up when wanted.

The width of the canal at top is 42 feet and 14 at bottom, and its depth of water five feet; the locks are 82 feet long and ſeven wide, calculated for 25 ton boats. This line was firſt ſurveyed by Mr. James Barnes in 1803, and by Mr. Benjamin Bevan in 1808 and 1809, and the latter is appointed engineer for the execution of the work.

GRAND *Weſtern Canal*, is ſo denominated in an act which paſſed in the year 1796, as mentioned in our article CANAL, but under which no progreſs had then been made. In April 1810, it was reported, that a beginning had at length been made on the ſummit level, in Holcomb, Devon. A much larger canal, capable of conveying ſhips from the Briſtol channel to the ſouth coaſt, has been ſome time in agitation, for avoiding the very circuitous and tedious navigation round the Land's End; which, however deſirable, is ſcarcely practicable, we incline to think, for want of water.

GRAND *Aſſiſe, in Law.* See ASSISE.

GRAND *Cape.* See CAPE and ATTACHMENT.

GRAND *Couſtumier, le*, an ancient book of very great authority, which contains the ducal cuſtoms of Normandy.

GRAND *Days.* See DAY, in *Law.*

GRAND *Diſtreſs, diſtrictio magna*; a writ of diſtreſs, ſo called on account of its extent, which reaches to all the goods and chattels of the party within the county.

This writ lies in two caſes: either when the tenant or defendant is attached and appears not, but makes default: or where the tenant or defendant hath once appeared, and after makes default. On ſuch occaſions, this writ lies by common law, in lieu of a petit cape.

GRAND *Elixir, guard, jury, larceny, prior, provoſt of France; ſerjeanty.* See ELIXIR, GUARD, &c.

GRAND *Guſto*, in *Painting.* See GUSTO.

GRANDE, in *Geography*, a town of Norway, in the dioceſe of Drontheim; 21 miles N. W. of Drontheim.

GRANDEE is underſtood of a lord of the firſt rank or prime quality.

In Spain, the term grandees is uſed abſolutely to denote the prime lords of the court, to whom the king has once given leave to be covered in his preſence: there are ſome grandees for life only; made by the king's ſaying ſimply, be covered. Others are grandees by deſcent; made by the king's ſaying, be covered for thyſelf and heirs. Theſe laſt are reputed far above the former.

There are ſome who have three or four grandeeſhips in their family.

GRAND-GOR. A Scotch appellation for the venereal diſeaſe.

In the Philoſophical Tranſactions, N° 469. ſect. 5. we have a proclamation of king James the IVth of Scotland, ordering all who had this diſeaſe, or who had attended others under it, forthwith to repair to an iſland in the Frith of Forth. If the grand-gor was the pox, and this diſtemper came into Europe at the ſiege of Naples in 1494, it muſt have made a very quick progreſs to cauſe ſuch an alarm at Edinburgh in 1497.

GRANDI ERCOLE, in *Biography*, whom Vaſari calls Ercole da Ferrara, was a painter of the early ages in the art after its revival. He was a diſciple of Lorenzo Coſta, whom he afterwards ſurpaſſed in excellence, and at whoſe death he was appointed to compleat the work of the Crucifixion, begun by the former for Domenico Garganelli, in the church of St. Pietro in Bologna, by which he gained great reputation for the excellence of the colour, and the truth and force of expreſſion; although it is wrought in the dry ſtyle of Mantegna and P. Perugino. When unfortunately the chapel was deſtroyed, that part of the picture which was preſerved was placed in the palace Tanara. His peculiar ſhyneſs of manner made him many enemies in Bologna. He therefore quitted it and went to Ferrara, where he produced many works which are very ſcarce now. His fondneſs for wine ſhortened his life, and he died at the age of 40 in the year 1531.

GRANDI, FRANCIS LEWIS, who flouriſhed in the latter end of the 17th, and the commencement of the 18th centuries, was born in 1671 at Cremona. He was diſpoſed to a ſtudious life, and choſe the profeſſion of theology, in order that he might freely indulge his inclination. He entered into the religious order of Camaldolites, at Ravenna, at the age of 16; and on this occaſion he relinquiſhed his own Chriſtian name, and received that of *Guy*. He became, in the early progreſs of his ſtudies, diſtinguiſhed for his proficiency in the different branches of literature and ſcience, and being diſſatisfied with the Peripatetic philoſophy of the ſchools, he was ambitious of contributing to introduce a more rational ſyſtem. With this view he offered himſelf as a candidate for the vacant profeſſorſhip of philoſophy in the ſchool of Florence, and obtained his object, though not without the moſt determined oppoſition from the prejudiced adherents to the old opinions. He now applied himſelf to the introduction of the Carteſian philoſophy, while, at the ſame time, he became zealouſly attached to mathematical ſtudies. The works of the great Torricelli, of our countryman Wallis, and of other celebrated mathematicians, were his favourite companions, and the objects of his familiar intercourſe. He publiſhed a treatiſe to reſolve the problems of Viviani on the conſtruction of arcs, which he dedicated to the grand duke Coſmo III., who was ſo delighted with the performance, that he appointed the author profeſſor of philoſophy in the univerſity of Piſa. From this time Grandi purſued the higher branches of mathematics with the utmoſt ardour, and had the honour of ranking the ableſt mathematicians among his friends and correſpondents. Of the number may be named the illuſtrious Newton, Leibnitz, and Bernouilli. By his life of St. Peter Damiano, publiſhed in 1702, and his examination of the legends of St. Romauld, he gave offence to the bigots of his community, and was depoſed from the dignity of abbot of St. Michael at Piſa; but the grand-duke had too liberal a mind to be offended; and to ſhew the eſtimation in which he held the philoſopher, he immediately appointed him his profeſſor of mathematics in the univerſity; which, perhaps, led to his re-inſtatement in the abbacy. He now reſolved ſome curious and difficult problems for the improvement of acouſtics, which had been preſented to the Royal Society in Dublin, and having accompliſhed his object, he tranſmitted the ſolutions, by means of the Britiſh miniſter at the court of Florence, to the Royal Society at London. The principal work of Le Grandi was "A Treatiſe on Series and Infiniteſimals." He appeared likewiſe as the defender of Galileo's doctrine reſpecting the earth's motion, and obtained a complete victory over thoſe who oppoſed it. He was deeply verſed in ſubjects of political economy, and various diſputes were referred to his deciſion reſpecting the rights of fiſhery, &c. He was appointed commiſſioner from the grand-duke and the court of Rome jointly, to ſettle ſome differences between the inhabitants of Ferrara and Bologna, concerning the works neceſſary to preſerve their territories from the ravages of inundation. For theſe and other important public ſervices he was liberally rewarded by his employers. Reverting to his literary labours, Le Grandi engaged in a conteſt with Le Ceva, on the ſubject of the philoſophy of the ancients and moderns. This diſcuſſion was occaſioned by a preface to a Latin poem by Le Ceva, in which he maintained that none but heretics would renounce the philoſophy of Ariſtotle. The remainder of his life this great man ſpent in mathematical purſuits, and in the publication of works of ſcience, which are too numerous to be recited here. He died at the age of ſeventy-two in the year 1742. Moreri.

GRANDIER, URBAN, was born in the latter part of the 15th century. His father, a notary-royal at Sablé, gave him a good education, and introduced him while young among the Jeſuits at Bourdeaux, to whoſe friendſhip he recommended himſelf, as well by his natural genius and fine underſtanding, as by his diligence and proficiency in his ſtudies. Conceiving highly of his talents, the fathers of the college gave him the living of St. Peter, at Loudun, of which they were the patrons, and procured him a prebend in the church of the Holy Croſs. Theſe benefices rendered him the object of jealouſy with eccleſiaſtics, which was ſtill farther heightened by the accompliſhments of his perſon and the elegance of his manners. With his friends he was eaſy, facetious, and agreeable, but extremely haughty towards thoſe whom he regarded as his enemies. Some of his brethren of the clergy he had exaſperated, by the arrogance with which he triumphed over them, upon gaining certain ſuits in the eccleſiaſtical court, and he raiſed a hoſt of foes by his reported ſucceſsful gallantries with the ladies, to the great mortification of diſappointed rivals, incenſed fathers and huſbands. A league was formed with a view of driving him entirely out of Loudun: a heavy charge of debauchery, irreligion, and impiety was laid againſt him, in the biſhops' court of Poictiers, which produced, firſt, a ſuſpenſion of the prieſts' functions; and afterwards he was condemned to reſign his benefices, and to the practice of penance and mortification. From a ſentence ſo ſevere, Grandier appealed to the archbiſhop of Bourdeaux, by whoſe means he was acquitted, and even allowed to ſue for the recovery of damages, and the reſtitution of the profits of the benefices during his ſuſpenſion. The archbiſhop, a friend to peace, earneſtly recommended him to change his reſidence, but he was incapable of renouncing his favourite paſſion, revenge. He returned to Loudun, bearing in his hand a branch of laurel, and in his mind a fixed reſolution of humbling his enemies. They were equally bitter, and ſmarting under the laſh of the victor, they ſet about means to compaſs his deſtruction. A prieſt, named Mignon, deviſed a plan, which ultimately enabled them to gratify all their malignity. He trained up nuns in the Urſuline convent at Loudun, to act the part of women poſſeſſed with evil ſpirits: theſe were inſtructed to accuſe, in their frantic fits, Grandier of having ſubjected them to demoniacal influence. At firſt he was indifferent to the reports, conſidering the buſineſs as a mere farce. It had, however, a moſt tragical concluſion. Grandier, at length, finding, from the effects produced upon the credulous devotees, that matters were taking a ſerious turn, appealed to the magiſtrates, conſcious of his own innocence, and requeſting them to take cognizance of the affair. They began the inveſtigation, and were ſatisfied that the whole was the effect of trick, but when they attempted to interpoſe their authority, and prohibit the continuance of ſuch diſgraceful proceedings, the prieſts who had patronized and inſtructed the women, and who were bent upon the deſtruction of Grandier, diſowned their juriſdiction and defied their power. An application was made to the archbiſhop of Bourdeaux, who employed phyſicians to examine into the caſe, and by their reports no doubts were left in the mind of the prelate, that the buſineſs was founded on the moſt groſs and ſcandalous impoſture. Upon this the archbiſhop iſſued an order, the ſeverity of which put the whole legion of devils to flight. After a time the ſcheme was renewed, and the authors of it contrived to engage cardinal Richlieu to favour their malignant deſigns. For this purpoſe the monks of Loudun wrote to father Joſeph, one of their fraternity, informing him that Grandier was author of a ſatire, entitled "The Shoemaker's wife of Loudun," containing reflections on the cardinal's birth and perſon, which had excited in the boſom of the cardinal the ſharpeſt ſtings of reſentment. Believing that the information was correct, he determined to make the ſatiriſt feel the full weight of his vengeance. Grandier was arreſted and brought to trial, and after a tedious proceſs, in which the farce of exorciſing the poſſeſſed was ſeveral times repeated, and the judge's partiality and tyranny diſplayed in the moſt glaring light, "upon the depoſition of Aſhtaroth, a devil of the order of Seraphim, and the chief of the poſſeſſing demons, and upon the depoſitions of the nuns, who pretended to be poſſeſſed of devils, the commiſſioners gave judgment, declaring Grandier duly attainted and convicted of the crime of magic, ſorcery, and poſſeſſion, happening by his means in the perſons of ſome of the Urſaline nuns, &c. for the reparation of which he was condemned to an amende honourable, and to be burnt alive with the magical characters." Grandier, innocent of the charge, heard the ſentence without any emotion, and afterwards ſuſtained the torture, ordinary and extraordinary with aſtoniſhing fortitude, never ſuffering one repining expreſſion againſt his enemies to eſcape him through the whole ſcene. The laſt words which he was heard to utter previouſly to the flames reaching his vital parts, were in ſupplication to God, to whoſe mercy he recommended himſelf. Such was the fate of Urban Grandier, whoſe pride and paſſions appear to have been cauſes of the conſpiracy to which he fell a victim, and whoſe hiſtory exhibits a memorable example to ſhew to what pitch of folly and madneſs the fury of an incenſed cabal, the revenge of a miniſter, and the proſtitution of a judge, may be wrought up. The relations of the caſe is given in "The Hiſtory of the Devils of Loudun," firſt publiſhed at Amſterdam in 1693, and which has been frequently reprinted. As an author Grandier is known by a funeral oration for Scævola de St. Martha, which is highly commended for the maſterly ſtrokes of eloquence interſperſed through it. Moreri.

GRANDINES, in *Surgery*, ſmall tumours on the eyelids.

GRANDMONT, in *Geography*, a town of France, in the department of the Upper Vienne, near which was an abbey, ſuppreſſed in 1769; 15 miles N.E. of Limoges.

GRANDOLA, a mean town of Portugal, in the province of Eſtramadura, containing 800 houſes, ſituated between Cadaon and the ſea-coaſt. Behind it is the Sierra de Grandola, that proceeds in two ranges, one behind the other, from eaſt to weſt; the town is 27 miles S.E. of Setuval.

GRANDPRE', a town of France, in the department of the Ardennes, and chief place of a canton, in the diſtrict of Vouziers; 33 miles E. of Reims. The place contains 1350, and the canton 8617 inhabitants, on a territory of 242½ kiliometres, in 14 communes.

GRANDRIEUX, a town of France, in the department of the Lozere, and chief place of a canton, in the diſtrict of Mende; 10 miles N.W. of Langogne. The place contains 1657, and the canton 5389 inhabitants, on a territory of 235 kiliometres, in 7 communes.

GRAND-SERRE, Le, a town of France, in the department of the Doubo, and chief place of a canton, in the diſtrict of Valence. The place contains 1491, and the canton 6189 inhabitants, on a territory of 232½ kiliometres, in 10 communes.

GRANDVILLE, or Granville, a town of France, in the department of the Channel, and chief place of a canton, in the diſtrict of Avranches, 12 miles N.W. of it. The place contains 5454, and the canton 12,290 inhabitants, on a territory of 80 kiliometres, in 8 communes. The harbour can receive only about 60 ſmall veſſels. The town is ſeated on a ſharp rock, forming a peninſula of an oval form, and ſurrounded with walls; it has two gates, and two fauxbourgs. Near it is an oyſter-fiſhery, and on the land ſide quarries of large and very hard ſtones. N. lat. 48° 50'. W. long. 1° 32'.

GRANDVILLIERS, a town of France, in the department of the Oiſe, and chief place of a canton, in the diſtrict of Beauvais; 14 miles N.N.W. of Beauvais. The place contains 1633, and the canton 12,655 inhabitants, on a territory of 167½ kiliometres, in 22 communes. N. lat. 49° 39'. E. long. 2° 2'.

GRANDWALDEN, or Gran, a town of Norway, in the dioceſe of Chriſtiania; 26 miles S. of Chriſtiania. The town ſtands on an eminence in the midſt of an extenſive plain, looking down on ſeveral conical rocks, covered with firs, and remarkable for two churches in the ſame churchyard, called the "Two Siſters."

GRANGE, an ancient term for a barn, or place wherein to lay up and threſh corn.

The word is formed of the Latin *granea;* or of *granum, grain, corn*, &c. Hence alſo *granger* or *grangier,* a grange-keeper or farmer.

Hence *grange* is a name which was formerly much applied to ſuch farm-houſes as were provided with large barns, granaries, and other ſimilar offices, for the preſervation of grain, &c.

Grange is alſo uſed, in a more extenſive ſenſe, for a whole farm, with all the appendages of ſtabling for horſes, ſtalls for cattle, &c. and for an inn.

Grange, Joseph de Chancel de la, in *Biography*, born in 1676 of an ancient French family, at Antoniat in Perigord, exhibited from his boyiſh days a ſingular paſſion for poetry and romance. He was educated among the Jeſuits at Bourdeaux, and when he was only nine years old, he compoſed a comedy in three acts, which was repreſented by his ſchool-fellows. His early talents ſeemed to have marked him out for diſtinction, and his mother took him to Paris, and obtained for him the place of page to the princeſs of Conti. Before he was ſixteen, his tragedy of Jugurtha was repreſented in the capital, and was applauded as a moſt extraordinary effort of ſuch a ſtripling. He continued to write pieces for the ſtage, which were productive of reputation and pecuniary advantages; but the work which rendered him famous, though it expoſed him to much mortification and ſuffering, was entitled "Philippiques," a ſatire in verſe, directed againſt Philip, the regent duke of Orleans. This appeared in 1718, and it charged the duke with the crime of poiſoning ſeveral branches of the royal family.

The author attempted to eſcape, but, falling into the hands of his purſuers, he was committed to the priſon of St Marguerite. It appears that he was not brought to trial, and that he contrived to effect an eſcape from priſon and the country, but upon the death of the regent he returned to France, where he lived unmoleſted. He died at his family ſeat of Antoniat in 1758. His works were collected in five vols. 12mo. and, with his own corrections, publiſhed the year after his deceaſe. They conſiſt chiefly of tragedies, operas, and miſcellaneous poems. The tragedies are moſt eſteemed: they are ſaid to be "artful in the contexture of the plot, and abounding in intereſting ſituations, but feebly written, and trite in language and ſentiment." In his latter years he employed his time on a hiſtory of Portugal. In manners he had all the fire and vanity of a Gaſcon: he had few friends, and ſeems to have been more feared on account of his ſatirical powers, than beloved for his virtues.

Grange, in *Geography*, a town of Sweden, in the province of Dalecarlia; 33 miles S.S.W. of Falun.

Grange, *La*, a cape on the N. coaſt of the iſland of Hiſpaniola. N. lat. 19° 55′. W. long. 72° 30′. This cape, with Point de Dunes, forms the mouth of the bay of Monte Chriſti, in the county of Stirling.

Grange *Point*, a cape on the S. coaſt of the Iſle of Wight. N. lat. 50° 38′. W. long. 1° 15′.

Grange *River*, a river of Upper Canada, which empties itſelf into a bay of the ſame name on the N. ſhore of lake Superior, W. of the Cris. This river leads to Nipigan, a place which formerly furniſhed the beſt beaver and martin, and was the fartheſt advanced poſt of the French traders, at the time when Great Britain conquered Canada.

GRANGEA, in *Botany*, Adanſon, v. 2. 121. Juſſ. 184. Claſs and order, *Syngeneſia Polygamia-ſuperflua.* Nat. Ord. *Compoſitæ diſcoideæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common calyx* imbricated, ſpreading; its ſcales oblong, obtuſe. *Cor.* compound; the united florets of the diſk very numerous, tubular, five-cleft, regular; females fewer, in the circumference, tubular, three-cleft. *Stam.* in the united florets, filaments five, capillary, very ſhort; anthers united into a cylinder, with five teeth. *Piſt.* Germen ſmall; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma undivided in the united florets, cloven in the female ones. *Peric.* none, except the permanent calyx. *Seed* ſolitary to both kinds of florets, obovate, compreſſed, crowned with a toothed border. *Recept.* hemiſpherical, naked.

Eſſ. Ch. Receptacle hemiſpherical, naked. Seed-crown membranous, toothed. Calyx imbricated, ſpreading. Florets of the radius three-cleft.

We have alluded to this genus under Ethulia, from which it differs in having a crown to the ſeed, florets of the radius three-cleft, and ſcales of the calyx obtuſe. It moſt approaches *Tanacetum* in character, but is ſufficiently diſtinct. The following are the only ſpecies we have been able certainly to determine.

1. G. *maderaſpatana*, (Artemiſia maderaſpatana; Linn. Sp. Pl. 1190. Tanacetum Ægyptiacum; Jacq Hort. Vind. v. 3. 46. t. 88. Abſinthium maderaſpatanum, ſenecionis incani folio, corymbis ſolitariis in ramulorum faſtigio ſpecioſis; Pluk. Amalth. 3. t. 353. f. 3. A. minus odoratum gangeticum, floribus chamæmeli ſolitariis e foliorum alis; Pluk. Almag. 2. Phyt. t 1. f. 2.)—Leaves ſinuated, ſomewhat lyrate, hairy. Flower-ſtalks elongated.—Native of the Eaſt Indies. *Root* annual, tapering, branched. *Stems* procumbent, a ſpan or more in length, ſubdivided, leafy, downy. *Leaves* alternate, ſeſſile, deeply pinnatifid, in a lyrate form, and ſinuated, clothed with ſoft whitiſh hairs, their ſegments rather rounded. *Flowers* yellow, almoſt globular, near half an inch in diameter, on axillary, ſolitary, ſimple, hairy ſtalks, half as long as the leaves. Linnæus in both editions of Sp. Pl. quotes Plukenet, t. 357. f. 3. Adanſon, his profeſſed critic, ſeems to have augmented the error in copying him, and cites t. 257. f. 3; which has given us a great deal of trouble; more eſpecially as we have a plant from the Paris garden for Adanſon's *Grangea*, which proves *Hippia integrifolia*, Linn. Suppl 389, and does not anſwer to the character or habit of *Grangea.* Nevertheleſs, as it came with ſuch authority, we have laboured in vain to find any thing like it in Plukenet, and thought for a while we had found it in t. 45 f. 3, which bears a rude reſemblance to our ſpecimen, but is *Parthenium Hyſterophorus.* Finally, Burmann's *Sphæranthus africanus*, Fl. Ind. t. 60. f. 2, which is not that of Linnæus, and which Juſſieu ſuſpects may be a *Grangea*, is not unlike this *Hippia.* If it be our plant, his ſuſpicion is refuted. The *leaves* in our ſpecimens are occaſionally undivided or lyrate, more cut than in Burmann's plate, and leſs ſo than in Plukenet's t. 45. f. 3. The calyx, however, which is well expreſſed in the latter for the *Parthenium*, does not accord with our's.

2. G. *minima.* (Artemiſia minima; Linn. Sp. Pl. 1190. Burm. Ind. 177. t. 58. f. 3.)—Leaves wedge-ſhaped, bluntly toothed, ſmooth. Flowers nearly ſeſſile.—Native of China, and the Eaſt Indies. We received it in 1803, from the ſtove of the late right honourable Charles Greville at Paddington, where it was preſerved rather for its rarity and ſingularity than beauty. It is an annual plant, much ſmaller in all its parts than the foregoing, ſmooth, proſtrate, of a light green colour. *Flowers* the ſize of a ſmall pea, axillary, nearly ſeſſile, whitiſh, ſometimes with a purple tinge. Their ſtructure is extremely minute.

We ſcruple to admit *Ethulia divaricata* into this genus, though ſomewhat ſimilar in habit, becauſe of its naked ſeed, and ſharp calyx. See Ethulia.

GRANGEMOUTH, in *Geography*, a village of Scotland, of conſiderable extent, founded by ſir Lawrence Dundas, upon the angle formed by the junction of the river Carron and the canal. It deſerves mention as a place of conſiderable trade. Veſſels bring into this port timber, hemp, flax, deals, and iron, from the Baltic, Norway, and Sweden, and grain from foreign markets, as well as from the coaſts of England and Scotland. The trade to London is carried on by the Carron ſhipping company; 3 miles E.N.E. of Falkirk.

GRANGERIA, in *Botany*, ſo named by Commerſon in memory of M. Granger, a ſurgeon, who travelled into Egypt and Judea between the years 1730 and 1736, from whence he ſent numerous ſeeds to enrich the botanic garden at Paris. He publiſhed, in 1745, in 12mo, *Relation du voyage fait en Egypte en* 1730, according to Haller, who mentions him as "not a trifling man, though he touched but ſlightly upon botany. He greatly depreciates the wonders and fertility of Egypt."—Juſſ. 340. Lamarck. Illuſtr. t. 427. Claſs and order, *Icoſandria Monogynia.* Nat. Ord. *Pomaceæ*, Linn. *Roſaceæ*, Juſſ.

Gen Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped, with five ovate, acute, permanent ſegments. *Cor.* Petals five, roundiſh, ſcarcely longer than the calyx, inſerted into its rim. *Stam.* Filaments fifteen, awl-ſhaped, longer than the petals, inſerted into the calyx; anthers roundiſh. *Piſt.* Germen ſuperior, obovate, wooly; ſtyle one, thread-ſhaped; ſtigma obtuſe. *Peric.* Drupa obtuſe, ſomewhat triangular. *Seed.* Nut triangular, of one cell.

Eſſ. Ch. Calyx five cleft, inferior. Petals five. Germen woolly. Drupa with a triangular nut.

1. G. *buxifolia.*—A tree, native of the Iſle de Bourbon,

where it is called *Arbre de buis*, or Box tree, from the ſimilitude of its *leaves* to the *Buxus*. Theſe are about an inch long, ovate, acute, entire, veiny, ſmooth on both ſides, nearly ſeſſile, with a pair of ſmall awl-ſhaped *ſtipulas*. *Flowers* ſmall, in terminal or axillary cluſters. *Fruit* ſomewhat like that of an olive, but ſmaller, and rather angular.

GRANHULT, a town of Sweden, in the province of Smaland; 35 miles N. W. of Calmar.

GRANI, in our *Ancient Writers*, muſtachoes or whiſkers of a beard.

The word ſeems formed from the ancient Britiſh or Iriſh, *greann, a beard*.

It is given for a reaſon why the cup is refuſed to the laity, "Quia barbati, & prolixos habent granos, dum poculum inter epulas ſumunt, prius liquore pilos inficiunt, quam ori infundunt."

GRANIFEROUS, producing or bearing any ſort of grain.

GRANIFEROUS *Pods*, a term ſignifying ſuch pods as contain ſmall ſeeds of ſome of the grain kinds.

GRANILITE. Under this denomination Kirwan comprehends all varieties of granite that contain more than three ingredients, ſuch as quartz, feldſpar, mica, and garnet: ſuch ſupernumerary ingredients, however, muſt be conſidered as accidental, and of too little importance to confer the diſtinction of a particular name on the granite in which they occur.

GRANINGE, in *Geography*, a town of Sweden, in Angermannland, on a lake; 40 miles N. W. of Hernoſand.

GRANITE, an aggregate rock, the eſſential ingredients of which are feldſpar, quartz, and mica, being the ſame as thoſe of gneiſs, from which granite differs chiefly in the arrangement of the three component parts: their being mingled without order or regularity, produces a granular ſtructure, while that of gneiſs is generally ſlaty. (See GNEISS.) It is, probably, this granular nature of the rock in queſtion which has procured it its name; though ſome authors are of opinion that the word *granite* is nothing but a corruption of *geranites*, a name mentioned by Pliny, as that of a ſtone of the colour of a ſtork's neck. The fact is, that the word granite, which is now adopted by almoſt all European nations, originated with Italian antiquaries, and Tournefort was not the firſt writer who makes mention of it.

The three conſtituent parts of granite vary with regard to their colour, ſize, relative quantity, form, and freſhneſs.

The *colour* of this rock is generally more or leſs reddiſh, becauſe the feldſpar, uſually the predominating part, is oftener of that than of any other colour. Sometimes the feldſpar is greyiſh and yellowiſh-white, and ſo like the admixed quartz, that it can be diſtinguiſhed only by its peculiar fracture and luſtre. It has been obſerved that the red colour occurs more frequently in the newer, while the greyiſh-white appears to be more characteriſtic of the older formation of granite. Alſo long continued expoſition of granite to the action of the atmoſphere contributes to render its feldſpath pale or grey. Yellow and green feldſpar ſeldom occur as ingredients of granite.—The colour of the quartz is uſually greyiſh; ſometimes this part is perfectly colourleſs and tranſparent, in which caſe, as the grains cannot be viewed by tranſmitted light, it appears deep grey or black.—The mica is much more frequently black or grey, than brown or perfectly white.

The abſolute *ſize* of the ingredients of granite is ſubject to conſiderable variation; they are ſeen from very large to very fine granular, the latter being more frequent in the newer formation. With regard to the relative ſize of its conſtituent parts, we diſtinguiſh equally mixed from unequally mixed granite; the former being that in which the magnitude of the three ingredients is nearly the ſame.

The *quantity* of theſe parts is equally various: ſo that ſometimes one, ſometimes two of them predominate: upon the whole it is the feldſpar that is found in the greateſt proportion, and the mica in the leaſt. There are, indeed, ſome varieties of granite in which the quartz or mica are entirely wanting. Such binary aggregations of the granitic kind have received diſtinct appellations by ſome authors. Thoſe of quartz and feldſpar, or feldſpar and mica, were called ſimple granites by Wallerius; ſemi-granites by Blumenbach; and Kirwan propoſes to denote all theſe duplicates in general by the name *granitell*, ſpecifying, when neceſſary, the conſtituent peculiar parts of each. The aggregate of quartz and mica is called *geſtell-ſtein*, or *ſtell-ſtein*, by ſome of the older German writers; and that of feldſpar and mica, eſpecially when the latter is of a brown or browniſh-red colour, and forms the predominant ingredient, has obtained the Finlandic name of *Rapakivi*. Such dictinctions, however, are unneceſſary and inapplicable, ſince often in one and the ſame granitic maſs the proportion and number of the component parts are ſeen conſiderably to vary. Beſides, there are many rocks enumerated by authors as granitels, which cannot, with any propriety, be referred to granitic compounds; ſuch as feldſpar with hornblende, with nephritic ſtone, with garnet, ſteatite, or the ſame ſeparately combined with quartz or mica.

There is but very little variety in the *form* of the component parts: they are almoſt always maſſive and indeterminately angular, and ſeldom occur in the form of regular cryſtals. The feldſpar is found cryſtallized in Bohemia, at Schlakkenwalde, near Carlſbad; at Tzeidler, in the Saatz diſtrict; alſo near Hohenwalde, in Upper Palatinate; at Ochſenkopf and Keſſein, on the Fichtel-gebirge; at Schneeberg, in Saxony; in England; in the iſland of Arran, &c. The granite in which theſe feldſpar cryſtals are ſeen, is often of ſuch fine grain, and the quartz and the mica are ſo intimately united with each other, that they form, as it were, a matrix for the cryſtals: ſuch granite is called *porphyritic* granite. Part of the pavement on Weſtminſter and Blackfriars' bridge conſiſts of this ſpecies of granite. Something like cryſtallization of the quartz is now and then obſerved in granite, but it is always irregular. In the variety, called graphic or Portſoy granite, in which the feldſpar conſtitutes by far the greateſt part of the maſs, and which contains mica in ſmall groups, at great diſtances from each other, the quartz is diſpoſed in ſuch a manner, that when the rock is cut in a certain direction, it exhibits forms which bear ſome diſtant reſemblance to written characters: whence it has obtained its name. But by ſome, neither the Portſoy nor Siberian graphic ſtones are conſidered as true granites.—Alſo, the mica is now and then found cryſtallized in granite, ſuch as in Siberia, at Waldheim, Metweida, Johan-georgenſtadt, in Bohemia, &c. In a variety of granite of Mount St. Gothard, all the three conſtituent parts are ſaid to occur cryſtallized together.

The feldſpar is alſo ſometimes found in the ſhape of cuneiform concretions, repreſenting on their fracture a ſurface comparable to the paws of ſome animals, or to the petals of flowers: this ſingular variety comes from the neighbourhood of Breitenbrunn, in the Upper Ertzgebirge.

With regard to the *freſhneſs* or ſtate of preſervation which theſe three ingredients exhibit, we have to obſerve that the feldſpar, which, in general, has a vitreous luſtre and a perfectly foliated fracture, is alſo ſeen in various ſtages of decompoſition; it occurs dull, earthy, friable, and even entirely diſintegrated, in which ſtate it is known by the name of porcelain-earth. This diſintegration takes place chiefly near the ſurface of granitic mountains, and in the immediate vicinity of veins. Granite, with feldſpar thus converted into an earthy ſtate, is found in Cornwall, on the Hartz, at Burkardſgrün in Saxony, &c.; and it is probable to Mr. Emmerling that the gieſs-ſtein, (Saxum fuſorium, Linn.) which, on account of its looſe texture, is made uſe of in the braſs founderies of Sweden and France, may be granite in a ſimilar ſtate of incipient decompoſition. Alſo, the mica is ſubject to diſintegration, eſpecially when acted upon by ſubterraneous water and vapours; the maſs into which it is thus converted is conſidered as being of the nature of ſteatite. In this ſtate it is found at Fichtelberg, in the Upper Palatinate, and in the vicinity of Tornitz, near Carlſbad, in Bohemia.

Beſides feldſpar, quartz, and mica, other foſſils are found admixed, which, not being conſidered as eſſential, are generally diſtinguiſhed by the appellation of *accidental ingredients*. They are, 1. Shorl; the moſt frequent of all. It occurs maſſive and diſſeminated, ſometimes alſo cryſtallized, and appears principally to belong to the old granite-formation: it is found in ſeveral parts of Saxony, in Lower Bavaria, Upper-Palatinate, Wirtenberg, Tranſylvania, Cornwall, &c.; 2. Garnet: moſtly in ſmall grains. It occurs but rarely; but has been found near Leipzig (in boulders), at the Greifenſtein, and in the neighbourhood of Voigtsdorf, in the vicinity of Freiberg, in Saxony, in Lower Bavaria, &c. An aggregate of quartz, mica, and garnets, is by the Swedes called norka or murkſten. 3. Tinſtone; frequent in the granite of Geier, Zinnwald, &c. 4. Nephrit or jade appears to occur not only in gneiſs, but alſo with real granite, in Switzerland. 5. Rock cryſtal. 6. Beryl; in the iſland of Alba, and perhaps alſo in Siberia. 7. White common opal, ſometimes occurs in the granite of Eibenſtock in Saxony. 8. Topaze is ſometimes ſeen, together with tinſtone, in the granite of Zinnwald. 9. Calcareous ſpar, very ſeldom. 10. Fluor-ſpar, the ſame; in Siberia, at Geier in Saxony. 11. Barytes, equally ſeldom; in Switzerland.

Foreign beds are leſs frequently met with in granite than in other rocks. The more remarkable ones are thoſe of tin-ſtone, galena, and blende at Zinnwald on the Bohemian frontiers; the beds of mica, particularly in Sileſia and Luſatia; of quartz, and rock cryſtal in Switzerland. Alſo beds of feldſpar are ſaid to occur in it. The green feldſpar, called Amazon ſtone, is found in large maſſes in the granite of the Ural mountains of Siberia.

Stratification of Granite.—Though granite occurs frequently as widely-extended maſſes, in which the eye is unable to diſcover any continued traces of parallel ſeparation; yet there can be no longer any doubt that thoſe geologiſts, who abſolutely denied the exiſtence of ſtratified granite, were either entirely unacquainted with the ſtructure of many of the European granitic mountains, or too much influenced by the principles of their favourite theories, to allow the obſerved traces of demarcation to be any thing but irregular and accidental rents and fiſſures. Pini even endeavours, by mathematical figures, to prove the impoſſibility of ſtratification in granite. Notwithſtanding all this, the obſervations of the moſt eminent geologiſts appear to prove that ſuch ſtratification, even in the ſtricteſt ſenſe of the word, is not uncommon; but it is often a matter of great difficulty, for an eye, unaccuſtomed to viewing the ſtructure of mountains on a large ſcale, to diſtinguiſh the paralleliſm, or to follow the obſcurely marked progreſs of the line of ſeparation of the ſtrata, eſpecially when they are of conſiderable thickneſs.

But in many caſes, it would appear that this ſtratification is too diſtinct to leave any doubt upon the mind of the obſerver. Nothing can be more convincing than the account given by Gruber of the ſtratified nature of the granite compoſing the Rieſengebirge, that ſeparates Sileſia from Bohemia. The rocks that chiefly compoſe this celebrated range of mountains are granite and gneiſs, which, on the higheſt points, ſuch as the Rieſen and Schnee-kuppe, are ſeen in fourfold alternation. Mr. Gruber has aſcertained the dip and direction of the ſtrata in eight places, and proved them to be perfectly diſtinct from the rents which are frequently ſeen nearly at right angles with the lines of ſtratification.

From Sauſſure's obſervations, made on the ſeveral granitical pyramids or "aiguilles" of the Mont-Blanc, it would appear that all the parts of this mountain are compoſed of vaſt layers of granite perpendicular to the horizon, and directed from N.E. to S.E. Still more diſtinct this ſtratification appears on Mount St. Gothard. (See GOTHARD.) According to Charpentier, Leſke, and others, alſo the granite of the whole of Upper Luſatia, and of ſeveral parts of Saxony, affects the ſtratified ſtructure.

In a ſimilar manner Mr. Gruber obſerved the regular ſtratification near Carlſbad and Teplitz; and Dr. Reuſs found the ſame in ſeveral other parts of Bohemia; ſuch as in the Eger diſtrict, where the ſtrata dipped north at an angle of 18°; in the Saatz diſtrict at Leſchkau; in the Leutmeritz diſtrict on the Saxon frontiers; at the Wolfsberg, where the ſtrata run from two to ſix feet in thickneſs; as alſo in ſeveral places in the diſtrict of Buntzlau, towards the Rieſengebirge. La Perouſe deſcribes the granite of part of the Pyrenees as diſpoſed in layers or beds.

In the north of Europe, ſimilar regularity appears to prevail in the ſtratification of granite; thus, according to Cronſtedt and others, in Sweden, on the Kinnekulle and Billing, in Weſt Gothland, the granite (conſiſting moſtly of red feldſpar, white quartz, and black and greeniſh mica, in nearly equal proportion) is obſerved in diſtinct layers, with ſuperincumbent ſtrata of rocks of ſubſequent formation.

Pallas followed vaſt and continuous layers of granite through whole tracts of mountains in Siberia: indeed, part of the granitic Ural mountains, in the neighbourhood of the lake Kolywan, are deſcribed as having the appearance of huge artificial ſtructures, in which the layers appear to be looſely piled on one another.

Dr. Hutton ſuppoſed granite, when not ſhiſtoſe in its ſtructure, to be altogether unſtratified; profeſſor Playfair, however, in his expoſition of the Plutonic ſyſtem, ſo far differs from the opinion of his ingenious friend, that he allows granite to form ſtrata alſo where it has no character of gneiſs; and he thinks that this admiſſion does not embarraſs the theory with any new difficulty; but, on the other hand, he ſuſpects that the ſtratification aſcribed by the Neptuniſts to the granite mountains is, in many inſtances, either an illuſion, or at leaſt ſomething very different from what, in other ſtones, is accounted ſtratification. Profeſſor Playfair found ſtratified granite, in England, at Chorley Foreſt, in Leiceſterſhire, where, particularly near Mount Sorrel, beds of granite are ſeen, holding the ſame direction with thoſe of the ſubjacent "horn-ſtone ſchiſtus;" and likewiſe at Faſſnet-water in Berwickſhire, where the beds of granite run from about S.S.W. to N.N.E. conformable to the ſchiſtus on either ſide of them. Reſpecting the granite mountains of Arran, we have it obſerved by the ſame philoſopher that this ſtratification appears doubtful. The mountain of Goatfield, in that intereſting iſland, appeared, contrary to what Mr. Jameſon had advanced in his "Mineralogy of the Scottiſh Iſles," without any veſtige of ſtratification in its granitic part, as did alſo the whole group of mountains to which it belongs; for though he ſaw large tabular maſſes, ſometimes nearly vertical, ſeparated by fiſſures, they appeared to him to be much too irregular, too little extended in length and height, and vaſtly too much in thickneſs, to be reckoned the effects of ſtratification. As in the third volume of Jameſon's "Syſtem of Mineralogy," Arran is not mentioned among the localities where ſtratified granite occurs, it would appear as if that geognoſian does not lay any ſtreſs upon his firſt remark on the nature of the above-mentioned mountain.

The relative age of the different varieties of granite has engaged the attention of ſeveral writers on geology; but it muſt be ſaid, that moſt of the opinions that have been broached on this ſubject, and the various ideas entertained by theoriſts reſpecting what they call regeneration of granite, are too vague, or at leaſt too little founded on actual obſervation, to be entitled to particular notice. Some geologiſts on the other hand have abſolutely denied the exiſtence of a ſecond and third granite-formation. The Wernerian ſchool admits three diſtinct formations of granite. The *firſt* or *oldeſt* is that which, of all rocks we are acquainted with, is ſunk the deepeſt into the interior of the earth, and which therefore may with propriety be conſidered as the fundamental rock. This oldeſt granite alſo conſtitutes the higheſt parts of the ſurface of the earth, and, thus elevated, is generally ſurrounded, and, as it were, enveloped by other primitive rocks. It is frequently coarſe-grained and porphyritic. It occurs both ſtratified and unſtratified; and it is the latter which is often ſeen in large globular diſtinct concretions of conſiderable dimenſions, ſuch as in ſeveral parts of Bohemia, in the Fichtelgebirge, in the iſland of Arran, &c.

This formation is, of courſe, far more widely extended than thoſe of a more recent origin. The *ſecond granite formation* is conſidered as occurring only in veins which never reach any of the newer rocks, but are confined to the oldeſt formation. Such granite is marked with leſs regularity of ſtructure, than what is obſerved in the older formation; at the ſame time that it ſurpaſſes the neweſt granite, both with regard to the regularity of arrangement, and ſuperior firmneſs of the conſtituent parts. The *third*, or *neweſt granite-formation*, is always found ſuper-incumbent on older primitive rocks, often in an unconformable and over-lying poſition: it alſo occurs in veins, which have been ſeen to interſect or traverſe veins of the ſecond granite formation; as a certain criterion of the greater relative age of the latter. Its ſtructure, according to the characteriſtic given of it by profeſſor Jameſon, is very irregular; it has a deep red colour, and contains ſometimes grains of garnet, and often fragments of various primitive rocks of various magnitude. When it occurs in veins, theſe are, according to the ſame author, not connected with any rock beyond the ſtrata which they traverſe. Examples of this neweſt formation are, that at Greifenſtein, a large group of ſteep rocks between Ehrenfriederſdorf and Geier in the Saxon metalliferous mountains, where the coarſe granular and irregularly aggregated granite, compoſed principally of feldſpar and quartz, with but a ſmall portion of mica, occurs reſting on mica ſlate, in an unconformable and over-lying poſition: it contains neſts of quartz and feldſpar, as alſo fragments of gneiſs and mica ſlate, from the ſize of a cubic each, to that of 100 cubic feet and upwards Another inſtance of this formation we have in the tin ſtockwork at Geyer, where it is contained in a hollow of gneiſs, and agrees in its characters with that of Greifenſtein. Another portion of the ſame formation, is that at Johanngeorgenſtadt, Auerſberg, and Eibenſtock, where, however, it occurs only in veins, which are from a foot to ſeveral fathoms wide, and are uſually traverſed by metalliferous and other veins. Mr. Mohs has given a very good characteriſtic of this newer granite. Veins of the ſame kind occur alſo in Bohemia, Upper Luſatia, at Miſella in the Alps, in the Shetland iſlands, in Glen Moriſon, and in the Highlands.

The nature of the juſt mentioned *granitic veins* is conſidered in a different light by Dr. Hutton, according to whom all veins, whether they are obviouſly connected, or whether they have no apparent connection, with any large maſs of granite, are coeval with, and conſtitute a part of the main body of what is called the oldeſt granite by the followers of the Neptunian ſyſtem. Mr. Playfair has given ſeveral examples of veins inviſibly connected with larger maſſes; in thoſe at the iſle of Coll, in the Hebrides, at Portſoy, in Cornwall, in Glen Tilt; and of ſuch as are viſibly connected with the main granitic body, in thoſe occurring in the iſland of Arran, in Galloway, in Inverneſs-ſhire, St. Michael's Mount, Cornwall. Mr. Jameſon, however, ſays that he has convinced himſelf, after a very careful examination of the rocks of the iſland of Arran and of Galloway, that they do not afford a ſingle inſtance of granite veins, ſhooting from the oldeſt granite into the adjacent rocks, nor of veins traverſing newer primitive rocks, as it has been inſinuated to be the caſe with the granite veins in Glen Tilt. The ſame author obſerves on this occaſion, that veins of feldſpar have been frequently confounded with granite veins, and he ſubjoins ſome obſervations on this ſubject communicated by the late Dr. Mitchell, according to which there is a moſt palpable difference between ſuppoſed and genuine granite veins; the former being frequently narrower than one inch, and commonly much ramified, and ſometimes tortuous; but they conſtantly adhere moſt firmly to the adjacent ſtone, and when they contain apparent fragments, the ſlaty ſtructure of theſe is ever conformable to that of the contiguous rock; while genuine granite veins never fall ſhort of ſome inches, are always pretty ſtraight, ſeldom giving off branches: they have a diſtinct ſeparation, and contain fragments of the adjacent rock, which lie promiſcuouſly; the granite is conſtantly uniform, containing the three ingredients equally mixed; and Dr. Mitchell has always found it ſmall-grained. The ſuppoſed granite, according to him, conſiſts of feldſpar, of a very unequal grain, incloſing ſometimes ſpots of mica, and rarely ſpecks of quartz. From all which this mineralogiſt concludes, that the laſt mentioned veins are nearly of contemporaneous origin with the rocks in which they are contained, and ought, therefore, to be conſidared as, and called, feldſpar veins.

Although granite is the hardeſt, and one of the moſt durable rocks we are acquainted with, it is, nevertheleſs, ſubject to *diſintegration*, which manifeſts itſelf not only in the crumbling of the ſurface of the expoſed parts of granitic beds, but likewiſe in the ſeparation of vaſt maſſes, which, being diſunited by the enlargement of the rents and fiſſures that generally traverſe the granitic mountains, or croſs the ſtrata in a nearly vertical direction, are partly precipitated from their high ſituation, partly diſplaced in various manners, ſo as to produce the appearance of huge artificial ſtructures, and of other objects to which the fancy of the beholder may compare them.

M. De Luc has ſeen on the Rieſenbirge, in Sileſia, a number of pillars produced by ſuch diſintegration, both ſolitary and grouped together, in a ſtraight line, and, at a diſtance, preſenting the appearance of many high piles of gourds.

The Adon-ſholo mountains in Dauria, which conſiſt of granite, are, according to Pallas, in many parts broken into all manner of ſhapes, repreſenting vaſt ruins, grottos, and immenſe flat maſſes piled on one another in all directions.

—Several of the mountains are, as it were, ſtrewed with blocks of granite, which, at a diſtance, appear as numerous herds of cattle; and it is this circumſtance which is ſaid to have procured this ridge the name of Adon-ſholo, a Mongole word, denoting herd-like mountains. All theſe detached rocks are fragments of the vaſt ſtrata of granite that compoſe the greateſt part of the Dauric mountains. The ſummits of the Goatfield and other mountains of Arran have the appearance of huge walls compoſed of large granitic maſſes. At Huelgouet, in Lower Brittany, we are informed by Monnet, as alſo in the Voſges, enormous maſſes of granite are ſeen piled on one another, and forming moſt extraordinary groups. The granite being here divided into maſſes by fiſſures, which are filled up with granite poſſeſſing leſs ſolidity, this latter is ſooner acted upon by atmoſpheric agency, whence, by its diſintegration, the maſſes become perfectly detached, and adopt various poſitions. But beſides the accidental groups formed by the rolling down of the rocks, there are other groups of granitic rocks at Huelgouet, that appear to be in their natural poſition, and many of them form an aſſemblage of rock maſſes, which have a perfectly rhomboidal form, and are regularly joined to each other by means of their correſponding planes. One of the inſulated rocks in a group at Huelgouet, is called *Pierre branlante*, or the rocking ſtone: it is 21 feet long, ſeven feet high, and eight feet wide, and its cubical content is 1160 feet: it is ſo accurately poiſed on the edge of another rock, which ſerves for its baſe, that the ſtrength of a few men ſuffices to change its centre of gravity, and to communicate an oſcillatory motion to it. The phenomenon of the *rocking ſtones* is not unknown in this country; the largeſt is that ſeen at the Land's End in Cornwall, where they are called Logan-ſtones; it weighs upwards of ſixty tons, reſting on another rock of granite of conſiderable height cloſe on the ſea-ſhore. "The two ſtones," ſays Mr. Playfair, who avails himſelf of this phenomenon among others to explain the migration of ſtony maſſes, "touch but in a ſmall ſpot, their ſurfaces being conſiderably convex towards one another. The uppermoſt is ſo nearly in an equilibrium, that it can be made to vibrate by the ſtrength of a man, though to overſet it entirely would require a vaſt force. This ariſes from the centre of gravity of the ſtone being ſomewhat lower than the centre of curvature of that part of it on which it has a tendency to roll; the conſequence of which is, that any motion impreſſed on the ſtone forces its centre of gravity to riſe, (though not very conſiderably,) by which means it returns whenever the force is removed, and vibrates backward and forward, till it is reduced to reſt. Were it required to remove the ſtone from its place, it might be moſt eaſily done, by cutting off a part or blowing it away by gun-powder; the ſtone would then loſe its balance, would tumble from its pedeſtal, and might roll to a conſiderable diſtance. Now, what art is here ſuppoſed to perform, nature herſelf in time will probably effect. If the waſte on one ſide of this great maſs ſhall exceed that on the oppoſite in more than a certain proportion, and it is not likely that that proportion will be always maintained, the equilibrium of the Logan-ſtone will be ſubverted, never to return. Thus we perceive how motion may be produced by the combined action of the decompoſition and gravitation of large maſſes of rock."

It was probably from ſeeing the fantaſtical and imitative forms produced by granitic cliffs, and by the diſintegration of granite, that M. Vitte framed his unfortunate hypotheſis reſpecting the pyramids of Egypt, and the ruins of Perſepolis, Palmyra, and Balbec, all which, together with the temple of Jupiter at Girgentum, the palaces of the Incas in Peru, &c. &c. were conſidered by that antiquary as productions of nature.

Granite is much leſs *metalliferous* than gneiſs and other primitive mountains; but tin and iron abound in it. Beſides theſe, ſeveral other metals occur in it in ſmall proportion, *viz.* gold, though very rarely, in Peru; native ſilver, almoſt equally ſeldom, at Wittichen and Alt Wolfach, in the Black Foreſt, near veins of ſilver and cobalt; copper; galena, for inſtance, at Schreiberſhauſen, at the foot of the Schneekuppe, in Sileſia; biſmuth, zinc, cobalt, manganeſe, molybdena, arſenic, tungſtein, and wolfram, all which occur generally in ſmall veins; but tin, galena, and blende, are found in beds at Zinnwald in Saxony, and in Bohemia.

As to the *extent* of granite over the world, it may be ſaid that ſcarcely any country we are acquainted with is entirely deſtitute of that rock. In Aſia we have the Uralian and Altaic mountains, with the Caucaſus; in Africa, the Atlas, ſeveral mountains of Egypt, thoſe of the Cape of Good Hope; in North America, ſome mountains of New York, Pennſylvania, and Virginia; in South America, great part of the Andes, the mountains de los Mariches in the Carracas, the Cordilleras of Parima, Sierra Nevada de Merida, &c.; in Europe, the Seewoga mountains of Scandinavia, thoſe of Finnland, the Carpathes, the Hartz, the Rieſen-gebirge, the mountains of Upper Luſatia, a part of the Saxon metalliferous mountains, (eſpecially Eibenſtock, Johangeorgenſtadt, Schwartzenberg, Schneeberg, Ehrenfriederſdorf, Geier, Nauendorf, Altenberg, and Zinnwald,) the Fichtel-gebirge, the Odenwald and Schwartzwald, the Alps of Swiſſerland and Savoy, the Apennines, Pyrenees, the mountains of Cornwall, &c. all which have granite for their principal conſtituent rock.

The *uſe* made of granite is manifold; it is employed for building, paving, ſteps, for troughs in ſtamping mills, for millſtones, &c.

The uſe of granite for architectural and economical purpoſes is perhaps no where more amply diſplayed than at Peterſburg, where not only the imperial and other palaces, but even ordinary dwelling houſes, have their lower parts lined with ſlabs of granite. The left bank of the great Neva, from the foundery to the gulf of Cronſtadt, and both banks of the Fontanka and of the Catharine canal, are lined by high walls conſtructed of ſuch ſlabs of granite; as are many bridges over the Neva, baluſtrades, &c. The pillars, ſtairs, balconies, &c. in the palace of Cronſtadt, are almoſt all of the fineſt kinds of granite. Thoſe employed for ornamental architecture are cut and poliſhed by lapidaries; but thoſe intended for leſs delicate purpoſes, ſuch as common ſlabs, ſteps, cylinders, troughs, &c. are worked by peaſants, particularly by thoſe of Olonetſk. The government towns, however, Moſcow not excepted, are too diſtant from the chief granite mountains, to be enabled to make frequent uſe of that rock for the above purpoſes.

Granite has been more particularly applied, together with ſienite, for the purpoſes of architecture and ſtatuary, by the ancients, eſpecially by the Egyptians; and many very intereſting monuments of their ſkill and patience are ſtill exiſting in the collections of antiquities.

M. Brand has divided the different granites uſed in the arts after their predominant colours; the following are the principal varieties, in which, however, the black and white kind is not included, one of its ingredients being hornblende, which aſſigns it a place among the ſienites. See SIENITE.

Grey Granite of Cheſſi, in the department of the Rhine; it conſiſts of white quartz and black mica, with large cryſtals of roſe-coloured feldſpar. The columns of the Egliſe d'Enée (ancient temple of Auguſtus) at Lyons, are of this kind of granite, which has alſo been worked by the Romans.

Grey Granite of Thain.—It conſiſts of grey quartz, black mica, and white feldſpar cryſtals, which are ſometimes from two to three inches long. The quarries of this granite are on the road from Lyons to Valence, on the right bank of the Rhone. It is very well adapted for the conſtruction of large monuments. The granite of St. Peray, not far from Thain, is exactly like this, except that its feldſpar cryſtals are of a roſe-colour.

Grey Granite of Lavezzi.—Found in the ſmall iſland Lavezzi, near Bonifacio, S. of Corſica, in the ſtraits that ſeparate this iſland from Sardinia. This granite is compoſed chiefly of ſmall irregular cryſtals of feldſpar, mixed with a little black mica, beſides which it contains alſo feldſpar cryſtals, of a milk-white colour. In the quarry of that iſland a large unfiniſhed column is to be ſeen, which has been relinquiſhed by the Roman workmen.

Grey Granite of Elba.—Its grain is pretty uniform; its colour ſometimes approaches to light violet. There are four columns of this variety to be ſeen in the Muſée Napoleon: they were taken out of the church which contained the tomb of Charlemagne, at Aix-la-Chapelle.

The grey granites are much more common than the green or greeniſh, of which the following deſerve to be mentioned.

Antique green Granite.—Its predominant ingredient is white quartz, which contains here and there ſome light green feldſpar. There is a column of it in the Villa Pamfili, near Rome.

Fine grained antique Granite.—(Baſalte verd oriental.) The component parts of this work are ſo minute and intimately blended, that they can ſcarcely be diſtinguiſhed by the naked eye. Its colour approaches to deep olive. It is very hard, and takes a fine poliſh. The Egyptians have much employed it for the conſtruction of monuments; and ſeveral ſtatues of it may be ſeen in the Capitol and the Villa Albani. There is another variety with white ſpots, which is known at Rome under the name of Baſalto Orientale pidochioſo; this is very rare, for there are but two columns of it in exiſtence, namely, in the church of St. Pudentiana at Rome. Some varieties bearing that name are ſienite.

Granite of St. Chriſtoph:—compoſed of violet quartz, white feldſpar, and green mica. This magnificent rock is found at Oiſans, in the department of the Iſere.

Corſican orbicular Granite.—This beautiful rock (which probably belongs to the ſienite formation) was diſcovered by M. Barral, in the iſland from which it derives its name. Its compoſition is very extraordinary; it has a baſis of ordinary grey granite, which, however, in moſt parts, exhibits a conſiderable portion of hornblende. But what more particularly characterizes it, is a number of balls, of from one to two inches in diameter, each compoſed of ſeveral concentric and perfectly parallel layers, the outermoſt of which, generally white, opaque, and two or three lines thick, is compoſed of quartz and feldſpar, blended in various proportions, and exhibiting a radiated appearance, rather converging towards the centre of the ball. The ſecond layer, which is of a greeniſh-black colour, and about one line thick, is compoſed of fine laminar hornblende; and this is ſucceeded by a white, generally tranſlucid quartz layer, of about four or five lines in thickneſs, incluſive of two or three very thin layers of hornblende, that are generally ſeen within the ſubſtance of this third principal layer. Each of theſe layers is generally of equal thickneſs in the whole of its circumference. Theſe three parts may be conſidered as the coating: the interior of each ball is leſs defined than the ſurrounding layers; it conſiſts of a blackiſh and a whitiſh ſubſtance, the former ſurrounded by, and paſſing into the latter, the centre of which is uſually a dark-grey ſpot.

The quarry of this rock is unknown, a ſingle block only having been found in the gulf of Valinco, in Corſica: its weight was about 80 pounds; but it was ſoon broke into ſmall fragments, which are now diſtributed among collectors. There is a beautiful vaſe of it, one foot ſix inches high, in the cabinet of M. Dedree. The granite of Corſica is figured by M. Faujas de St. Fond, in his "Eſſai de Géologie," and in Mr. Sowerby's "Exotic Mineralogy."

Among the red granites, we have what is called *red oriental granite*, which, as uſually containing hornblende, often in large ſeparate patches, will be deſcribed under SIENITE.

The red Granite of Ingria.—This granite, ſays M. Patrin, is diſtinguiſhed from others in this, that the feldſpar, inſtead of being in grains, or parallelopiped cryſtals, as in moſt other granites, conſtantly appears in the ſhape of round or oval pieces of from half an inch to two inches in diameter. This granite takes a very fine poliſh, and in this ſtate exhibits the feldſpar in the ſhape of white, round, or oval *chatoyant* ſpots, in a reddiſh ground. The rock, which ſerves as a pedeſtal of the equeſtrian ſtatue of Peter the Great, at St. Peterſburg, is of this granite: the block was originally 32 feet long, 21 feet thick, and 17 feet long; but, in order to give it its preſent ſhape, imitative of a pictureſque natural rock, it has been much diminiſhed in ſize. This block was diſengaged from a ſwamp, about forty verſts from Peterſburgh: its weight was calculated to be above three millions of pounds. We have ſeen ſeveral fragments that were detached from the very block forming the pedeſtal of the ſtatue; but in none of them did we obſerve the form aſcribed by Patrin to the feldſpar.

The public ſummer promenade-garden at Peterſburg is decorated with a ſuperb colonade of this granite: the columns, which are ſixty in number, are of the Tuſcan order; their ſhafts, made of one piece, are about twenty feet high, and three feet in diameter. The iſland, called Kotlin-Oſtrow, on which is the fortreſs of Cronſtadt, is covered with blocks of this granite, the feldſpar of which is ſometimes of the kind called Labrador-ſtone.

Red Granite of the Voſges Mountains.—This granite is compoſed of large laminæ of roſe-coloured feldſpar, grey grains of quartz, and ſmall ſcales of mica. It has ſo ſtrong a reſemblance to the Egyptian red granite, that it is difficult to diſtinguiſh them. Its quarries are on the heights of Montaujeu, near the Papean mountains, in the Voſges.

Violet Granite of Elba.—The feldſpar of this variety is in large violent cryſtals. The pedeſtal of the equeſtrian ſtatue, in the Piazza della Santiſſima Annonziata at Florence, is made of it, as are alſo the ſodes in the chapel of St. Laurence in the ſame town.

Roſe-coloured Granite of Baveno.—This beautiful granite conſiſts of fleſh-coloured feldſpar, white quartz, and ſome grains of black mica. Conſiderable quarries of it are found on the borders of the Lago Maggiore, which are worked, without intermiſſion, for ſupplying Milan, and the whole of the neighbouring country, with this granite. It takes a very fine poliſh: here and there it exhibits ribbands, or zones, of a grey colour, which are compoſed of the ſame ingredients as the reſt of the maſs, but reduced into very minute particles. Many columns, porticos, &c. are ſeen of it at Milan.

The name of *graphic granite* is given to thoſe kinds in which the feldſpar forms large concretions, intermixed with grey quartz-cryſtals, exhibiting, when cut tranſverſely, angular figures, moſtly ſhaped like a 7; while others are leſs regular, and bear a diſtant reſemblance to rude alphabetical writing. They are not conſidered to be genuine granite by ſome mineralogiſts.

Graphic Granite of Portſoy.—The feldſpar is of various tints of pale fleſh-red; the quartz dark, but tranſparent, with now and then ſome ſmall particles of mica. This rock is minutely deſcribed by Dr. Hutton.

Graphic Granite of Siberia.—Its feldſpar is of a yellowiſh-white, or reddiſh colour; the quartz, exhibiting figures ſimilar to thoſe of the quartz in the preceding ſort, is of the variety called ſmoaky topaze. Mica occurs in it in ſmall neſts, and black ſhorl in acicular cryſtals.

Graphic Granite of Autun.—Of a pale roſe-colour; quartz-cryſtals grey, very numerous. It is found in the neighbourhood of Autun, department of Saône-et-Loire, particularly at Marmagne. This, in M. Brand's opinion, is the moſt beautiful of all graphic granites. Another variety of this ſtone is found at the ſame place: its feldſpar is white; the quartz grey, in ſmall cryſtals; it is ſuſceptible of very fine poliſh.

Graphic Granite of Corſica.—Likewiſe of a roſe-colour; but generally paler than that of Autun, from which it is alſo diſtinguiſhable, by its quartz-cryſtals being larger, and at greater diſtance from each other. It contains ſome thinly diſſeminated bronze-coloured mica. It takes a fine poliſh.

GRANIVOROUS, an epithet or denomination given to ſuch animals as feed upon corn, or any other grain or ſeeds.

Granivorous animals are chiefly of the bird kind. Theſe have a peculiar proviſion for the digeſting of ſo dry and hard a food.

GRANNA, in *Geography*, a town of Sweden, in the province of Smaland; 18 miles N.N.E. of Jonkioping.

GRANO, in *Biography*, a performer on the trumpet and German flute, and a compoſer of tunes for thoſe inſtruments, which had their day of favour in the early part of the laſt century. He was a kind of mungrel dilettante, who during many years condeſcended to make concerts and give leſſons, en profeſſeur, always inſinuating that it was merely for the pleaſure of amuſing the public and inſtructing individuals. Grano's trumpet march was long uſed by the Guards.

GRANON, in *Geography*, a ſmall iſland on the W. ſide of the gulf of Bothnia. N. lat. 61° 5′. E. long. 17° 5′.

GRANSEE, a town of the Middle Mark of Brandenburg; 30 miles N.N.W. of Berlin. N. lat. 52° 59′. E. long. 13° 13′.

GRANSO, an iſland in the Baltic, near the E. coaſt of Sweden. N. lat. 57° 46′. E. long. 16° 5′.

GRANSON, a town of Switzerland, in a bailliage of the ſame name, belonging to Bern and Friburg, ſituated between the lake of Neufchatel and mount Jura, and remarkable for the battle in which Charles the Bold, duke of Burgundy, was defeated by the Swiſs in 1476; 16 miles S.W. of Neufchatel. N. lat. 46° 50′. E. long. 6° 26′.

GRANT, Concessio, in *Law*, the regular method by the common law of transferring the property of *incorporeal* hereditaments, or ſuch things of which no livery can be had. (Co. Litt. 9.) For which reaſon all corporeal hereditaments, as lands and houſes, are ſaid to lie in livery; and the others, as advowſons, commons, rents, reverſions, &c. to lie *in grant*. (Ibid. 172.) The reaſon is thus given by Bracton (l. ii. c. 18.): "*traditio*, or livery, *nibil aliud eſt quam rei corporalis de perſona in perſonam, de manu in manum, tranſlatio aut in poſſeſſionem inductio; ſed res incorporales, quæ ſunt ipſum jus rei vel corpori inhærens, traditionem non patiuntur.*" Theſe, therefore, paſs merely by the delivery of the deed. And in ſigniories, or reverſions of lands, ſuch grant, together with the attornment of the tenant, (while attornments were requiſite,) were held to be of equal notoriety with, and therefore equivalent to, a feoffment and livery of lands in immediate poſſeſſion. It therefore differs but little from a feoffment, except in its ſubject-matter; for the operative words therein commonly uſed are "*dedi et conceſſi*," "have given and granted." For the difference between gifts and grants, ſee the article Gift. The king's grants are matter of public record. (See Record.) No freehold can be given to the king, nor derived from him, but by matter of record. To this end a variety of offices are erected, communicating in a regular ſubordination one with another, through which all the king's grants muſt paſs, and be tranſcribed, and enrolled; that the ſame may be narrowly inſpected by his officers, who will inform him if any thing contained therein is improper, or unlawful to be granted. Theſe grants, whether of lands, honours, liberties, franchiſes, or aught beſides, are contained in charters, or letters patent. (See Patents.) The *manner* of granting by the king does no more differ from that by a ſubject, than the conſtruction of his grants when made. 1. A grant made by the king, "at the ſuit of the grantee," ſhall be taken moſt beneficially *for* the king, and *againſt* the party; whereas the grant of a ſubject is conſtrued moſt ſtrongly *againſt the grantor*. It is therefore uſual to inſert in the king's grants, that they are made, not at the ſuit of the grantee, but "ex ſpeciali gratia, certa ſcientia, et mero motu regis;" and then they have a more liberal conſtruction. 2. A ſubject's grant ſhall be conſtrued to include many things, beſides what are expreſſed, if neceſſary for the operation of the grant. Thus, in a private grant of the profits of land for one year, free ingreſs, egreſs, and regreſs, to cut and carry away thoſe profits, are alſo incluſively granted. (Co. Litt. 56.) And if a feoffment of land was made by a lord to his villein, this operated as a manumiſſion (Litt. § 206.); for he was otherwiſe unable to hold it. But the king's grant ſhall not enure to any other intent, than that which is preciſely expreſſed in the grant. As, if he grants land to an alien, it operates nothing, for ſuch grant ſhall not alſo enure to make him a denizen, that he may be capable of taking by grant. (Bro. Abr. tit. patent. 62. Finch. L. 110.) 3. When it appears, from the face of the grant, that the king is miſtaken, or deceived, either in matter of fact or matter of law, as in caſe of falſe ſuggeſtion, miſinformation, or miſrecital of former grants; or if his own title to the thing granted be different from what he ſuppoſes; or if the grant be informal; or if he grants an eſtate contrary to the rules of law; in any of theſe caſes the grant is abſolutely void. (Freem 172. Finch. 101, 102.) To prevent deceits of the king, with regard to the value of the eſtate granted, it is particularly provided by the ſtatute 1 Hen. IV. c. 6. that no grant of his ſhall be good, unleſs, in the grantee's petition for them, expreſs mention be made of the real value of the lands. Blackſt. Com. vol. ii.

GRANTHAM, in *Geography*, a townſhip of Upper Canada, in the county of Lincoln, fronting lake Ontario.

Grantham, a market and borough town in the ſoke, or wapentake, of the ſame name, in Keſteven diviſion of the county of Lincoln, England, is ſituated on the ſide of the river Witham, on the ancient Roman road called Ermine ſtreet. The town compriſes four principal ſtreets. The church is an elegant ſtone ſtructure, conſiſting of a nave and two ſpacious aiſles, with large handſome pointed windows, and is celebrated for its lofty ſpire, which is 273 feet in height. The ſtyle of architecture appears to be that of the thirteenth century; though Mr. Gough obſerves that the church was endowed by Hugh, biſhop of Lincoln, A.D. 1100.

1100. Beneath the church is a chancel-houſe, filled with human ſkulls and other bones. Among ſeveral handſome monuments in this edifice, are, one to ſir Thomas Bury, chief baron of the exchequer in the time of George I, and one to ſir Dudley Ryder, chief juſtice of the King's Bench, in the ſucceeding reign. The font exhibits a fine ſpecimen of ancient ſculpture.

Grantham was incorporated under a charter granted by Edward IV. in 1463; when it firſt returned members to parliament; the repreſentatives are choſen by the freemen of the borough. The civil government is veſted in an alderman, a recorder, 12 common burgeſſes, a coroner, an eſcheator, and twelve ſecond men, who are the common council. The juriſdiction of this corporation extends over the whole ſoke, comprehending twelve villages, and the alderman acts as ſheriff of the town and ſoke, the ſheriff of the county having no authority within the ſoke and diſtrict thereof. The guildhall was rebuilt under an act of parliament in 1787. A free-ſchool was founded here by Richard Fox, biſhop of Wincheſter, and further endowed by king Edward VI.; this ſchool attracts attention, from the circumſtance of its having been a place of education to that luminary of ſcience, ſir Iſaac Newton. Near the ſouth entrance into the town, on St. Peter's hill, formerly ſtood an elegant croſs, erected by king Edward I., in memory of Eleanor his queen, who died in 1290; this being one of the places where the corpſe was laid in ſtate in its way for interment in Weſtminſter Abbey. Grantham is diſtant from London 111 miles N., has a well ſupplied market on Saturdays, and five annual fairs. In the return under the late population act, the number of houſes is 631, occupied by 3303 inhabitants.

A canal has been lately cut from Grantham to the river Trent, an extent of 25 miles. It is ſupplied with water by means of large reſervoirs made for that purpoſe. The chief articles conveyed by this navigation are corn and coals. Turner's Hiſtory of the Soke of Grantham, &c. Beauties of England and Wales, vol. ix.

GRANTHAM *Canal*, is the parliamentary name of an inland navigation about 33 miles long, in the counties of Nottingham, Leiceſter, and Lincoln, of which we gave an account in our article CANAL, and nothing material has occurred to be added thereto.

GRANTOWN, a town of Scotland, in the county of Inverneſs; 17 miles S. of Fores.

GRANVILLE, GEORGE, baron Landſdown, in *Biography*, a nobleman chiefly remembered as a poet, born in 1667, was ſon of Barnard Greenvill, one of the diſtinguiſhed family of Greenville or Granville, the latter mode of ſpelling the name being introduced by the ſubject of this article, who is thereby ſeparated from the reſt of his houſe. He ſhewed very early talents, and was entered, in his 12th year, at Trinity college, Cambridge. In the ſame year, he wrote a copy of verſes on the ducheſs of York's viſit to the univerſity, and on the acceſſion of James II. he offered incenſe to the new prince in three ſhort pieces, of which Dr. Johnſon ſays, "the firſt is profane, and the two others ſuch as a boy might be expected to produce." In 1688, when an invaſion was threatened, he was deſirous of devoting his life to the ſervice of James, and requeſted his father to preſent him to the king for that purpoſe. The revolution ſucceeded, and being poſſeſſed of neither intereſt nor conſiderable fortune, he lived in literary retirement. During this period his dramatic works were chiefly compoſed and acted. The firſt of theſe was "The Gallants," ſaid by himſelf, by way of apology, to have been written at an age when ſome perſons are but beginning to ſpell. This was afterwards brought forward in a more correct form, under the title of "Once a Lover and always a Lover." His tragedy of "Heroic Love," founded on the fable of Homer's Iliad, was acted the ſame year with great applauſe from the wits and critics. On this occaſion he was complimented in a copy of verſes from the pen of Dryden. When queen Anne came to the crown, Mr. Granville emerged from the political obſcurity in which he had lived: his fortune was increaſed by the death of his father, and that of his uncle, who left him an annuity. He was now elected a member of parliament for the borough of Fowey, and feeling the common ardour of his countrymen of all parties againſt the ambition of Lewis XIV., he joined other literary perſons in a tranſlation of the Philippics of Demoſthenes, to rouſe the nation to oppoſe the Philip of modern times. By the death of his elder brother ſir Bevil Granville, in 1706, he ſucceeded to a good eſtate, and he continued to ſerve in parliament, ſitting as knight of the ſhire for the county of Cornwall. On the change of adminiſtration in 1710, he was appointed ſecretary of war in the room of ſir Robert Walpole. He married in the ſame year Mary, the daughter of the earl of Jerſey, then widow of Thomas Thynne, eſq. Shortly after this he was introduced into the houſe of peers by the ſtyle and title of lord Landſdown, baron of Biddeford, at the memorable creation of twelve peers, in one day, *viz.* December 31, 1711. The elevation, however, of lord Landſdown was not one of thoſe which appeared very extraordinary, as two peerages had become extinct in the Granville family. On account of his principles and conduct he ſtood high in favour of the queen, who made him a privy counſellor, comptroller and treaſurer of the houſehold; but the acceſſion of George I. put an end to the power of his party, and deprived him of his place. He remained ſteady to his former connections, proteſting againſt meaſures which he deemed unconſtitutional, and in conſequence of his zeal he was regarded with a ſuſpicious eye, and was reckoned by people in power as a diſaffected man. Upon the breaking out of the rebellion in 1715, he was committed to the Tower, and kept confined in that fortreſs till February 1717, when he obtained his liberty and reſumed his ſeat in the houſe of lords. In 1719 he oppoſed with violence the propoſed repeal of the bill to prevent occaſional conformity; his ſpeech on the ſubject he afterwards printed. Subſequently to this a derangement in his private affairs, owing to the want of economy, obliged him to ſpend ſome years on the continent. During his abſence, the firſt volume of biſhop Burnet's "Hiſtory of his own Times," making its appearance, lord Landſdown undertook the vindication of the duke of Albemarle and the earl of Bath, from ſome aſperſions thrown upon them in that work. He alſo took occaſion to vindicate his great uncle, ſir Richard Greenville, from the unfavourable repreſentations of his conduct by lord Clarendon, and archdeacon Echard. On this occaſion he publiſhed two tracts in 1732. In the ſame year he publiſhed a ſplendid edition of his works, leaving out a comedy, which, on account of its licentiouſneſs, had been objected to, and he alſo omitted to inſert his ſpeech againſt occaſional conformity. He now felt reconciled to the meaſures of government, and to the change in the ſucceſſion, which formerly he had regarded with horror. He went to court, and was graciouſly received by queen Caroline, to whom he preſented his works, with ſome elegant lines written in a blank leaf. He died Jan. 30, 1735, in his 64th year. In private life, lord Landſdown was amiable, polite, and candid. He was liberal in patronizing literary merit, and had the credit of being one of the firſt to recognize the riſing powers of Pope, who repaid him for his kindneſs by his dedication of Windſor

Foreſt. His own talents, as a poet, were not of the firſt order, but his works are ſtill read with pleaſure. He is chiefly known as a writer of amatory pieces, moſt of which are addreſſed to Myra, the counteſs of Newburgh, the object of his youthful paſſion. Theſe are not either highly poetical nor ſtrongly expreſſive of feeling. Johnſon characterizes his "Eſſay on unnatural Flights in Poetry," as poſſeſſing didactic merit, and his "Britiſh Enchanters," as lively and pleaſing. He ſeems to think favourably likewiſe of his epilogues and prologues. Biog. Brit. Johnſon's Lives of the Poets.

GRANVILLE, in *Geography*. See GRANDVILLE.

GRANVILLE, a county of North Carolina, in Hillſborough diſtrict, S. of Virginia, containing 14,015 inhabitants, of whom 6106 are ſlaves. Its chief town is Williamſburg.—Alſo, a townſhip of the county of Annapolis, in Nova Scotia, N. of Annapolis river, on the bay of Fundy, 30 miles long; firſt ſettled from New England.—Alſo, a townſhip of Hampſhire county, Maſſachuſetts, about 14 miles W. of Springfield; incorporated in 1754, and containing 2309 inhabitants.—Alſo, a poſt-town in Waſhington county, New York, containing 3175 inhabitants.

GRANVILLE, or *Greenville*, a flouriſhing town in Mecklenburg county, Kentucky.

GRANVILLE'S *River*, a river of the iſland of Egmont, or New Guernſey, which runs into the ſea, S. lat. 10° 42'. E. long. 163° 58'.

GRANULATED OIL. See OIL.

GRANULATION, in *Chemiſtry*, an operation performed on metals, whereby they are reduced into ſmall grains or globules.

It is done by melting them, and when in fuſion, caſting them from a certain height into cold water; in which they congeal into granules, as required, and are hereby rendered more eaſy to be diſſolved. The beſt way is to pour the fluid metal through a cullender, or a new birchen broom, or to agitate the water with a broom, thus giving it a circular motion while the metal is poured in. Copper is granulated for making braſs in a cylindrical wooden reſervoir, four or five feet deep, in which a circular braſs or copper bottom may be raiſed or lowered by means of a chain. The reſervoir is covered with a copper lid, in the middle of which is a hole half a foot in diameter, intended to receive an iron ladle pierced with holes and coated with clay. The reſervoir being filled with water, the melted copper is poured through the holes in the ladle into the water; where it is broken by its fall into ſmaller drops or grains, rendered ſolid by the cold water, and collected in the moveable bottom, which is raiſed by the annexed chain, that the granulated copper may be taken out. Macquer, Dict. Chem. Eng. edit. art *Braſs*. See BRASS.

Lead, tin, and braſs, which are very brittle, when they are ſo hot as to be almoſt fuſed, may be granulated by pouring them, in a ſtate of fuſion, into a box, the inner ſurface of which is rubbed with powdered chalk, and by ſhaking the box: the metals in the box are no ſooner become ſolid, and conſequently very brittle, than they are ſhivered, by being daſhed againſt the ſides of the veſſel into a fine duſt. Silver and gold, and the more tenacious metals, muſt be granulated in either of the firſt methods above-mentioned, with water. Cramer, Art of Aſſ. p. 70.

The term granulation is alſo applied to *gun-powder*: which ſee.

The granulation of common fowling ſhot conſiſts merely in cauſing the fuſed metal to fall in equal ſpherical drops into water. The lead is melted with the addition of a ſmall proportion of arſenic, which being reduced to a metallic ſtate, by means of greaſe ſtirred in during the fuſion, renders it leſs fluid. An oblong ſhallow veſſel of iron, perhaps 10 inches wide, 14 long, and 2½ deep, called a "Card," whoſe bottom is pierced with holes, proportionate to the ſize of the ſhot, is placed at the height of from one to three inches, over the ſurface of a tub of water, covered with a thin film of oil. The card is previouſly heated to the temperature of the metal, by immerging it in the cauldron; and a ſtratum of ſoft droſs or ſcoriæ, found on the ſurface of the fuſed alloy, is then placed on its perforated bottom, and being ſlightly preſſed down with the ladle, forms a kind of filter, which partly chokes up the apertures, and prevents the metal from flowing through them in continuous ſtreams. The fuſed metal is then poured by ladle-fulls into this veſſel, and appears, notwithſtanding, to run through it with conſiderable velocity; ſo that it ſeems difficult to believe, that it falls in ſeparate drops, till one is convinced by taking up a quantity of ſhot from the bottom of the water. The imperfections to which this ſhot is ſubject, are remedied in the patent ſhot, the manufacture of which differs from that of the preceding kind, in the addition of a larger portion of arſenic, which varies according to the quantity of the lead, in dropping it from ſuch a height, that it becomes ſolid before it enters the water, which is from 40 to 100 feet. Beſides, it is firſt dried and ſifted. It is then *boarded*, which conſiſts in ſcattering it on ſeveral poliſhed ſlabs, or trays of hard wood, with rims in the form of a π, except that the ſides converge towards the lower part, to which a ſlight inclination and alternate motion in their own planes are given by boys employed in the manufacture. The ſhot, whoſe form is imperfect, are detected by the ſluggiſhneſs of their motion, and remain behind, whilſt the others roll off from the board. The laſt operation is the poliſhing; which is performed by agitating the ſhot with the addition of a very ſmall quantity of black-lead, not exceeding two ſpoonfuls to a ton, in an iron veſſel, turning on an horizontal axis, like a barrel churn. It does not appear that any higher degree of perfection than that which is thus attained remains to be deſcried. The argentine brilliancy of the ſhot when newly made, the beautiful accuracy of its form, and the curious inſtance of inanimate tactics which it preſents when ſcattered on a plate, renders it even an agreeable object of contemplation. Nicholſon's Journal, vol. 1. 4to.

GRANULATION. In *Surgery*, granulations are the ſmall eminences of new animal matter, with which the cavities of ſores and wounds become filled up in the proceſs of healing. Granulations, according to Mr. Hunter, are formed by an exudation of the coagulating lymph from the veſſels, into which new ſubſtance the old veſſels very probably extend, at the ſame time that entirely new ones are generated in it. Hence granulations are exceedingly vaſcular, perhaps more ſo than almoſt any other animal ſubſtance. Mr. Hunter informs us, that he noticed upon a ſore a white ſubſtance, exactly ſimilar in every viſible reſpect to coagulating lymph. He did not attempt to wipe it off, and the next day of dreſſing he found this very ſubſtance vaſcular; for, on touching it with a probe, it bled freely. He obſerved the ſame appearance on the ſurface of a bone that had been laid bare. He once ſcraped off ſome of the outſide of one of the bones of the foot, in order to ſee if the ſurface would granulate. The following day he remarked, that the ſcraped part was covered with a whitiſh ſubſtance, having a tinge of blue. When he paſſed his probe into it, he did not feel the bone bare; but only its reſiſtance. He conceived this ſubſtance was coagulating lymph, thrown out in conſequence of inflammation,

flammation, and that it would be forced off when ſuppuration came on; but on the ſucceeding day he found it vaſcular, having all the appearance of healthy granulations.

The veſſels of granulations firſt paſs to their baſis from the original parts, whatever theſe may be, and then run in nearly parallel lines to their external ſurface, where they ſeem as if they ended.

The ſurface of the new ſubſtance continues to have the ſame diſpoſition for the ſecretion of pus, as the parts from which it itſelf was produced. Granulations are very convex, which is an appearance the very reverſe of what happens in ulceration, or while a ſore is increaſing in ſize. They appear rough, in conſequence of having a great many points or ſmall eminences, and they are deemed the more healthy, the ſmaller ſuch points are.

Healthy granulations are of a deep florid red colour, a circumſtance which might lead one to ſuſpect, that the colour was principally owing to the arterial blood; but Mr. Hunter was of opinion, that this appearance only denoted a briſk circulation in the new-formed ſubſtance, the blood not having time to become dark.

When granulations are naturally of a livid red, they are commonly unhealthy, and ſhew a languid circulation. Such appearances may often be induced by poſition, and we frequently ſee it take place on ſores of the leg, when the limb is not kept in a horizontal poſture. In this circumſtance, the new-formed veſſels are incapable of ſupporting the increaſed column of blood, and of acting upon it. The ſtagnation allows the change of colour to happen, and the alteration, in all probability, takes place both in the arteries and veins. Here may be ſeen the reaſon why ſore legs are frequently very backward in healing, when the patient is ſuffered to put his foot on the ground, or to walk about.

Healthy granulations, ſituated on an expoſed or flat ſurface, riſe nearly even with the ſurface of the ſurrounding ſkin, and often a little higher; and in this ſtate they are always of a florid red colour. When they exceed this height, and aſſume a growing diſpoſition, they are then unhealthy, and they become ſoft and ſpongy, without any diſpoſition to form ſkin.

Granulations always have the ſame diſpoſition as the parts upon which they are formed; and take on the ſame mode of action. If it is a diſeaſed part, they are diſeaſed; and if the diſeaſe be of any ſpecific kind, they are alſo of the ſame nature, and, of courſe, produce matter of the ſame quality.

When granulations are healthy, they are always prone to unite with each other, the great uſe of which is to bring about the union of parts, ſomewhat like what is the reſult of union by the firſt intention. See WOUNDS.

The diſpoſition which granulations have to unite with each other upon coming into contact, without the appearance of any intermediate animal ſubſtance, is perhaps effected, as Mr. Hunter conjectures, in the following manner. When two ſound granulations approach together, the mouths of the ſecreting veſſels of the one coming to oppoſe the mouths of ſimilar veſſels of the other, they are ſtimulated into action, which is mutual; ſo that a kind of ſympathetic attraction takes place, and as they are ſolids, the attraction of coheſion is eſtabliſhed between them. This has been termed inoſculation. The veſſels thus joined are altered from ſecreting to circulating. There are ſome other ſurmiſes hazarded by Mr. Hunter reſpecting the rationale of this minute proceſs of nature; but the curious reader muſt refer for them to the author's own relation of the ſubject.

Mr. Hunter informs us, that he has ſeen two granulations on the head, *viz.* one from the dura mater after trepanning, and the other from the ſcalp, unite over the bare one, which was between them, ſo ſtrongly in twenty-four hours, that ſome force was required to ſeparate them, and when ſeparated, they bled.

The inner ſurface of the ſkin, in caſes of abſceſſes, not only does not readily granulate, but does not readily unite with the granulations underneath. Hence the frequent formation of fiſtulæ and ſinuſes.

Unhealthy granulations have not an equal tendency to unite with each other: a ſmooth ſurface is formed, which continues to ſecrete matter. Thus, Mr. Hunter regarded the internal ſurface of a fiſtulous ulcer as, in ſome degree, ſimilar to the inner ſurface of the urethra, when it is forming the diſcharge commonly called a gleet. Such ſores have no diſpoſition in their granulations to unite, and nothing can produce an union between them, but altering the diſpoſition of theſe granulations, by exciting a conſiderable inflammation and probably ulceration; ſo as to form new granulations, and by this means give them a chance of falling into a ſound ſtate.

It is alſo noticed by Mr. Hunter, that granulations are not furniſhed with ſo much power as parts poſſeſs, which are originally formed. Hence they more readily ulcerate and ſlough. He ſtates, that they not only ſhew the condition of the part in which they grow, or the condition in which they are themſelves, but alſo, how the conſtitution is affected by many diſeaſes.

The ſame author has made ſome obſervations reſpecting the longevity of granulations. He ſays, that they often ſeem to be formed with only ſtated periods of life, and thoſe much ſhorter, than the life of the part, on which ſuch granulations are ſituated. Their life, indeed, does not appear to be ſo ſhort, when cicatrization can be accompliſhed; but while a ſore is in a granulating ſtate, they frequently periſh without any viſible cauſe. Thus, ſays Mr. Hunter, a perſon may have on his leg a ſore, which granulates well, the granulations have a healthy appearance, the ſkin is forming round the edges, and every thing promiſes well, when, all at once, the granulations become livid, loſe their life, and immediately ſlough off. In ſome inſtances, they are deſtroyed, partly by ulceration, and partly by mortification. Then new granulations are frequently produced, and go through ſimilar changes. Sometimes this happens three or four times in the ſame perſon. Mr. Hunter in vain tried various methods for rendering the granulations in ſuch caſes more durable.

Suppuration and granulation are eſſential for the cicatrization and union of almoſt every wound, which has not been united by the firſt intention: a few ſmall wounds and ſcratches, which heal under a ſcab, being the only exceptions.

Our author, in the following ſection of his treatiſe on the blood, notices, that cicatrization ſeems to be in view immediately after the granulations are formed. The parts which had receded, in conſequence of a breach being made in them, by their natural elaſticity, and, probably, by muſcular contraction, now begin to be brought together by this new ſubſtance, which ſoon contracts. The contraction takes place in every joint, but principally from edge to edge, which brings the circumference of the ſore towards the centre, ſo that the ſore becomes ſmaller and ſmaller, although little or no new ſkin may be formed.

The tendency in the granulations to contract is, in ſome degree, proportioned to the general healing diſpoſition of the ſore, and the looſeneſs of the parts, on which they are formed. When new ſkin cannot be produced, the granulations do not ſo readily contract, and, therefore, Mr. Hunter infers, that their contraction and the production of ſkin are probably effects of one cauſe. The induration, occaſioned by inflammation, retards the contraction of granulations, though Mr. Hunter was inclined to think, that the circumſtance did not ariſe ſo much from a mechanical principle, as from the diminution of the diſpoſition to the proceſs occaſioned by the inflammation itſelf. Granulations, however, as the ſame writer explains, are ſometimes undoubtedly retarded in their contraction by mechanical cauſes, when formed on parts naturally fixed, ſuch as a bone; for inſtance, on the ſkull, the ſhin, &c.

When, by reaſon of a loſs of ſubſtance, there is a deep hollow ſore, and the contraction of the granulations is conſiderably advanced, before they have had time to riſe as high as the ſkin, the edges of the latter part are generally drawn down, and tucked in by it, in the direction of the excavated ſurface of the ſore.

If it is a cavity or abſceſs, which is granulating, with only a ſmall opening, as often happens when the ſurgeon has neglected to make a free aperture, the whole circumference contracts, like the bladder of urine, till little or no cavity remains; and if any cavity is left, when the granulations can contract no further, they unite with ſuch as are oppoſite to them.

This contraction in the granulations, ſays Mr. Hunter, is continued till the whole of a ſore is healed, or ſkinned over; but it happens in the greateſt degree in the beginning, when there is leſs reſiſtance in the ſurrounding parts.

The contraction of granulations may often be aſſiſted by art, namely, by uſing bandages, which tend to puſh, draw, or keep the ſkin near to the ſore which is healing.

Beſides the contractile power of the granulations, there is a ſimilar power in the ſurrounding edge of the cicatrizing ſkin, which aſſiſts the contraction of the granulations, and is even more conſiderable, drawing the mouth of the wound together like a purſe, and ſometimes, when the ſurface of the ſore is high, graſping the granulations.

The contractile power of the ſkin is chiefly confined to the very edge, where it is healing. The ſurrounding old ſkin either does not contract at all, or not much, as is evident from its being thrown into folds and plaits, while the new ſkin is ſmooth and ſhining. The original ſkin, having little or no power of contraction, is a reaſon why round ſores cannot ſo readily heal as long ones.

Mr. Hunter has explained, that the uſes, ariſing from the contraction of granulations, are various. It facilitates the healing of a ſore, as there are two operations going on at the ſame time, *viz.* contraction and ſkinning. It avoids the formation of much new ſkin, an effect which is very evident in all ſores which are healed, eſpecially in ſound parts. When a thick thigh, ſeven or eight inches in diameter, has been amputated, the ſurface of the ſore is of the ſame width; yet, in the end, the cicatrix will be no broader than a crown-piece, in conſequence of the old ſkin becoming drawn over the ulcer, by the contractile power of the granulations. The advantage of this is conſiderable, ſince ſuch parts as are originally formed are always much fitter for the purpoſes of life than thoſe which are newly formed.

After all, a ſore is covered with ſkin, the ſubſtance, which is the remains of the granulations on which the new ſkin is formed, ſtill continues to contract, till hardly any thing more is left than what the new ſkin ſtands upon. This is a very ſmall part, in compariſon with the firſt formed granulations, and, in time, it loſes moſt of its apparent veſſels, becoming white and ligamentous. All new-healed ſores are at firſt redder than the common ſkin, but afterwards become much whiter.

As the granulations contract, the ſurrounding old ſkin is ſtretched to cover the part which is deprived of integuments. At firſt, the ſkin is brought little further than into the poſition from which it had receded, on the occurrence of the wound; but afterwards it becomes drawn much more conſiderably, being ſtretched and elongated. See Hunter's Treatiſe on the Blood, Inflammation, &c. chap. 7.

GRANULES, in *Geology*, is a term which Mr. Whitehurſt, ("Enquiry," 1ſt edit. p. 180.) and others, employ to expreſs the grains or minute lumps of ſtony matter, compoſing the ſand uſually found on the ſurface of valleys, and which is formed by attrition and the grinding down of ſtones of different kinds.

GRANULOSE Roots, are thoſe compoſed of ſmaller knobs than the grumoſe ones, and reſembling ſo many grains of corn; of this ſort is the white ſaxifrage.

GRANUM Viride, in *Botany*, a name given by ſome authors to the turpentine-tree. The fruit of this tree is reddiſh while unripe; but as it ripens, it becomes of a deep blueiſh-green colour, and hence the name.

GRANZA, in *Geography*, a town of Africa, in the country of Magadoxa.

GRANZOW, a town of the Ucker-Mark of Brandenbury; 8 miles S. E. of Prenzlow.

GRAO, a port of Spain, in Valencia, which carries on a coaſting trade along the Mediterranean; on one ſide, on the coaſts of Catalonia, Rouſſillon, Languedoc, as far as Marſeilles; and on the other ſide, to Alicant, Carthagena, and Malaga: ſome veſſels even paſs the ſtraits of Gibraltar, into the Atlantic, and go to Cadiz; and ſometimes they go round Portugal as far as the ports of Galicia. The largeſt of theſe ſhips are from 50 to 60 tons, each having a crew not exceeding 11 men. They carry out wines, ſilk, wool, dry fruits, and kali; and return with linens, woollens, ironmongery, ſpices, and corn. Grao is pleaſant in ſummer, on account of the ſea-baths, which draw together a great number of people for health or amuſement.

GRAPE, the fruit of the vine. See Vine and Wine. See alſo Currants and Raisins.

Grape *Hyacinth.* See Hyacinth.

Grape, *Mangrove* or *ſea-ſide.* See Coccoloba.

Grapes, *Wolf* See Lycostaphylæ.

Grape-*galls*, in *Natural Hiſtory*, a name given by authors to a ſpecies of protuberances, reſembling cluſters of grapes, and when ripe of a reddiſh colour, which are found hanging from the oak at ſome ſeaſons of the year. Theſe are genuine galls, though of a peculiar kind, and owe their origin to a very ſmall four-winged black fly. See Galls.

Grape-*ſhot*, in *Artillery*, is a combination of ſmall ſhot, put into a thick canvas bag, and corded ſtrongly together, ſo as to form a kind of cylinder, whoſe diameter is equal to that of the ball adapted to the cannon. The number of ſhot in grape varies according to the ſervice or ſize of the guns: in ſea-ſervice nine is always the number; but by land it is increaſed to any number or ſize, from an ounce and a quarter in weight to three or four pounds. In ſea-ſervice, the bottoms and pins are made of iron, whereas thoſe uſed by land are of wood.

Grape-*ſtone*, Botrites, is a ſort of ſtalagmites, which effervesces with acids, according to Dr. Grew, "Rarities of Greſham College," p. 304. It is alſo the name of certain botroidal ſtalactites, which are ſometimes met with, pendant from the roofs of caverns in lime-ſtone diſtricts.

Grapes, in the *Manege*, a term uſed to ſignify the arrets or mangy tumours that happen in a horſe's legs. See Arrets.

GRAPHICAL Perspective, in *Optics*, is an inſtrument deſcribed by Mr. Martin, conſiſting of a tube containing two convex lenſes, which are placed at twice their focal diſtance from each other; and in their common focus is another glaſs, divided into equal parts with the point of a diamond. Though this inſtrument does not magnify any object, yet the angle under which an object is ſeen is eaſily known by it; and ſince this angle varies with the diſtance of objects, it is eaſily applied to the purpoſe of meaſuring inacceſſible heights and diſtances; and ſince the field of view is divided into equal ſquares, it is uſeful in drawing the perſpective appearance of objects. Moreover, as all foreign light is excluded by the tube in which theſe lenſes are incloſed, pictures ſeen through it have a fine relievo, on which account, and alſo becauſe objects appear inverted through it, the images of a camera obſcura are viewed with it to peculiar advantage. If a lens of a greater focal length be fixed at a proper diſtance from the centre of the tube, this inſtrument will be a teleſcope, and will magnify the prints which are looked at through it; and if a ſmall lens be uſed, it will be a microſcope, and the ſame micrometer will ſerve for them both. Martin's Optics, chap. xvii. p. 280, &c.

GRAPHIDA, in *Natural Hiſtory*, a name by which ſome authors have called the *morochthus*, or French chalk.

GRAPHIS, in *Botany*, from γραφω, *to write*, a name invented by Adanſon, who is pleaſed to ſpell it *grafis*, and adopted by Ehrhart, for the various ſpecies comprehended under the *Lichen ſcriptus* of Linnæus, and which conſtitute the very diſtinct genus of *Opegrapha* in Acharius; ſee Eng. Bot. v. 25, 26. t. 1753, &c.

GRAPHISCUS, in the *Writings of the Ancients*, a name given to an inſtrument uſed for extracting darts from wounds. It is ſaid to have been the invention of Diocles, and is deſcribed by Celſus.

GRAPHITE. See Plumbago.

GRAPHOIDES, γραφοειδης, in *Anatomy*, an appendage of the bones of the temples, long, ſmall, ſharp, and a little crooked, like a cock's ſpur; called alſo *ſtyloides*.

The ſame name is ſometimes alſo applied to the muſculus digaſtricus.

Likewiſe to an extenſion of the brain, reſembling a writing pen.

GRAPHOMETER, a name which ſome authors, particularly the French, give to a ſurveying inſtrument, by us commonly called a *ſemicircle*; which ſee. Mr. Nicholſon, in the fifth volume of his "Journal," 8vo. has deſcribed, and illuſtrated by appropriate figures, a ſubterranean graphometer, invented by M. Komarzowſki, F. R. S. and preſented to the National Inſtitute of France. It is a ſimple conſtruction of the common *theodolite* (which ſee), and is calculated to anſwer the author's intentions in operations like thoſe of mining, where great accuracy is not required. In vol. i. of the ſame "Journal," we have the deſcription of an inſtrument reſembling a graphometer, invented by Cit. Carangeau, for determining the mutual inclination of the faces of a cryſtal, or its prominent angles; it conſiſts of two concentric, equal quadrantal arcs joined by a hinge; to which are applied compaſs-legs or radii, capable of being ſhortened to apply to ſmall cryſtals, &c. See Goniometer. See alſo *Plate* VI. *Cryſtallography*, *fig.* 93.

GRAPNEL, or Grapling, on *Ship-board*, a kind of ſmall anchor for boats or gallies to ride by. It differs from other anchors, as having four or five flukes and no ſnack, though there are ſome with three flukes, with which they uſe to ſweep for hawſers or ſmall cables. In men of war alſo, the grapnels, or at leaſt a lighter kind of them, whoſe flukes are furniſhed with ſtrong barbs on their points, are uſed to be thrown into an enemy's ſhip, in order to catch hold of ſome of her gratings, rails, gun-wales, &c. this is done in order to boarding of her. They are particularly uſeful in fire-ſhips, and called fire-grapplings.

GRAPPLE, in the *Manege*. A horſe is ſaid to grapple with one or both legs, when he catches or raiſes them more haſtily and higher than ordinary, as if he were curvetting.

GRAPTOLITHI, in *Natural Hiſtory*, are the petrificata ficta of Linnæus and others; as dendritæ, landſcape-marble, dendropotamites, &c. all which, according to Mr. William Martin, "Outlines," p. 8. ſhould be excluded from the liſt of extraneous foſſils.

GRASS, Gramen, in *Botany*, See Gramina.

To enumerate all the ſpecies of graſs which are found growing naturally in England, would greatly exceed the bounds which can be allowed for this article; it will ſuffice, therefore, to mention a few ſpecies, which are either uſed in medicine, or cultivated as a pabulum for cattle; for there is ſcarcely a paſture in this country where great numbers of different ſpecies are not to be found intermixed. Mr. Ray has ranged them in the following order, *viz.* wheat-graſs, rye-graſs, darnel-graſs, panick-graſs, canary-graſs, fox-tail graſs, cat's-tail graſs, hedge-hog graſs, creſted-graſs, oat-graſs, cock's-foot-graſs, buck-graſs, and millet-graſs. Theſe and other graſſes Linnæus has arranged into diſtinct genera. See the following articles:

Grass, *Arrow-headed.* See Triglochin.

Grass, *Bent.* See Agrostis.

Grass, *Bird.* See Bird-*graſs*.

Grass, *Canary.* See Phalaris.

Grass, *Capon's-tail.* See Festuca.

Grass, *Cat's-tail.* See Phleum.

Grass, *Clover.* See Trefoil.

Grass, *Cock's-tail.* See Dactylis.

Grass, *Cotton.* See Eriophorum.

Grass, *Couch.* See Triticum.

Grass, *Creſted.* See Dog's-*tail-graſs* and Cynosurus.

Grass, *Dog's.* See Triticum and Agrostis.

Grass, *Sea-dog's*, a name ſometimes given to the double ſpiked ſecale, or rye. See Secale.

Grass, *Dog's-tail.* See Dog's-*tail-graſs* and Cynosurus.

Grass, *Feſcue.* See Festuca.

Grass, *Fox-tail.* See Alopecurus.

Grass, *Gooſe.* See Asperugo.

Grass, *Hair.* See Aira.

Grass, *Hare's-tail.* See Lagurus.

Grass, *Knot.* See Polygonum.

Grass, *Knot, German.* See Scleranthus.

Grass, *Knot, Mountain*, and *Verticillate.* See Illecebrum.

Grass, *Love*, or *Quaking.* See Briza.

Grass, *Meadow.* See Poa.

Grass, *Hard meadow.* See Cynosurus.

Grass, *Millet.* See Milium.

Grass, *Oat*, a name given to a ſpecies of the feſtuca. See alſo Avena.

Grass, *Panic.* See Panicum.

Grass *of Parnaſſus.* See Parnassia.

Grass, *Pepper.* See Pilularia.

Grass, *Pudding.* See Mentha.

Grass, *Quaking.* See Briza.

Grass, *Rattle.* See Pedicularis.

Grass, *Ruſh.* See Scirpus.

Grass, *Rye*, or *Ray.* See Lolium and Hordeum.

Grass, *Scorpion.* See Scorpiurus.

Grass, *Scorpion, Mouſe-ear.* See Myosotis.

Grass, *Scurvy.* See Cochlearia.

Grass, *Shave.* See Equisetum.

Grass, *Silk.* See Apocynum.

Grass, *Sword.* See Gladiolus.

Grass, *Trefoil.* See Trefoil.

Grass, *Vernal.* See Anthoxanthum.

Grass, *Vetch.* See Lathyrus.

Grass, *Viper's.* See Scorzonera.

Grass, *Whitlow.* See Draba.

Grass, *Whitlow, Rue-leaved.* See Saxifraga.

Grass, *Worm.* See Spigelia.

Grass, *Wrack.* See Zostera.

Grass, in *Agriculture,* a general name applied to thoſe herbaceous plants that are employed in the feeding and fattening of neat cattle, ſheep, &c. It has been long ſince remarked in an able tract on the graſſes of this country, "that much of our meadow and paſture-land may be rendered infinitely more valuable than it is at preſent, by the introduction of ſome of the beſt graſſes which we poſſeſs; and that this is an opinion which has long prevailed among many of the more enlightened agriculturiſts of the preſent age, ſome of whom have endeavoured to excite the huſbandman to collect and cultivate ſeeds of this ſort, by writings fraught with the soundeſt reaſoning; while others have attempted to attract him by the offers of well-directed premiums; but that hitherto neither the writings of the one, however convincing, nor the premiums of the other, however alluring, have, as the author thinks, been productive of the deſired effect." And "Mr. Stillingfleet ſays, it is wonderful to ſee how long mankind has neglected to make a proper advantage of plants of ſuch importance, and which in almoſt every country are the chief food of cattle. The farmer, for want of diſtinguiſhing and ſelecting graſſes for ſeed, fills his paſtures either with weeds, or bad or improper graſſes; when by making a right choice, after ſome trials, he might be ſure of the beſt graſs, and in the greateſt abundance that his land admits of. At preſent, if a farmer wants to lay down his land to graſs, what does he do? He either takes his ſeeds indiſcriminately from his own foul hay-rick, or ſends to his next neighbour for a ſupply. By this means, beſides a certain mixture of all ſorts of rubbiſh, which muſt neceſſarily happen; if he chances to have a large proportion of good ſeeds, it is not unlikely but that what he intends for dry land may come from moiſt, where it grew naturally, and the contrary. This is ſuch a ſlovenly method of proceeding, as one would think could not poſſibly prevail univerſally; yet this is the caſe as to all graſſes, except the darnel-graſs, and what is known in ſome few counties by the name of the Suffolk-graſs (*poa annua*); and this latter inſtance is owing, it is believed, more to the ſoil than any care of the huſbandman. Now, continues he, would the farmer be at the pains of ſeparating once in his life half a pint or a pint of the different kinds of graſs-ſeeds, and take care to ſow them ſeparately; in a very little time he would have wherewithal to ſtock his farm properly, according to the nature of each ſoil, and might at the ſame time ſpread theſe ſeeds ſeparately over the nation by ſupplying the ſeed-ſhops. The number of graſſes fit for the farmer is, he believes, ſmall; perhaps half a dozen, or half a ſcore, are all he need to cultivate; and how ſmall the trouble would be of ſuch a taſk, and how great the benefit, muſt be obvious to every one at firſt ſight. Would not any one be looked on as wild, who ſhould ſow wheat, barley, oats, rye, peas, beans, vetches, buck-wheat, turnips, and weeds of all ſorts together? Yet how is it much leſs abſurd to do what is equivalent in relation to graſſes."

It is alſo aſſerted by Mr. Kent, that meadow and paſture-land is oftener neglected than ploughed ground, notwithſtanding it generally admits of a much greater proportion of improvement. The beſt graſſes cannot be collected at too great an expence; for he has ſeen a ſmall ſpot of land, in the middle of a large piece, which was laid down twelve or fourteen years ſince, by the writer noticed above, upon an eſtate in Herefordſhire, with ſome choice ſeeds, at the ſame time when the remainder of the field was laid down with common ſeeds; and that this ſpot is conſiderably better than the reſt. From theſe experiments, and his own obſervations, he is clearly of opinion, that any perſon who has land calculated for graſs may improve it, by this method of laying it down, to a much greater degree than he can in the common way. Dr. Anderſon has likewiſe obſerved, in the ſecond volume of his eſſays, that although it is probable, that none of the graſſes that have been hitherto cultivated by the farmer are of the moſt proper kind for paſturage; yet there is little reaſon to doubt but that many of the moſt valuable kinds for this purpoſe would admit of being cultivated with the ſame eaſe as ſome of thoſe are with which we are well acquainted, if they were properly ſeparated from others, and cultivated with equal care. But ſo long as we ſhall remain ignorant of the peculiar qualities of each kind of graſs, ſo as not to be able to diſtinguiſh the good from the bad, it is not ſurpriſing, that we ſhould remain firmly perſuaded that nature alone can provide valuable paſtures, and that age is ſo eſſentially neceſſary for bringing them to their ultimate perfection. For, if we allow our fields to remain uncultivated, without having ſowed them with any kind of graſs-ſeeds, it muſt ever happen, that the ſeeds of ſuch graſſes as are brought by the wind, or otherwiſe, from the neighbouring fields, will there take root, and in time eſtabliſh themſelves. And as it may ſometimes happen, that ſome of the moſt valuable paſture-graſſes may there abound; the field, in theſe caſes, will become filled with their ſeeds, and in due time may afford the moſt valuable paſture. But if bad kinds of graſſes ſhould abound in the neighbourhood more than the good, the field will as naturally become filled with the ſeeds of theſe uſeleſs plants. And as a number of theſe are hardy and abiding plants, if the field is once filled with them, the paſture will be, of conſequence, always of little value, if it ſhould be allowed to remain undiſturbed for any length of time. Let the reader, therefore, conſider how numerous the circumſtances are that muſt accidentally concur together before it is poſſible to expect a very fine field of paſture-graſs, if left to nature, and then he will perceive how improbable it is that all theſe ſhould concur to produce their full effect in any one field whatever. There muſt be no roots of bad graſſes, nor ſeeds of robuſt annuals, in the ſoil when it is left out from tillage; and the ſeeds of the moſt valuable kinds of graſſes muſt be in the neighbourhood in ſuch abundance as to fill the whole field ſufficiently at once. Nor is this all. For as there is, no doubt, a conſiderable variety of valuable kinds of graſs, ſome of which are naturally fitted to grow to perfection on one kind of ſoil, or upon that ſoil when in certain circumſtances, while others would thrive beſt upon another ſoil, or upon that ſoil only in certain peculiar circumſtances; it muſt ſo happen, that theſe very plants which are beſt adapted to the ſoil in the ſtate it may be in at the time, ſhould be found in abundance in the neighbourhood of the field. Neither muſt there be found near that, any ſort of robuſt quick-growing plant, the ſeeds of which, by being blown upon that field, might ſuddenly ruſh up and ſuffocate in their infancy theſe tender and valuable plants. Nor muſt there be found any bad kinds of graſs, that, by being eſtabliſhed along with the good in any proportion, might tend to diminiſh the value of the paſture.

" Now, let any one reflect on the infinite diverſity theſe few particulars may admit of, and think how utterly impoſſible it is that all the favourable circumſtances, without any of thoſe that are unfavourable, ſhould concur in any one caſe, and he will acknowledge, that thoſe who found their hope of obtaining the moſt valuable paſtures only upon the fortuitous concurrence of all theſe circumſtances, or who imagine that every paſture which is old muſt, on that account, of neceſſity be good, act in direct contradiction to the plaineſt dictates of reaſon and common-ſenſe. For, although it ſhould be allowed that the graſſes hitherto cultivated are not of the moſt proper ſort for forming good paſtures, and that therefore, on ſome occaſions, much better natural paſtures may be met with than could be formed by means of any of theſe; yet it by no means follows from thence, that if the farmer were perfectly acquainted with the value and diſtinguiſhing qualities of each kind of natural graſs, and knew the ſoil and culture that beſt agreed with it, the moſt proper manner of rearing it, and every other particular relating to the economy thereof, he might not perhaps have it in his power to form artificial paſtures as much excelling the natural as theſe laſt at preſent uſually exceeded the former. For were he poſſeſſed of the knowledge above ſuppoſed, he could at once fill the ſoil with the ſeeds of thoſe valuable graſſes which he knew were beſt adapted to it, and thus effectually exclude the admiſſion of every uſeleſs plant, or pernicious kind of graſs, that might be brought from the neighbouring fields by the wind, or other accidental cauſes.

" Let us, therefore, inſtead of contenting ourſelves on all occaſions with ſuch paſtures or graſs-lands as nature may afford, rather ſtudy to improve thoſe that are indifferent, by endeavouring to obtain a knowledge of ſuch plants as might afford the moſt valuable paſture, and cultivating theſe with aſſiduity and care. The inattention of the improving farmers in Great Britain to this ſubject has been truly amazing. But it is hoped the attempts that have been made by ſome late writers may have the effect of turning their attention to a ſubject of ſuch great importance; with regard to which, they will then doubtleſs make many valuable improvements. It is, however, to be feared, that till ſome attempt ſhall be made to aſcertain the particular qualities and peculiarities of the different kinds of graſſes, the public will be often impoſed upon by ſpecious accounts of new graſſes, which may be really poſſeſſed of few valuable qualities, and may very much tend to diſcourage the inquirer. It is conſequently neceſſary, to ſtrenuouſly endeavour to diſcover what are the particular purpoſes for which any one plant would be deemed valuable, and in what reſpects it might be looked upon as of no value at all: For, as there is no plant that can be alike uſeful on all occaſions, if we loſe ſight of this moſt neceſſary diſtinction, it may often happen, that we may attempt to rear a particular plant for purpoſes which it was never fitted to anſwer; and our want of ſucceſs in theſe trials may make it be entirely rejected, even in caſes for which it was extremely proper and beneficial.

It is ſtated that ray-graſs continues to be the only graſs whoſe ſeeds can be purchaſed for the purpoſe of laying down meadow and paſture-land; and how inadequate that graſs is for ſuch a purpoſe is known to every intelligent farmer. Why indeed the *lolium perenne* (ray or rye-graſs) ſhould originally have been made uſe of in preference to all the other graſſes, cannot, perhaps, be ſatisfactorily accounted for: moſt probably it owes its introduction to accident, or to its being a common graſs whoſe ſeeds were eaſily collected, rather than to its being preferred from any inveſtigation of its merits compared with the others. However this may be, there appears to be no reaſon for excluding the others; for it would appear exceedingly improbable, that of upwards of a hundred graſſes, taking the word graſs in its ſtrict ſenſe, that are growing wild in this country, the Author of nature ſhould have created only one as ſuitable to be cultivated for paſturage or fodder. Since this period, however, moſt of the natural graſſes have been cultivated for the purpoſe of affording ſeed, which may be procured genuine from many ſeedſmen in moſt places. Taking it for granted then, that there are other graſſes ſuperior in many reſpects to the ray-graſs, this queſtion naturally ariſes—How comes it that they have not found their way into general uſe? To this it may be anſwered, improvements in any ſcience, but more eſpecially in agriculture, are ſlow in their advances; and perhaps no claſs of men adheres more pertinaciouſly to old prejudices than that of farmers, and the difficulty of diſtinguiſhing the graſſes from each other has, too, no doubt, proved one grand obſtacle: many of theſe plants are ſo much alike, that the moſt diſcerning botaniſt is often at a loſs to know ſome of them apart: if ſo, how eaſily may the huſbandman be deterred from the arduous taſk! There is another cauſe alſo which may have operated againſt their introduction: graſſes, as well as other plants, have been frequently recommended from a partial and limited obſervation of them, by perſons who neither knew them well as botaniſts or agriculturaliſts, or who have recommended them, merely to gain by the credulity of the public. But, perhaps, the chief reaſon has been, that perſons who might be expected to make the improvements, have not had the means fairly put into their hands to make the experiment, there not having been any eaſy means of obtaining ſuch ſorts of graſs-ſeeds as may be moſt ſuitable for the purpoſe. It appears, however, that in the herbage of good meadows, or graſs-lands, there ſhould be a combination of produce, bateableneſs, and early growth. The firſt is, in moſt caſes, the agriculturaliſt's grand object—and no wonder, ſince it is the quantity chiefly which enables him to pay his rent, and ſupport his cattle: to obtain this, the judicious huſbandman ſpares no expence in labour or manure. But it does not follow that produce is to be attended to ſolely, or that, for its ſake, we are to cultivate rough cock's-foot graſs, meadow-ſweet, and ſuch coarſe plants. Graſſes which have been recommended for being remarkably grateful to cattle, as the ſheep's-feſcue graſs, or for the ſweetneſs of their foliage merely, if they are found to be deficient in the grand article of produce, will never anſwer the farmer's or grazier's purpoſe, ſince to be a good meadow it muſt be productive. Cattle, in regard to food, doubtleſs have their particular likings, though we cannot properly judge of it, in which it may be neceſſary ſometimes to indulge them; but this practice muſt not be carried too far; for as the farmer cannot afford to feed his ploughmen on pigs and poultry, neither can he indulge his cattle in general with the finer or more delicate hay or herbage. By the bye, we do not know but that the moſt productive graſſes may alſo be the moſt nutritious, or that cattle will not as eagerly eat the herbage or hay made of the meadow fox-tail graſs, as of the fine bent (*agroſtis capillaris*), and procumbent trefoil (*trifolium procumbens*). Moreover, cattle are known frequently to thrive on food to which they are habituated by neceſſity, though at firſt they could ſcarcely be prevailed on to touch it. Perſons, in making experiments, are very apt, as has been already obſerved, to conclude too haſtily from the appearance which a plant aſſumes on its being firſt planted or ſown; the moſt inſignificant vegetable will often make a great ſhow, when its fibres have freſh earth to ſhoot into;

but the trial comes when the object of our experiment has been in a meadow or paſture ſeveral years, when its fibres from long growth are matted together, and it meets with powerful neighbours to diſpute every inch of ground with it: if it then continues to be productive, it muſt have merit. We ſee that lucern, when left to itſelf, is ſoon overpowered; if we ſow broad-leaved clover, which is moſt undoubtedly a perennial, the firſt year we ſhall have a great crop of clover; let this field be left to itſelf, and the clover, like the lucern, will yearly diminiſh, not becauſe it is a biennial, as ſome have ſuppoſed, but becauſe plants hardier or more congenial to the ſoil uſurp its place: this ſhews, then, that at the ſame time that we introduce a good plant, that plant muſt alſo be a powerful one, able to keep poſſeſſion, and continue to be productive.

With regard to the ſecond quality, or that of the cattle's thriving on the food they eat; this is, undoubtedly, of great conſequence, and it is to be regretted that our knowledge of the moſt nutrient herbage is ſo limited: of thoſe plants which have been cultivated, we are able to ſpeak with ſome certainty; it is well known that clover, lucern, ſaintfoin, tares, and ſeveral other plants, have a tendency to fatten cattle; but what graſſes, or other plants, which have not been ſubjected to a ſeparate cultivation, have this particular tendency, remains to be aſcertained by experiment. But as leguminous plants, in general, are found to agree with cattle, we may reaſonably conclude that a certain quantity of them muſt be proper in paſtures. Certain paſtures are found to be more bateable or feeding than others; but whether this ariſes from ſituation, or their particular produce, remains alſo to be diſcovered by further obſervation.

Reſpecting the third quality, or the early growth of plants, as the farmers and graziers unitedly complain of the want of early herbage in the ſpring; thoſe plants, therefore, which are found to put forth early foliage, and to be grateful to cattle, are deſerving of great attention. As far as graſſes are concerned, the ſweet-ſcented vernal, the meadow fox-tail, the ſmooth and rough-ſtalked meadow-graſs, will effect all that can be expected from thoſe of Britiſh growth: much, very much, however, will depend on ſeaſons: if the winter be very ſevere, or north-eaſterly winds prevail in the ſpring, graſſy herbage will be backward: to counteract the bad effects of ſuch ſeaſons, our paſtures ſhould be warmly ſituated, not drenched with moiſture, ſheltered by thick hedges, and divided into ſmall encloſures: in ſhort, a ſet of encloſures ſhould be formed for this very purpoſe, where there is a proſpect of its anſwering the deſigns of the cultivator. But where early paſturage is the deſideratum, other plants, as well as graſſes, may deſerve a place amongſt them, as rib-wort, or rib-graſs (*plantago lanceolata*), dandelion (*leontodon taraxacum*), broad-leaved clover (*trifolium pratenſe*), with many others of the ſame kind. And as an early herbage, though it is valuable for paſturage, is no leſs ſo for hay; by the middle of May at furtheſt, a meadow of this ſort would be fit for mowing, and the ſecond hay-making might commence by the time that hay-making uſually takes place in the country. The writer has ſometimes thought, but perhaps the idea is too ſpeculative, that we ought to have two ſorts of meadows, one for hay, the other for paſture; that our hay-meadows ſhould conſiſt entirely of graſſes, and chiefly for this reaſon, that the hay would on that account be much ſooner made; an object of conſequence at all times, but more ſo when the proceſs commences in May. In June and July the more powerful heat of the ſun is able to exſiccate the thick leaves and ſtalks of the more ſucculent plants; but, in the neceſſary prolongation of this buſineſs, the graſſes muſt materially ſuffer. But for the purpoſe of paſturage, the attention of the agricultor ſhould be chiefly directed to ſuch ſorts of graſſes as have the propenſity of running to leaves, in preference to ſuch as abound more in flower-ſtalks or ſtems.

The ſame writer ſtates, that if we examine our meadows, paſtures, and downs, we ſhall find them pretty much in a ſtate of nature, and, excepting thoſe paſtures which of later years have been ſown with ray-graſs and clover, full of an indiſcriminate mixture of plants, ſome of which afford good, others bad food, ſome good crops, others ſcarcely any crops at all: but that he may not be thought to ſpeak at random on this ſubject, he will ſtate a few facts to corroborate what he has aſſerted. His worthy and much-eſteemed friend, Thomas White, eſq. with a view to aſcertain the produce of ſeveral downs and commons fed on by ſheep, procured, from each of thoſe under-mentioned in Hampſhire and Suſſex, a turf, which, though not more than ſix inches in diameter, and choſen indiſcriminately, produced, on being planted in his garden, as follows:

Different Turfs.

Turf from Selborn-Common.—Plantago lanceolata, agroſtis capillaris, avena flaveſcens, dactylis glomerata, feſtuca duriuſcula, poa annua, cynoſurus criſtatus, trifolium repens, crepis tectorum, achillea millefolium, galium verum, hypochæris radicata, hieracium piloſella, thymus ſerpyllum.

Turf from Oakhanger.—Trifolium repens, holcus lanatus, poa annua, agroſtis capillaris, agroſtis paluſtris.

Turf from Deortun.—Ranunculus repens, lolium perenne, holcus lanatus, prunella vulgaris, feſtuca duriuſcula, agroſtis paluſtris, trifolium repens, crepis tectorum, achillea millefolium.

Turf from Glynd-hill.—Medicago lupulina, achillea millefolium, poa pratenſis.

Turf from the ſame.—Avena flaveſcens, feſtuca duriuſcula, feſtuca ovina, hieracium piloſella, agroſtis capillaris, trifolium repens, thymus ſerpyllum.

Turf from Short-Heath.—Feſtuca bromoides, aira præcox, juncus campeſtris, poa annua, agroſtis capillaris.

Turf from Mount Cabron.—Rumex acetoſa, daucus carota, medicago lupulina, poterium ſanguiſorba, feſtuca duriuſcula, avena flaveſcens.

Turf from Ringmer-Down.—Linum catharticum, ſcabioſa columbaria, ornithopus perpuſillus, avena flaveſcens, feſtuca duriuſcula, trifolium repens, hypochæris radicata, crepis tectorum, lotus corniculatus, juncus campeſtris, hieracium piloſella, feſtuca ovina, thymus ſerpyllum, poa pratenſis.

It is, perhaps, no ſmall recommendation to the *poa trivialis*, that it is a principal graſs in that uncommonly productive meadow near Saliſbury, mentioned by Stillingfleet, and more particularly deſcribed in the firſt volume of the Memoirs of the Bath Agricultural Society. And that the account given of the extraordinary fertility of this meadow excited his curioſity, and induced him to requeſt a gentleman reſiding near the ſpot to favour him with ſix ſmall turfs, cut up in different parts of the ſaid meadow, and which being planted in his garden, at Lambeth-Marſh, produced as follows:

Different Turfs.

Turf 1.—Poa trivialis, ranunculus acris, triticum repens, agroſtis paluſtris.

Turf 2.—Poa trivialis, alopecurus pratenſis, triticum repens.

Turf 3.—Poa trivialis, agroſtis paluſtris.

Turf 4.—Poa trivialis, triticum repens, peucedanum ſilaus.

Turf 5.—Poa trivialis, alopecurus pratenſis, agroſtis paluſtris, avena elatior, triticum repens.

This experiment proves, in a great degree at leaſt, what he long before ſuſpected, that the extraordinary fertility of this meadow aroſe not from any new graſs peculiar to it, but from ſeveral unuſual circumſtances concurring and favouring in an uncommon degree the growth of certain well-known graſſes, eſpecially the poa trivialis and agroſtis paluſtris; conſequently, in the forming and improving of graſs-lands, the moſt certain plan will be to cultivate the ſeeds of ſuch graſſes as may be moſt adapted to them, and afterwards ſow them at proper ſeaſons upon the lands, when they have been put into a ſuitable condition for their reception.

The directions given are, that if a piece of ground can be had that is neither very moiſt nor very dry, it will anſwer for all the ſeeds; they may then be ſown on one ſpot: but if ſuch a piece cannot be obtained, they muſt be ſown on ſeparate ſpots, according to their reſpective qualities, no matter whether in a garden, a nurſery, or a field, provided it be well ſecured and clean. Dig up the ground, level, and rake it; then ſow each kind of ſeeds thinly in a ſeparate row, each row nine or twelve inches apart, and cover them over lightly with the earth; the latter end of Auguſt or beginning of September will be the moſt proper time for this buſineſs. If the weather be not uncommonly dry, the ſeeds will quickly vegetate; and the only attention they will require will be to be carefully weeded: in about a fortnight from their coming up, ſuch of the plants as grow thickly together may be thinned, and thoſe which are taken up tranſplanted, ſo as to make more rows of the ſame graſs. If the winter ſhould be very ſevere, though natives, as ſeedlings, they may receive injury; therefore it will not be amiſs to protect them with mats, fern, or by ſome other contrivance. Advantage ſhould alſo be taken of the firſt dry weather in the ſpring, to roll or tread them down, in order to faſten their roots in the earth, which the froſt generally looſens; care muſt ſtill be taken to keep them perfectly clear from weeds. As the ſpring advances, many of them will throw up their flowering ſtems, and ſome of them will continue to do ſo all the ſummer. As the ſeed in each ſpike or panicle ripens, it muſt be very carefully gathered, and ſown in the autumn, at which time the roots of the original plants, which will now bear ſeparating, ſhould be divided and tranſplanted, ſo as to form more rows: the roots of the ſmooth-ſtalked meadow-graſs in particular, creeping like couch-graſs, may readily be increaſed in this way; and thus, by degrees, a large plantation of theſe graſſes may be formed, and much ſeed collected for the uſe of the agricultor. But a more ready way, according to a late writer, is, for the farmer to notice that ſpecies of graſs moſt affected by his ſoil, and carefully to gather the ſeed from a piece of old meadow, purpoſely left three or four weeks longer than common, or at leaſt long enough to become ſufficiently ripe. He ſhould not ſcruple the trouble of ſelecting the heads as they lie in the ſwath; but they who deſire not to be ſo particular, will threſh out the ſeed together, either in the field or before it ſhall have heated in the mow. And good ſeeds of different ſorts of graſſes may now alſo be procured from different ſeedſmen in large towns and other places; but the collection ſold under the title of hay-ſeeds ſhould never be truſted to in any reſpect. Mr. Curtis, from the numerous applications that were made to him by gentlemen for graſs-ſeeds, was induced to ſelect ſuch as appeared to him the moſt uſeful, and thereby rendered the public an eſſential ſervice. He wiſhed at leaſt to put it in their power to decide on a matter which had been long agitated, and from which he was far from being the only one that entertained the ſanguine hopes of its proving a great national advantage. The graſſes he has recommended will, he is confident, do all that our natural graſſes can do: they are ſix of thoſe which conſtitute the bulk of our beſt paſtures; moſt of them are early, all of them are productive, and they are adapted to ſuch ſoils and ſituations as are proper for meadows and paſtures. But, let no one expect them to perform wonders; for after all they are but graſſes, and as ſuch are liable to produce great or ſmall crops, according to particular ſeaſons, or to the fertility or barrenneſs of the ſoil on which they are ſown and cultivated.

This liſt comprehends the *anthoxanthum odoratum,* or ſweet-ſcented vernal-graſs; the *alopecurus pratenſis,* or meadow fox-tail graſs; the *poa pratenſis,* or ſmooth-ſtalked meadow graſs; the *poa trivialis,* or rough-ſtalked meadow graſs; the *feſtuca pratenſis,* or meadow-feſcue graſs; and the *cynoſurus criſtatus,* or creſted dog's-tail graſs; of which repreſentations may be ſeen at *figs,* 1, 2, 3, in *Plate, Graſſes, Agriculture,* and *figs.* 1, 2, 3, in *Plate Graſſes*; but more full accounts of them may be found by referring to their different botanical titles, in different parts of the work.

But of the above graſſes, the meadow fox-tail and rough-ſtalked meadow graſs are fitteſt for moiſt land; the meadow-feſcue, or ſweet-ſcented vernal, are the moſt proper for land either moiſt or moderately dry; and the ſmooth-ſtalked meadow-graſs and creſted dog's-tail are thoſe that are beſt ſuited for dry paſtures and other ſimilar lands.

It is, however, ſuppoſed, that in the more ſouthern parts of the kingdom we may in vain expect to clothe dry ſoils with the conſtant verdure of graſſes; they will not ſtand the drought of hot parching ſummers: in ſuch ſeaſons, they are only plants which ſend down roots to a great depth that can be expected to look green or be productive, as the *lotus corniculatus, medicago falcata,* and ſome others.

The order of flowering in the above graſſes is: 1. Sweet-ſcented vernal. 2. Meadow fox-tail. 3. Smooth-ſtalked meadow. 4. Rough-ſtalked meadow. 5. Meadow-feſcue. 6. Creſted dog's-tail.

It is obſerved that many more graſſes might be added to this liſt, and thoſe too which perhaps might be highly deſerving of it; but he has his doubts, whether by recommending more he might not increaſe the difficulty of introducing graſs-ſeeds without any adequate advantage in return.

But beſides theſe, the *feſtuca ovina,* or ſheep's-feſcue-graſs; the *feſtuca duriuſcula,* or hard-feſcue graſs; the *poa compreſſa,* or flat-meadow graſs; the *poa paluſtris,* or marſh-meadow graſs; the *phleum nodoſum,* or knot-graſs; and the *lolium perenne,* or rye-graſs, which is an uſeful graſs in many caſes; may all be employed with advantage. They may be ſeen at *figs.* 1, 2, 3, in *Plate Graſſes,* and at *figs.* 1, 2, 3, in *Plate Graſſes.*

And in the ſecond volume of his Eſſays on Rural Affairs, Dr. Anderſon has likewiſe given deſcriptions of many others, which, he conceives, may be beneficially employed in forming graſs-lands, ſuch as the *alopecurus bulboſus,* or bulbous fox-tail graſs; the *feſtuca rubra,* or purple feſcue-graſs; the *holcus mollis,* or creeping ſoft graſs; the *plantago anguſtifolia* and *tenuifolia,* or narrow-leaved and ſmall graſs-leaved plantain or rib-graſs; and the *poa procumbens,* or creeping-meadow graſs.

In a valuable "Eſſay on the Converſion of Graſs-Land into Tillage," inſerted in the Communications to the Board of Agriculture, vol. iii. part 1. the following detail of ſeveral plants of the graſs kind is given, with the ſoils they are moſt proper for, or on which they ſucceed to the greateſt advantage.

“ Ray-graſs *(lolium perenne)*. This graſs, which for many purpoſes is a very valuable one, is chiefly to be recommended for the two diviſions of ſoil diſtinguiſhed under the titles of loam and ſand. It will flouriſh on any land, except ſtiff clay, and will grow even on that; but, upon rich ſands and loams, it becomes not only a good ſpring-graſs, but, if properly managed by due mixtures, turns out well as a permanent paſture-land; always, however, moſt valuable by being ſheep-fed, for which it is ſingularly adapted. Mr. Peacey's two varieties of it are ſaid, by ſome perſons who have tried them, to be ſuperior to the common ſort. Mr. Profeſſor Martyn, he ſays, ſtates the *cynoſurus cæruleus, poa nemoralis, bromus mollis, alopecurus, anthoxanthum,* and *poa pratenſis,* as all being earlier than the *lolium perenne,* or ray.” See LOLIUM *Perenne.*

“ Yorkſhire white *(holcus lanatus)*. This, he obſerves, flouriſhes well on any moiſt ſoil, and grows very generally, except on the moſt dry and barren ones, where, however, it is alſo found. It ſhould be ſown chiefly with a view to ſheep, for it is not equally good for other ſtock: many acres of it have been cultivated on his farm for ſheep, and it has anſwered greatly when kept cloſe fed. Mr. Marſhall, in his Midland Counties, mentions it as a good graſs for cows and other cattle, but bad for horſes. In his York Economy he, however, condemns it in toto; probably from not then having ſo cloſely remarked its qualities.” See HOLCUS *Lanatus.*

“ Meadow-feſcue *(feſtuca pratenſis)*. This is an excellent graſs for good loams and clayey ſoils, and he has found it abound largely on dry loams. He has laid down ſome parts of fields with it for compariſon with other graſſes on wet ſandy loams on a clay marle bottom, worth 14*s.* or 15*s.* an acre; but has found it giving way in four years to the plants more indigenous to the ſoil. He does not think there is any better graſs for either hay or paſturage, and it yields ſeed in great abundance. He adds, that colonel St. Leger was, he believes, the firſt who entered largely into the culture of this graſs: and Mr. Majendie, of Eſſex, revived it, and began with the *alopecurus*.” See FESTUCA *Pratenſis.*

“ Meadow fox-tail *(alopecurus pratenſis)*. He thinks that for moiſt loams and clays, there cannot be a better graſs than this: it is very early, and it abides on his farm after nine or ten years on the ſoils upon which the meadow-feſcue gives way to others. It has alſo been found, by Mr. Majendie, hardier againſt froſts than the *poa trivialis:* the greateſt objection to it is the difficulty of getting the ſeed in any degree of plenty; there is an inſect that feeds on it, and occaſions much diſappointment. Mr. Profeſſor Martyn, in his excellent “ Flora Ruſtica,” ſpeaks, he obſerves, highly of this graſs, and ſays the ſeeds may be collected without much difficulty; but he does not there advert to the inſect which is ſo pernicious, as noticed by Mr. Majendie, and by the ingenious Mr. Swayne, in his “ Gramina Paſcua.” In a field on his farm, where it is very well eſtabliſhed, and the herbage thick, it produces very few ſeed-ſtalks.” See ALOPECURUS *Pratenſis.*

“ Creſted dog's-tail graſs *(cynoſurus criſtatus)*. It is remarked, that to judge from the appearance of the bents of this graſs in poor upland but moiſt paſtures, a man would think it a very unpromiſing plant; but the rich marſhes of Bridgewater and Boſton, the famous paſturages of Painton in Devonſhire, and thoſe cloſe to Mr. Buller's caſtle near Leſkeard in Cornwall, Mr. Thorne's bullock-grounds on a limeſtone bottom near Taviſtock; Mrs Williams's at Little Malvern in Worceſterſhire, (which are among the richeſt paſtures in the kingdom), all abound, he aſſerts, very greatly in this graſs; in ſome of them it is the predominant herbage. Mr. Marſhall, in his York Economy, places it as the moſt prevailing plant in the beſt graſs-meadows of the vale of Pickering, ſome of which will feed a large cow from May-day to Michaelmas. Very fortunately it abounds much with ſeed, ſo that he has had many buſhels gathered in a ſeaſon by poor women and children, at one ſhilling a pound, and laid down many acres with it ſucceſsfully. Attention ſhould be paid to its being ripe; for he once ordered eight buſhels to be ſown on eight acres, and it failed from deficiency in ripeneſs.” See CYNOSURUS *Criſtatus.*

“ Roughed-ſtalked meadow-graſs *(poa trivialis)*. It is obſerved that Mr. Boys, of Betſhanger, in Kent, has been the largeſt cultivator of this graſs in the kingdom, and ſold large quantities of the ſeed, but gave it up for want of a demand. It is, he aſſerts, an excellent graſs on good, ſound, and moiſt loams. It is accounted in Lombardy ‘ the queen of meadow plants *(la regina dell' erbe)*,’ whether for dry paſtures or water meadows; multiplying itſelf much by ſeed, and little by the root; ſo that, if attention be not paid to permit ſome ſeed to fall, its quantity will ſenſibly diminiſh. Excellent for all ſorts of cattle.”

“ This hint concerning the ſeed is worth attention in England. Major Cartwright has found the *poa pratenſis* to be an excellent graſs on rich loams; and both ſucceeded well with ſir William Clayton, of Harleyford.” See POA *Trivialis.*

“ Cock's-foot *(dactylis glomerata)*. This graſs has been largely cultivated over the farm he now manages, and to his ſatisfaction on wet loams on a clay marle bottom, upon which the finer graſſes are apt to give way in a few years to the indigenous produce. If ſuffered to riſe high, it is very coarſe; but, fed cloſe, is a very valuable ſheep-paſture. Women and children make good earnings in gathering it at 4*s.* a buſhel. He has ſown two buſhels an acre, and 10lbs. common red clover; and when the clover wears out, the graſs fills the land, and abides well in it. It grows well in winter. It has been found highly uſeful as an early ſheep feed.”

It is ſtated in the Norfolk Report on Agriculture, that “ ſir Mordaunt Martin, in 1788, obſerving, by an experiment, that this graſs grew four inches in leſs than three days, determined to attend more particularly to it: he remarked, that when ſheep were let out of a fold, they ran over every thing, to get at a baulk that was full of it, and there ate it in preference to other graſſes. In ſome parts of Norfolk it is called cows' graſs, from their being very fond of it. He began to cultivate it in 1794. It grows at Midſummer, in a drought, when every thing elſe is burnt up. He ſows it with nonſuch, inſtead of ray-graſs, and finds it much more profitable.” And “ Mr. Overman, alſo, obſerving the eagerneſs with which ſheep, when let into a field at Burnham-market that had ſome cock's-foot graſs in it, ran over ray-graſs, and every thing elſe, to get a bite of this plant, thought it worth cultivating, and ſowed about an acre, on the dry gravelly part of his farm, juſt above the marſh. This ſpot was the only one, in a large field, that did not burn in the ſevere drought of 1800, and convinced him of the excellence of the graſs.” He alſo ſhewed the writer “ a beautiful crop of drilled wheat, which could ſcarcely be eſtimated at leſs than four quarters and a half per acre, pointed out a part of the field, ſuperior, if any thing, to the reſt; and ſaid it was an experiment on the cock's-foot graſs; he had found it an excellent plant for ſheep, but having examined the roots, perceived them to be ſo ſtrong, that he had ſome ſuſpicion they might exhauſt the land, and therefore ſowed this piece for a trial: the reſult has ſatisfied him that all apprehenſion of the kind was ill-founded, and he intends ſubſtituting it for ray-graſs." The author has alſo "cultivated this graſs on a large ſcale for many years, and has found it of great uſe. It is a moſt valuable plant when kept cloſe fed." See DACTYLIS *Glomerata*.

"Tall oat-graſs *(avena elatior)*. This is another coarſe graſs, profitable when kept cloſe fed: the ſeed might be had in any quantity from France, or gathered by hand in England. In the Rev. Mr. Swayne's experiment, it yielded a greater weight than any other graſs." See AVENA *Elatior*.

"Timothy graſs *(phleum pratenſe)*. This graſs is repreſented by all travellers in America, he obſerves, as the great ſupport of cattle, &c. wherever meadows are found; and it is aſſerted to have conſiderable merit. He has ſeveral times made the trial of keeping it cloſe fed by ſheep on a moiſt loam, upon a clay marle bottom. The ſucceſs was very encouraging; enough, he thinks, to prove that it is an object, in this line of huſbandry, which merits conſiderable attention; and the more, as the ſeeds are to be had, very clean dreſſed, in any quantity from America, at about a guinea a buſhel; which is ſufficient, with other plants, for four or five acres of land. He believes it is beſt adapted to clay, moiſt loams, and eſpecially peat." See PHLEUM *Pratenſe*.

"Yarrow *(achillæa millefolium)*. This, he aſſerts, is one of the moſt common and moſt valuable plants that is to be met with in England. On his farm the cultivation of it has been carried on with ſucceſs as a ſheep-paſture for ſome years. It is found on moiſt loams almoſt equally with dry burning ſands, gravels, and chalks. It has a ſingular quality of reſiſting drought on the moſt arid ſoils; ſo that, if you ſee at a diſtance a green ſpot on a burnt-up, cloſe-fed paſture, twenty to one but it is clothed with this plant. It is found in the richeſt meadows and bullock-paſtures. Five ſhillings per buſhel are given for gathering the ſeed in October: it is a plant deſerving great attention. Sheep are very fond of it. It is ſaid to form a fourth-part of the herbage of ſome of the fine meadows of Lombardy."

"Burnet *(poterium ſanguiſorba)*. It is remarked that there are large tracts of the fineſt parts of the South Downs upon which this plant forms half the indigenous paſturage. It abounds much alſo on all other chalk downs; but it will flouriſh on any ſoil, on ſand, clay, peat, &c. Some writers ſpeak of it for cows: it has been cultivated on his farm theſe five and twenty years for ſheep, for which animal it is very uſeful. The ſeed is to be bought almoſt every where." See BURNET.

And it is obſerved in the Agricultural Survey of Norfolk, that this plant was "introduced at Stoke 35 years ago, as the writer then regiſtered, with great ſucceſs; but it never made any progreſs, though it yielded luxuriant food for many horſes in February." However, "the reputation of this plant attracted the notice of Mr. Coke, who formed an experiment at Holkham, to examine carefully its merits, and, with the ſpirit that characterizes his huſbandry, ſowed 40 acres, mixing a ſmall quantity of white clover and rib-graſs with it. The reſult was as deciſive as can be imagined; the field has been fully and inceſſantly ſtocked with ſheep, and was conſtantly pared as cloſe to the ground, as a favourite ſpot in a paſture is by horſes." And in other reſpects it is alſo valuable, as "Mr Bevan has found it to be the moſt wholeſome food for ſheep in a wet ſpring, and a certain remedy for the flux." And he "is never without twenty acres of it."

"White clover *(trifolium repens)*. It is aſſerted that this plant has hitherto been the main dependence of thoſe who have laid down land to graſs; and though, for ſheep, it has not the ſweetneſs of ſome other plants, or of red clover, yet upon the whole, it is one of the beſt that can be relied on for all rich or dry loams, ſands, &c. and alſo for rich and drained clays and peats; but on poor wet loams and clays it will not abide, but gives way to the water-graſs *(agroſtis ſtolonifera)* and noxious plants, or other indigenous graſſes. There is no better teſt of good land, than its running ſpontaneouſly to this plant; from the fine loams on rock, upon the Tamar, to the deep friable ones of Leiceſterſhire, red-clover, left unploughed, gives way to a thick covering of this plant. Whatever ſeeds be ſown, this clover ſhould form a part of the dependence for ſucceſs. Mr. Bakewell, Mr. Wright of Norfolk, and ſeveral other practical farmers, made this obſervation, that ſtock has been known to do badly, though there was much food on the ground; perhaps that is preciſely the reaſon; and that this plant, like ſo many others, demands very cloſe feeding to diſcover its merit." See CLOVER.

"Trefoil *(medicago lupulina)*. It is obſerved that, though only a biennial, it is ſure to ſhed ſo much ſeed that it rarely wears out of land. It is a good plant, not at all nice in ſoil, and the ſeed cheap." See TREFOIL.

"Cow-graſs *(trifolium medium)*. An excellent plant for clays and ſtrong loams. It is ſaid, in the Lincoln Report, that Mr. Ancel got good crops on a rabbit ſand; the hint is worth purſuing, but he has not ſeen it cultivated on ſuch ſoils. It is much more abiding than common clover. The ſeed is always to be had: it is known alſo under the name of marle graſs. Mr. Bakewell's method of laying down was, by common red clover and ray graſs, being ſure of plenty of white clover and good graſſes coming: but he prepared by two crops of turnips in ſucceſſion, and ſowed with the barley following. On ſuch land as his, the practice is not to be condemned, but on other ſoils it would fail entirely."

"Rib-graſs *(plantago lanceolata)*. It is aſſerted that upon rich ſands and loams this plant gives a conſiderable herbage, and on poorer and drier ſoils it does well for ſheep; but that it is inferior to ſome others. Mr. Marſhall obſerves, that it has ſtood the teſt of years' eſtabliſhed practice in Yorkſhire, and is in good eſtimation; though not well affected by horſes, and bad for hay, from retaining its ſap. The eminent Haller informs us, that the aſtoniſhing richneſs of the famous dairies of the Alps, deſcribed by Scheuchzer, is attributed entirely to the plenty of this plant, and the *alchemilla vulgaris*. The ſeed is always plentiful." See PLANTAGO.

"Lucern *(medicago ſativa)*. This is more confined than any of the other plants. A landlord ſhould, he thinks, only ſtipulate for it on very rich, deep, friable, dry, ſound, mellow loams, and fertile ſands, worth 30*s*. an acre. Upon ſuch lands, he cannot do better than to encourage it among the tenantry, to be ſown broad-caſt, 20lbs. an acre, and to remain while productive, which will be from twelve to fifteen years. On ſuch ſoils it will, he ſays, ſupport more cattle than any other plant." See LUCERN.

But more full accounts of theſe graſſes will be found under the different heads which are referred to.

With reſpect to *hay-ſeeds*, it is ſtated that the only caſe in which theſe are admiſſible is, when a perſon has a very clean and valuable meadow or paſture which he ſaves with a view for ſeed; drawing out the bad plants whilſt the crop is on the ſwath, and threſhing the produce on a cloth, after ſtanding till the ſeeds be ripe. Thus managed, excellent ſeed may be procured with eaſe, and be beneficially employed in the forming of graſs-lands.

In regard to the arrangement of theſe different graſſes, as they relate to, or are proper for different ſorts of ſoil, it is fully ſhewn in ſpeaking of the methods of bringing land into the ſtate of graſs or ſward. See *Laying* LAND *down to Graſs*.

But beſides the plants that have been noticed above, it "is remarked that there are many others, ſome of which have been tried under his direction, which deſerve much attention; but he has not named them in the above-mentioned liſt, becauſe the ſeed cannot be procured but with difficulty: ſome perennial vetches, clovers, melilots, lotuſes, &c. &c. And ſeveral others are highly ſpoken of by ſome writers; yet as his own trials have not been equally ſucceſsful, he is not authoriſed to recommend them. He never tried the *vicia ſepium* ſufficiently, to give an opinion of it; but, by Mr. Swayne's account, it deſerves much attention."

However, in conſidering the modes of laying lands to the ſtate of ſward, liſts containing the proportions or quantities of different ſorts of graſs-ſeeds ſuitable for different ſorts of land, are offered to the attention of the cultivator. See *Laying* LAND *down to Graſs*.

It is remarked in a general way by the ſame writer "that if the land laid to graſs be intended for ſheep, it is not an object of very great conſequence to ſow only the finer graſſes; as cloſe feeding after the firſt year will make any graſs named in the liſts fine, ſweet, and productive; but this effect depends altogether on its being conſtantly fed cloſe, that is, all ſeed-ſtems being prevented from riſing. Every good farmer is ſenſible of the neceſſity of this with ray-graſs, but moſt unaccountably does not extend a ſimilar concern to other graſſes. Above 200 acres under the author's management have been laid down to graſs, chiefly for ſheep; and he has ſtocked the fields ſo early in ſpring, and ſo thickly, as juſt to keep down the ſeed-ſtems: the cock's-foot, oat graſs, and Yorkſhire white, with this management, have proved ſweet feeding graſſes, not at all rejected, even in fields where the flock had a choice. Several writers ſeem to have been very ſenſible of the conſequence of cloſe feeding. Mr. Davis, in the Wiltſhire Report, ſays, "the ſweetneſs of the ſeeds on the downs of Wilts depends much more on its being kept cloſe, and eaten as faſt as it ſhoots, than on any particular good quality of the graſs itſelf; for there are many downs that, when cloſe fed, appear to be a very ſweet paſture, but which, if ſuffered to run a year or two without a full ſtock on them, will become ſo coarſe, that ſheep will almoſt as ſoon ſtarve as eat the graſs."

And in the Survey of the County of Stirling in Scotland, it is ſtated, that, upon Benlomond, &c. the paſturing of ſheep has evidently, in the courſe of twenty years paſt, improved the quality of the herbage ſo as to raiſe graſs of a good ſpecies, and in very conſiderable abundance, where nothing formerly prevailed but bad kinds of graſs, and theſe in no great plenty: and the practice bids fair to baniſh heath from all the places that are paſtured by ſheep."

Further, Liſle, who was the beſt writer on huſbandry we had for many ages, alſo remarks, "that there are poor ſoils which require a much longer time to grow a ſecond inch than the firſt, and that conſequently on ſuch it is much more profitable to keep ſheep than cattle." The writer, on firſt reading this paſſage, made the experiment on land of 12*s.* and 15*s.* an acre, clipping the plants with ſciſſars, and carefully meaſuring and weighing the produce, and comparing it with neighbouring plants left to perfect the ſeed-ſtem; the ſuperiority was proportioned to the times of cutting. Sheep-feeding not only, he ſays, ameliorates, by enriching the ſoil and fining the herbage, but alſo by deſtroying weeds. Ragwort, with which the bullock-grounds of Limerick, in Ireland, are overrun for want of ſheep is, it is obſerved, much affected by them: and Mr. Marſhall, in his York Economy, gives an inſtance of a meadow, foul in the extreme with knobweed, cured by paſturing it repeatedly in the ſpring with ſheep. But here, a counter remark muſt be made, which is, that after a field has been paſtured long with ſheep, and cloſe fed, it becomes unable to yield a growth of hay: the plants, by being conſtantly cropped down, acquire a dwarfiſh habit, however quick the growth in that early ſtage. There is a ſmall field on the eſtate which he manages, which has been under graſs, time immemorial, and kept fed for the laſt forty years at leaſt, except one year in which it was mown, expecting a vaſt crop: the ſeaſon was very favourable, but he was utterly diſappointed, for the produce was ſmall. He has known the ſame thing happen on incloſing an old common. In Scotland a ſimilar remark has been made by Mr. Wight. "Two incloſures of the ſame ſoil were laid down together with graſs-ſeeds of the ſame kind: after two years' hay, the one was ſurrendered to paſture; from the other a crop of hay was taken every other year. After ſeven years' abſence, the proprietor returned home, and wanting more hay, mowed both, and that which had been paſtured gave the worſt crop." Something like the ſame thing has been obſerved in Switzerland, as ſtated in the Tranſactions of the Berne Society. It has occurred alſo in other inſtances.

With regard to the forming of graſs or ſward, the procuring of good ſeed has been found, from long experience in every part of the kingdom, to be of all other works the worſt executed by tenants: they ſow the cheapeſt ſeeds which can be procured, that is, common clover or ray, or the rubbiſh of their hay-lofts: the clover gives a crop the firſt year; but, as it wears out, all ſorts of trumpery ſucceed, if the ſoil be not good enough to run ſpontaneouſly to white clover. Great care ſhould therefore be taken by the owners of lands, which are to be brought into a ſtate of graſs, to have proper ſorts of graſs-ſeeds provided. About 25*s.* will purchaſe the ſeeds in moſt inſtances: the expence may be reckoned from 20*s.* to 30*s.* per acre; but depending on various circumſtances, as the ſtate of markets, and the price of labour. Of the ſeeds recommended, the following are to be bought in any quantity: cow-graſs, Yorkſhire white, Timothy from America, white clover, trefoil, ray, burnet, rib. And dog's-tail and cock's-foot are eaſily gathered by hand. Moſt of the graſs-ſeeds that have been recommended as uſeful in forming good graſs-lands may indeed, now, we believe, be had of the different ſeedſmen in London, and other places, as already noticed.

And the beſt methods of preparing the land, ſowing the ſeeds, and managing the new graſs-lands, are conſidered in treating of the practice of reſtoring arable lands to graſs. See *Laying* LAND *down to Graſs*.

GRASS, *Artificial*, a term ſignifying that kind of graſs that is produced by the ſowing of the ſeeds of different ſorts of plants that have a quick and luxuriant growth on arable land; as thoſe of the *red* or *broad clover*, *ſaintfoin*, *lucern*, *trefoil*, *tare*, *rye*, *graſs*, and other ſimilar kinds. They are ſhewn at *figs.* 1, 2, 3, in *Plate Graſſes* and at *figs.* 1, 2, 3, in *Plate Graſſes*, in *Agriculture*.

There are likewiſe ſeveral other plants of this nature, that may in all probability be employed with great advantage in the ſame intention. And it has been ſtated by a late practical writer, that "though the chief hinge on which modern huſbandry has been made to turn is that of the introduction of theſe ſorts of graſſes, it is extraordinary that they have yet, in but few diſtricts, been made to conſtitute a part of the courſe of cropping on arable land. In all well cultivated diſtricts, they, however, form a conſiderable proportion of the crops. The firſt of the above is a moſt invaluable plant, whether it be mown and uſed green, paſtured, or made into hay. By its long tap-roots it reſiſts the effect of exceſſive drought on the dryeſt ſoils, and increaſes the quantity of vegetable mould in all. It will grow on moſt ſoils, but is not equally productive; and whether it be mown and uſed in the green ſtate, paſtured, or made into hay, it generally produces four or five times the quantity of fodder that the ſame land would have done with common graſſes. Further, in good rotations, it frequently makes the ſecond crop, in lieu of white corn mown once, and the after-graſs eaten off with horſes, beaſts, or ſheep, and the land ſown with wheat. In that caſe, two pecks of the beſt ray-graſs, mixed with fourteen pounds of the clover-ſeed, ſhould be ſown upon an acre, which not only increaſes the quantity, but alſo greatly improves the quality of the hay. If the clover is for ſtall-feeding, the ray-graſs ſhould be omitted. But in poor light ſoils, the better way is to take two or three crops of corn, and then to lay the land down to reſt, three, four, five, or ſix years. In this caſe, it is adviſed that the farmer ſhould ſow the following ſeeds, in theſe proportions per acre:

Names of Seeds.	Quantities.
Of Burnet - - -	4 pounds
— Cow red-clover -	4 ditto
— White clover - -	8 ditto
— Trefoil - - -	4 ditto
— Ray-graſs - - -	2 pecks
— Vernal graſs - -	¼ ditto
— Sheep's-feſcue graſs -	½ ditto
— Creſted dog's-tail graſs -	¼ ditto.

"It is ſuppoſed, that by this management, the ſoil would acquire a vaſt increaſe of vegetable mould, and, by the paſture maintaining one-fourth more ſtock than it did before, it would be greatly charged with manure; by which means the land would be kept in perpetual good condition: and, when brought under tillage, produce one-fourth more corn than it did under other circumſtances." And it is remarked, in the Norfolk Survey, that "Mr. Purdis, of Eggmore, was recommended by a friend, whoſe management he had ſeen and approved, to ſow his ſeeds at twice: half of each ſort (white and red clover, and ray) at the time of ſowing barley; and the other half before the rollers in going over the young crop: and this practice he intends to purſue in future. He thinks it will give them a better chance of ſucceeding. He has 600 acres of ſeeds: he ſows the great quantity of 14lb. an acre of white clover, 8lb. of red, and one buſhel of ray-graſs. The laſt he eſteems much in ſpring; and, when an obſervation was made againſt it, ſaid, that in April and May he had three thouſand ſheep that found the excellence of it." This ſhould be attended to by the farmer. It is alſo further ſtated, that, "in 1784, in regiſtering the huſbandry of that ſpirited cultivator of Holkham, it was remarked, that 'thoſe who have been converſant in the huſbandry of old improved countries, know that a common complaint is the failure of red-clover. It has been ſown ſo repeatedly, that the land is ſaid to be ſurfeited with it. In the ſame diſtrict it comes to nothing on the old improved lands, yet yields immenſe crops on any accidental ſpot, where never, or rarely, ſown before.' The obſervation is ſo common, that no doubt can remain of the fact; however, it may be attributed to certain methods in management purſued in this county. Peas and tares had been tried as ſubſtitutes, but they are tillage-crops, and what theſe thin ſoils, haraſſed with the plough, want, is reſt. Mr. Coke, it is added, turned his views to a different and better quarter, to other artificial graſſes, which would anſwer the ſame purpoſe as clover and ray-graſs. He had recommended to him, on a former occaſion, trefoil, white clover, cow-graſs, rib-graſs, and burnet. Mr. Coke applied them with no inconſiderable ſagacity to the preſent purpoſe, and, that the experiment might not be deluſive, tried them ſpiritedly upon 30 acres in the middle of a large piece, laid with clover and ray-graſs. The quantities of ſeed he has found will vary according to circumſtances; but, in general,

Names of Seeds.	Quantities.
Of Cow-graſs - -	8 to 10lb.
— White clover - -	5 to 8lb.
— Rib - - -	5 to 8lb.
— Burnet - -	5 to 12lb.
— Trefoil - -	5 to 8lb.

according to the price, and alſo the intended duration of the lay. The ſucceſs of the firſt trial induced him to lay down a yet larger ſpace the ſecond year. And the third (with the barley of the laſt ſpring), no fewer than 221 acres; this is, in truth, ſays the writer, doing juſtice to a new huſbandry. Mr. Coke has found that thoſe ſeeds fill the land completely with plants, which are abiding two and even three years: and how much longer they may laſt, is more than he can pronounce, as their appearance is yet as good as ever. The author rode over all the pieces, and never ſaw a finer or more regular plant than they exhibited. And he has, on ſeveral occaſions, remarked, that ſheep give a preference to theſe graſſes, whenever ſown in the ſame field with clover and ray-graſs." And it is added, that "in regard to the continuance of theſe trials, ſome of the paſtures now remain, and are as fine as the ſoil will yield: thick, clean, and ſweet." And it is here remarked in regard to land being tired of this plant, that the obſervation he made, "during nine years that he was in the conſtant habit of viewing the farm of Mr. Arbuthnot, in Surrey, merits ſome attention. When he began to farm, the land was ſick of clover, inſomuch, that it was almoſt ſure to fail, from having been, perhaps for a century, ſown every four or five years. His friend adopted the courſe of—1. Beans; 2. Wheat; 3. Clover, in which it occurred once in three years, and the farmers predicted an abſolute failure: he viewed three courſes, and better crops, of pure red clover, were never gained. He began with ploughing treble the depth of that to which the land had been uſually ſtirred, and he manured very amply for every crop of beans, partly with night-ſoil, from London. In what degree the ſucceſs aroſe from depth of tillage, and what degree from a variation in manuring, cannot be aſcertained; but the experiment proved that theſe agents were equal to the cure of the malady." It is alſo further noticed, that "ſome farmers in Norfolk have moved out of the common ſphere, and ventured to plough deeper than their predeceſſors; nor have they found any inconvenience in ſo doing. It merits conſideration, whether this practice will not prove in ſome meaſure a remedy to the failure of clover. As to manuring, and eſpecially in great variations, the means are generally limited, and a change in this reſpect, however deſirable, is rarely in their power." But, "the only effective remedy hitherto practiſed, is that of omitting clover altogether, for one or two rounds, which points out the great importance of introducing as many new artificial graſſes as poſſible." See *Red* CLOVER.

The red-cow clover is another plant of the clover kind, which has been found very uſeful as an artificial graſs. According to Mr. Amos it is perennial, and grows naturally in high chalky fields, and in gravelly fields with clay beneath. In the moſt improved part of the country, when the land is to reſt for ſome years, this ſeed is ſown along with the white clover, as it continues in the ground much longer than the meadow-trefoil, and is nearly as productive, eſpecially on chalky and poor ſorts of land. And that where a crop of any of thoſe clovers is taken in lieu of a crop of corn, the grain ſhould be ſown firſt, but leſs in quantity than if no ſeeds were ſown with it; and, after the land has been made fine by harrowing and rolling them, fourteen pounds of clover-ſeed, and two pecks of beſt ray-graſs, ſhould be ſown upon an acre buſh-harrowed the length-way, and rolled the croſs way of the ridges: afterwards the whole muſt be well gripped or drained. Nothing more is neceſſary to be done, on account of the ſeeds, till the next ſpring, when the land ſhould be well dreſſed with the ſward-dreſſer or harrows, drawn with long buſhy thorns, the latter end of March, or the beginning of April; then cleaned and rolled the croſs way again. In all theſe operations, the land ſhould be neither too wet nor too dry, but in a due medium with reſpect to both theſe extremes, as, under other circumſtances, they do not ſucceed ſo well.

The time for cutting thoſe two graſſes is, when they are in full flower, and rather ſhewing evidences of declining or paſſing their maturity. See Clover.

And the white clover is, in Mr. Amos's opinion, the ſweeteſt graſs for all ſorts of ſtock yet known, and makes the cloſeſt ſward, and is very productive of foliage. Hence it is, he conceives it moſt peculiarly adapted to laying down land to paſture. It flouriſhes moſt upon rich, dry, warm ſoils; yet it will accommodate itſelf to moſt kinds. It is ſeldom ſown alone, unleſs it be to raiſe the ſeed; nor ſhould it ever be mown for hay. In laying down rich ſoils, which are intended to remain in paſture for many years, this ſeed ſhould predominate in the compoſition that is made uſe of. But in the Agricultural Report of Norfolk it is ſtated, that "Mr. Wright, of Stanhow, does not like white clover; he thinks it a bitter food, and that ſheep do not eat it kindly; ſo that while much food ſeems to be on the ground, ſtock do badly. This is an uncommon opinion, but the writer remembers Mr. Bakewell ſtarting the ſame idea." See *White* Clover.

The procumbent or hop-trefoil, is another plant of this ſort, which is not very productive, and thrives beſt upon dryiſh gravelly fields, and paſtures which have the ſame nature. They are both perennial. See Trefoil.

Saintfoin is a plant of the artificial graſs kind, which produces, Mr. Amos ſays, the beſt crops upon light rich land; but it will thrive upon the thinneſt lime-ſtone, gravelly, and chalky ſoils, with great luxuriance, even where theſe are ſo poor as to afford a very ſcanty crop of any of the other ſorts of graſſes. It thrives beſt when ſown alone, though it is frequently ſown with barley and oats, by cultivators that have not much experience of it. And it is adviſed, that upon whatever ſoil it is ſown, the land ſhould be brought into a very fine and clean tilth by culture. And, that about the latter end of March, or beginning of April, it ſhould be ploughed, and if it is roughiſh, be harrowed once in a place; then upon every acre, ſixteen pecks of ſaintfoin ſeed ſhould be ſown; then harrowing the land well, and ſowing eight pounds of common red-clover or trefoil, upon every acre afterwards, the land ſhould be buſh-harrowed and rolled. And, where weeds appear, they muſt be deſtroyed as they come up, by hand, or other means. It is recommended, that no ſtock be ſuffered to graze upon the ſeeds the firſt year; and, that if it be top-dreſſed with one quarter of rape or bone-duſt to an acre, about old Michaelmas, the plants are greatly invigorated and benefited by the application.

It is further ſtated, that, upon ſuch lands as the above, it furniſhes a crop of hay in ſummer of greater conſideration than any other of the artificial graſſes. The hay is excellent for all kinds of ſtock, and the after-math very good for cattle in autumn, and for ſheep in winter, till Candlemas. Hence, ſaintfoin is a moſt invaluable graſs on lime-ſtone, gravelly, and chalky ſoils; but it requires three years in coming to perfection; hence the propriety of ſowing common red-clover or trefoil along with it. And it ſhould be mown before it is in full bloſſom, otherwiſe there may be loſs in that way. See Saintfoin.

Lucern is aſſerted, by the above writer, to be the moſt productive, and that which comes into uſe ſooner than any other of the artificial graſſes. Horſes, beaſts, ſheep and pigs, are very fond of it, when it is mown and given them green, which is the moſt uſeful application of it. It is found to thrive beſt on rich, dry, loamy ſoils, which ſhould be made deep, fine, and clean of weeds by culture. And, he adviſes, that about the middle of April, ten pounds of ſeed ſhould be drilled on an acre, in rows of eighteen inches aſunder, and one inch deep, with a row of common red-clover between each; then buſh-harrowed and rolled. Nothing more is neceſſary to be done till weeds appear, when it ſhould be hand-hoed well, and the weeds in the rows pulled out by the hand. As ſoon as more weeds appear, it muſt be hand-hoed and hand-weeded a ſecond time, and even a third time, if neceſſary; when this is done, great care ſhould be taken not to tread upon the young lucern. And as ſoon at it begins to bloſſom it ſhould be mown, carried off, and given to the ſtock green. By this mode of application, it will, he ſays, keep more ſtock than any of the other graſſes.

But this plant alſo requires three years in coming to perfection; hence the propriety of ſowing common red-clover along with it. After that time, it may be mown three, four, or five times in a ſeaſon. But, between every mowing, it ſhould be well hand-weeded, and made quite clean of weeds. And every third year it ſhould have a covering of rotten dung, after the rate of eight or ten tons to the acre, applied over it about Martinmas. See Lucern.

Burnet is a graſs of the artificial kind, of which there are ſeveral varieties; but the only one worth cultivation in this country is the common ſort. This plant, though little cultivated, is highly valuable, either green or in hay for horſes and cattle, and is an excellent winter food for ſheep. It delights moſt in a dry, clean, light and deep ſoil; but it will grow very well on poor, gravelly, and chalky ſoils, which muſt be made clean and fine by culture. And it is adviſed by Mr. Amos, that, "about the middle or latter end of July the land ſhould be ploughed for the laſt time, and harrowed well: after theſe operations, four pecks of ſeed ſhould be ſown broad-caſt upon every acre, and then buſh-harrowed and rolled. And it is ſuggeſted, that as the proper ſeaſon for ſowing it is the latter end of July, it becomes an excellent ſuccedaneum to turnips, when they have been deſtroyed by the fly, which is often the caſe." And it is ſtated, that "the moſt profitable way of cultivating burnet is by ſowing it with other ſeeds, when the land is to be laid down in theſe proportions:

Names of Seeds.	Quantities.
Burnet-ſeed	1 peck
White clover	10 pounds
Trefoil	4 ditto
Vernal-graſs	¼ peck
Ray-graſs	1 ditto
Creſted dog's-tail	¼ ditto
Sheep's-feſcue	¼ ditto

The land ſhould be buſh-harrowed and rolled, and afterwards kept clean of luxuriant weeds. It is, however, remarked, that "much as this has been extolled, yet it is ſeldom ſown either alone, or with other graſs-ſeeds, ſince the introduction of red and white clover; though its greateſt excellence is for winter-paſture in the feeds of ſheep, &c." See Burnet.

Chicory is likewiſe a plant of this deſcription, which may be found highly beneficial on many poor ſandy or gravelly ſoils, where other ſorts of graſſes cannot eſtabliſh themſelves. It is aſſerted, in the Norfolk Report, that "Mr. Bevan ſowed an acre of poor land, worth not more than 2*s.* 6*d.* rent, with chicory in 1793, and that the next year it produced 7*l* 10*s.* in ſeed." And the writer ſays, that he has taken ſeveral opportunities of recommending this graſs in that diſtrict. On large tracts of poor land, he is confident it would increaſe the produce tenfold; and it well merits trial, he thinks, on every ſoil in it. The objection which has been founded on its not being eaſily extirpated, is, he contends, of no importance, for tares ſhould be ſown after it on ſome ſoils, and turnips on others, in which ſyſtem, its diſtinction is unqueſtioned. This hint ſhould not ſlip the notice of cultivators in other diſtricts.

Summer Tare.—This is a plant of the kind, which is much employed as ſummer herbage, either paſtured or mown green, as ſoiling for horſes, &c.; for hay, as a ſubſtitute for red clover (on land that has been tired of growing it); for manure to be buried in by the plough: and for ſeed: hence the ſeaſon for ſowing the ſeed of this tare will depend upon the uſe it is intended for. When for ſummer herbage, &c. it matters not how early the ſeed is ſown, provided no hard froſt enſue. The firſt ſowing may be as early in February as the ſeaſon and condition of the ſoil will allow, and to continue the ſowing at due intervals through the months of March and April, which will give a good opportunity for ſucceſſions of them, to the great convenience of ſummer-feeding, but when for depaſturing, it will be prudent to wait till the tares have gained a ſufficient increaſe of haulm, before the ſtock are turned in upon them. And when for ſoiling horſes, &c. they ſhould be mown before they flower; and in no inſtance ſhould the haulm be ſuffered to become rotten near the ſurface of the ground, which frequently happens on rich ſoils and moiſt ſeaſons. If for hay, as a ſubſtitute for red-clover, the ſeed ſhould be ſown as early in March as circumſtances will allow; but the time of mowing is more optional. Some mow them when the bloſſoms are fuller; others, juſt before they are quite ripe. But, in either caſe, the ſame caution is neceſſary, as in making ſaintfoin and clover into hay; and that is, to avoid breaking off the leaves, in which a great part of their virtue reſides. When they are intended for manure, the ſeed ſhould be ſown as early in February as the ſeaſon and condition of the ſoil will permit, and at the rate of four buſhels to the acre. For this uſe they ſhould be ploughed in before they get too long in their growth. But whatever is the intended uſe in cultivating this tare, the preparation of the land is the ſame; and this plant delights moſt in light ſandy ſoils: and, in every caſe the land ſhould be ploughed and harrowed once in a place, before the ſeed is ſown; then ſow the ſeed broadcaſt at the rate of three buſhels an acre for the firſt and ſecond uſes, harrow the land well afterwards, and then lay it dry.

"The great objects in cultivating this tare are, 1ſt, ſpring-food and ſummer-herbage for cattle and ſheep, eſpecially ewes and lambs. 2d. Hay, as a ſubſtitute for red-clover. 3d. Manure, to be buried in by the plough. And 4th. Seed. But whatever is the intended uſe of this tare, Auguſt and September is the prime ſeaſon for ſowing the ſeed of it. As ſoon, therefore, as the ground can be cleared of its crop, the land ſhould be ploughed and harrowed once in a place before the ſeed is ſown upon it." And it anſwers extremely well ſimply as a ſpring-food, when ſown with rye, in the proportion of ſix pecks of each to the acre. See Tare.

Where they can be cultivated, crops of this ſort ſhould never be neglected. See Artificial *Graſſes.*

Grass-*Ground*, in *Gardening*, the parts of ornamented grounds which are kept in the ſtate of lawn ſhort graſs or ſward. Thoſe ſpaces which are extended in the fronts of the houſes or habitations, and are termed lawns, are moſtly kept in ſhort graſs, which, by their conſtant verdure, ſummer and winter, and open rural appearance, exhibit a fine imitation of nature at all ſeaſons, eſpecially when the ſide boundaries terminate in rural plantations in various natural curves and bendings. This mode of laying out pleaſure grounds prevails much at preſent. But beſides theſe it is the practice to have rural ſhort graſs openings continued between the plantations throughout the different diſtricts of ground of this ſort, ſeparating and bounding the ſhrubbery clumps, borders, and other parts, in ſome places widely ſpreading, in others more contracted; but, in either caſe, extending to the boundaries of the ſeveral plantation compartments, in various bendings, ſweeps, and curves; by which the whole is rendered rurally ornamental, and at the ſame time more agreeable and eaſy to walk on than gravel between the plantations, when the weather is dry and hot during the ſummer ſeaſon. In the ancient ſtyle of gardening, it was much the cuſtom to have ſtraight ſhort graſs-walks, both for ornament and common walking upon: but for ornament, unleſs elegantly wide and ſpacious, they have a littleneſs in their general appearance, as may be ſeen where long narrow ſlips of ſhort graſs-ground are extended to ſome diſtance, in the way of walks; and for the latter purpoſe they are very improper in winter and all moiſt weather; and even in ſummer in the mornings and evenings, as being always damp and dewy. Walks of this kind ſhould therefore be but ſparingly introduced; and where any are made for variety, ornament, or ſummer's walking, they ſhould be as ſpacious as the ſituation admits, not leſs than from ten to fifteen feet wide, and even twenty feet wide or more, when the walk is conſiderably extended in length.

The method of forming ſhort graſs-ground work is either by ſowing the parts with graſs ſeeds, or by laying them with turf cut from a fine field, common, or down; the latter of which, where it can be obtained at a moderate expence, is greatly preferable, as it not only at once forms a complete ſward, but is generally more cloſe, even, and ſmooth, as well as leſs apt to run up to benty graſs, grow rank, or riſe in tufts, than by the ſowing method. The ſowing method is, however, much leſs expenſive.

Preparations.—In preparing the ground either for ſowing graſs ſeeds upon or laying with turf, the whole muſt be broken up equally to a moderate ſpade's depth, clearing out all the roots of perennial weeds and other coarſe materials. When this has been done, ſtakes or wooden pegs with notches, for making the level, according to the poſition of the ground, muſt be driven in; then proceed with line and ſpade to rough-level the ground according to the marks or levels on the pegs, afterwards treading, rolling, or ramming the whole down equally, that it may nowhere ſink in hollows afterwards. When this has been finiſhed, the levels ſhould be wrought up more accurately, and the whole finiſhed with a neat raking, clearing off all large ſtones, and making an even and ſmooth ſurface; in this ſtate it may either be ſown with graſs ſeed, or laid down with turf.

For the firſt method the proper ſeaſons for ſowing are either February, March, and April, or in Auguſt or September in moiſt weather. In moiſt wet ſoils the former is probably the beſt, but in thoſe of a dry gravelly nature, the latter. In this buſineſs it is of the utmoſt conſequence to procure good ſeeds; thoſe from hay-ſtacks or out of haylofts are often uſed, which may anſwer well, where the hay was the growth of ſome fine paſture free from weeds, and naturally afforded fine turf when grazed and mowed; but in other caſes there is often a mixture of various ſorts with weeds, by which the ſward is rendered irregular and foul, and never makes handſome ſhort graſs-grounds. If you are not furniſhed with ſeeds of your own, they muſt be obtained from the ſeedſman, and ſhould be of thoſe kinds which ſtrike deep root, ſpread out laterally in their tops, are permanent, and capable of reſiſting the effects of heat; there are many of this kind. (See *Laying* LAND *down to Graſs*.) The ſeed muſt be ſown broad-caſt, very thick and regular over the ſurface, and directly raked or harrowed in; and when the ſurface is dry it ſhould be rolled with a wooden roller, to bury the ſeeds more effectually, and make a ſmooth ſurface: when the graſs comes up, all weeds ſhould be removed; and the ſame ſeaſon, when the ſward is become thick and green, and advanced ſome inches in growth, it ſhould be mowed, rolling it well afterwards, and continue mowing it and rolling two or three times the firſt ſummer, eſpecially if it were ſown in ſpring, as, the oftener it is mowed and felled, the thicker and finer it will grow; and if it be intended to keep the graſs tolerably fine, mowing will be requiſite once a week or fortnight, according to the growth from April to October, and rolling once a week or fortnight in moderately dry weather, and occaſionally in the winter ſeaſon. In this way a good turf may be formed in a few years.

In the ſecond method, which ſhould always be employed where it can with convenience, the beſt turf is that of a fine paſtured common or down, where the ſward is fine and ſhort, with conſiderable cloſeneſs.

The beſt ſeaſon for laying the turf is from September till March or April, though it will grow at almoſt any time of the year, even, if there be occaſion, in the ſummer months.

The turf for this uſe is moſtly cut or flayed with an iron inſtrument called a turfing iron; all the turfs being cut of an equal width, length, and thickneſs; the proper ſize is a foot wide, a yard long, and about an inch in thickneſs. They ſhould be firſt marked by a line the proper width, length, and depth, and then cut with a racer or cutter, firſt longways a foot wide, then acroſs in yard lengths, proceeding afterwards to cut them up; having particular regard to cut them level, and all of an equal thickneſs, otherwiſe it will be impoſſible to lay them level. As they are cut they ſhould be rolled each up cloſe and tight, the graſs ſide inwards, and piled up by tens, eſpecially if they are cut by the hundred, which is moſtly the caſe. This is uſually done at from about a ſhilling to fifteen pence the hundred, according to the nature of the ſoil, as, whether ſoft and eaſy to cut, or hard and ſtony. A man will cut from three to five, ſix, or ſeven hundred a day, with a perſon to trace them out and roll them up as they are cut from the ſurface.

The method of laying them is very eaſy: they are placed regularly turf and turf, unrolling them as they are laid, joining them up quite cloſe edge to edge, and making good all deficiencies of broken parts as the work proceeds; and as ſoon as laid, they ſhould be well beaten with broad heavy wooden beaters, as flat pieces of elm or oak plank two inches thick, fifteen or eighteen inches long, and a foot broad, having long handles fixed ſlanting in the middles of the upper ſides. With theſe beat the graſs regularly all over, and then roll it well with a heavy iron or ſtone roller, repeating theſe operations in moiſt weather as there may be occaſion.

When very dry hot weather ſucceeds, ſo as to occaſion the turf to ſhrink and open at the joints, a good watering is of much advantage to it.

The management of ſhort graſs-ground, after it has been thus laid down, is that of mowing it in ſummer frequently, to keep it ſhort and fine, like a paſtured down; poling occaſionally with a long pole, to ſcatter the worm-caſts, which greatly deface all ſhort graſs, and rolling it frequently both to take up the ſcattered worm-caſts to make the ſurface clean, and to render it ſmooth, firm, and even in its appearance.

Mowing once a week, ten days, or a fortnight, or, according to its general growth, during the ſummer, is neceſſary, eſpecially for the principal home lawns, and other ſhort graſs-grounds, in the moſt conſpicuous parts; which parts ſhould always be kept very cloſe and fine, like the ſward of a fine paſtured down or common: it is performed with a ſhort graſs-ſcythe; and dewy mornings, or moiſt weather, muſt always be choſen for the work, as it will be impoſſible to mow ſhort graſs properly in dry weather. Previous to mowing, it is of advantage ſometimes to pole and roll the graſs the day before it is intended to mow. In performing the work of mowing, proper attention is neceſſary not to ſcore or leave the marks of the ſtrokes of the ſcythe, which has a very unſightly appearance; to prevent which, as much as poſſible, the point of the ſcythe ſhould be laid out rather wide, an inch or two beyond the meaſure of heel and point, eſpecially for very ſhort graſs, keeping the point rather out, and not drawing that part too faſt inwards, gathering the graſs neatly to the left in a range; and after having mowed thus to the end of the ſwarth, to mow it lightly back again, in order to trim off all ſcores, and other irregularities, unavoidably left the firſt time in executing the work.

After it has been all thus mown over, proceed to ſweep up the mowings of each ſwarth regularly, by ſtanding in the middle, ſweeping it along alternately to the right and left, to the end of the ſwarth, forming all the graſs in a range on each ſide; then ſweep up the ranges in large heaps, and carry the whole off directly in a wheel-barrow, large baſket, or other contrivance for the purpoſe.

The buſineſs of poling is performed by a long, taper, pliable, aſhen pole, fifteen or eighteen feet long, by paſſing it backwards and forwards, in rather dry weather, ſo as to break and ſcatter the worm-caſts about. The graſs ſhould be afterwards rolled with a wooden roller, when the ſurface is a little moiſt, but not too wet, by which the earth will all adhere to the roller, and render the ſurface perfectly clean, the work being repeated, as there may be occaſion, the year round; and in mowing-time, if the ſurface is foul, it is particularly neceſſary to pole and roll on the day previous to mowing, by which a clean ſmooth ſurface will be provided, ſo as to be able to mow cloſe, even, and more expeditiouſly. See POLING.

In the rolling of ſhort graſs-ground, it ſhould be performed occaſionally with a wooden roller, and a heavy iron or ſtone roller: the wooden roller is proper after poling, to clean up the worm-caſts and ſmooth the ſurface, being performed when the ſurface is not very wet, eſpecially if full of worm-caſts, as it would otherwiſe plaſter and daub the graſs, and render it unſightly; the heavy iron, or ſtone roller, ſhould be uſed occaſionally, when the ſurface is dry, to preſs down all inequalities, ſo cloſe as to preſerve a firm, even, ſmooth ſurface. And in fine-kept ſhort graſs-grounds, the rolling ſhould be performed occaſionally a day or two before mowing, to ſettle the ſurface firm and ſmooth, which greatly contributes to the eaſy and exact performance of the work: the buſineſs of rolling in ſmall, or but moderately large ſhort graſs-grounds, is moſtly performed by men; but in very extenſive grounds, it is ſometimes done by a horſe; having a large roller for the purpoſe, with ſhafts like a cart, and the horſe at the time wearing a ſort of leathern ſhoes, very broad at bottom, made ſo as to lace on occaſionally, like mens' half-boots, to prevent his feet cutting the ſurface in holes, and rendering it uneven, and of a bad appearance.

Where ſhort graſs-grounds are defaced by wild daiſies, dandelion, or other weeds, the firſt may be removed by having the blade of an old broad-ſword fixed in the end of a long pliable pole, which, as it cuts both ways, by ſweeping it backwards and forwards, it will head down the daiſies at a great pace; which may be repeated two or three times a-week, or as often as there may be occaſion for it.

The others ſhould be extirpated by means of an iron for the purpoſe, made in the form of a ſmall docking-iron.

In the autumnal finiſhing mowings, the graſs ſhould be generally cut down as cloſe and even as poſſible, that the ſward may remain in a neat even ſurface over the winter ſeaſon, and appear well in the early ſpring.

Theſe directions for the management of ſhort ornamental graſs-grounds, regard only ſuch as are required to be kept conſtantly ſhort, cloſe, and even in the ſurface, as is neceſſary in the principal lawns, plats, walks, and other diviſions, ſituated within the limits of the main pleaſure-ground. In the outward conſiderably extended diſtricts, continued into fields, parks, &c. it is not neceſſary to have them cut ſo frequently; two or three common mowings in a ſummer, with occaſional rollings afterwards, may be ſufficient.

Grass-*hearth*, in our *Cuſtoms, grazing*, or turning up the earth with a plough. Hence the cuſtomary ſervice for the inferior tenants of the manor of Amerſden in Oxfordſhire, to bring their ploughs to do one day's work for their lord, was called *graſs-hearth*, or *graſs-hurt*.

Grass *Huſbandry*, that ſort of huſbandry which has a relation to the management of graſs-land, or ſuch as are under the condition of ſward. This, in a great meaſure, conſiſts in the proper clearing, manuring, paſturing, or feeding down, ſhutting up, cutting or mowing, and the preſervation of the crops. This ſort of management is far from being perfectly underſtood in many parts of the kingdom, and conſequently the graſs-land is frequently in the moſt coarſe and wretched ſtate, being over-run with various kinds of coarſe and aquatic plants, as well as thoſe of the moſs, and other deſcriptions. See Husbandry, Grass, Meadow, and Pasture.

Grass-*land*, that ſort, or deſcription of land, which is moſtly preſerved in a ſtate of herbage or ſward. The ſorts of land that are the moſt adapted for this purpoſe are, according to ſome late writers,

1ſt. Such as are ſituated near large populous towns, where manure is cheap and plentiful, and where the produce of graſs-land is conſtantly on demand, and, of courſe, dear,

2dly. Such lands as are placed on the banks of rivers and brooks, that may be improved by irrigation to a much higher value than can poſſibly be done under any other method of cultivation.

3dly. Such lands as lie in vallies of mountainous countries, eſpecially chalky ſoils, where old meadow-land is ſcarce and valuable, and the greater part of the arable land is of that nature and quality, that it is impoſſible to convert it to good ſward-land. And

4thly. All ſuch cold ſtrong ground of the graſs kind, which, if ploughed up, would not be applicable to the purpoſes of the turnip-huſbandry, or thoſe of modern farming, and which, under the beſt practice of wheat-huſbandry, would not be ſo valuable as they are at preſent in the condition of ſward.

The forming of graſs-ground is effected with different degrees of difficulty in different inſtances; in ſome parts of the iſland it is accompliſhed, in general, with great care and facility, the ſoil having a natural tendency to the production of graſs herbage, when left in an unploughed ſtate, reverting to paſture without labour, expence, or even the ſowing of ſeed; while, in other caſes, all the art of man has been found ineffectual, to make good graſs-land. Even after 20 years fruitleſs expectation and expence, the land-holders have often been obliged to reſtore the ground again to a ſtate of tillage-huſbandry.

It is remarked, that conſequently the great difficulty in this buſineſs is to diſcriminate what ſort of land is ſuitable and proper for graſs, and that which is improper for the purpoſe. The beſt meadow-land does not always make the beſt tillage-land, nor does the beſt arable-land always make the beſt paſture, but frequently the reverſe. To make this diſcrimination, it is neceſſary to conſider well the proceſs of nature in propagating and perpetuating graſſes. The great object of nature is to perpetuate all her ſpecies; but upon the plants created for the ſupport of animals intended for the food and uſe of man, ſhe ſeems to have beſtowed more than ordinary care. Different kinds of animals propagate in different modes, ſome oviparouſly and ſome viviparouſly. Plants having no locomotive motion are endowed with a power of propagating in both modes. In trees and ſhrubs, and many kinds of plants, the aſſiſtance of man is required to obtain viviparous production, by grafting, budding, &c. But, in graſſes, nature does her own work, and that in both modes. We have only to attend to her examples, and we ſhall ſeldom err. In trees and ſhrubs, the bud is the viviparous production; in graſſes, the root performs the ſame office. Graſſes are as much the offspring of roots as of ſeeds. Every new root contains the germ of a future plant; and, as the ſeed-ſtalks of graſſes muſt neceſſarily be frequently cropped by animals, nature makes up the deficiency by an increaſe from the roots. Moſt of the beſt graſſes are, in their nature, biennial; but nature, by giving them the power of propagating by the root, has in effect made them perennial: a much more certain mode of propagation than by ſeed, as being increaſed inſtead of being injured by the biting and treading of animals, and by the produce being perfect in one year inſtead of waiting two, as in the production by ſeed. But this proceſs does not go on ſucceſsfully, unleſs the land is peculiarly apt for the production of graſſes. If it is too wet, the graſſes will be injured in the winter by rain and froſt, and will ſoon be ſuperſeded by ruſhes and other aquatic plants: if too dry, they will be killed by the ſummer's heat, and give place to moſſes, fern, heath, &c. No land will, it is conceived, make a good meadow, unleſs it is deep enough to admit the roots of graſſes to run down out of the reach of the ſummer's heat, and that it be retentive enough to hold water juſt ſo long as to produce fermentation, with ſuch an abſorbent under-ſtratum as will drain it before putrefaction takes place.

Some proportion of graſs-land ſhould always be attached to every farm, in order that a proper and ſuitable ſupply of winter and ſummer food may be provided for ſuch animals as may be requiſite in managing them, and alſo that adequate proportions of good manures may be raiſed; as, where this is not the caſe, it is impoſſible that farms can be well managed. And on all ſorts of graſs-lands, it is of much conſequence to keep them as clear and free as poſſible from the growth of all ſorts of coarſe plants, thoſe of the aquatic kind being removed by ſuitable drainage, and the application of different ſubſtances of the abſorbent deſcription to the ſurface of the land. They ſhould likewiſe be carefully eradicated from the hedge-rows of graſs-fields annually, and by that means be prevented from ſpreading themſelves over the ground by their ſeeds. By this practice, the hedge-plants would alſo be greatly benefited. Theſe ſorts of lands ſhould alſo be kept as clear as the nature of their application will admit, of all kinds of obſtacles that impede the production of perfect ſward, ſuch as the growth of moſs on their ſurfaces, and the continuance of cattle dung-hills, ant and mole hills, as well as thoſe of ſticks, ſtones, and other ſimilar ſubſtances. The proper methods of removing theſe are noticed under their particular heads, and in ſpeaking of meadow-lands, and paſtures.

According to the Agricultural Survey of the County of Hertford, in harrowing, with a view to deſtroy moſs, no benefit has been found to be produced, though the moſſy material has been well torn up. It is adviſed that manure ſhould be laid on at the ſame time: but that where aſhes are ſpread out over the ſurface without harrowing, the moſs plant is deſtroyed, and the graſs greatly improved. And in other caſes, much advantage has likewiſe been experienced from the application of fine ſand over the ſward, in an even but not too thick a manner. But the dung of animals ſhould never be ſuffered to remain any length of time in heaps upon the ſurface of graſs-lands, without being beat out ſmall, and diſperſed over the ſurface; as, wherever that is the caſe, the ſward in the places becomes tender, and the graſs comes up coarſe and in tufts, which are not eaten by cattle ſtock, and of courſe much injury ſuſtained.

In reſpect to the prevention of the riſing of ant-hills on graſs-lands, they may be in a great meaſure, if not wholly, guarded againſt, by having recourſe to frequent heavy rolling; as in the rolling down of ant-hills, inſtead of cutting them up, in an experiment made by the duke of Grafton, it was found to be attended with complete ſucceſs, on a large paſture which had been very much infeſted with ants, and which they had almoſt covered with hills. But in ſuch caſes the rollings ſhould be performed both in the autumn and ſpring ſeaſons, when the lands are in ſuch ſtates of moiſture as juſt to admit the impreſſion of the roller without receiving injury from the feet of the horſes; as, where ſuch operations are executed when the grounds are in a ſtate of conſiderable dryneſs, the benefits are comparatively ſmall. The beneficial effects that are produced in this way depend much upon the degree of conſolidation that is effected; as it is only by this means that the inſects can be prevented from carrying on their operations; a certain ſtate of lightneſs as well as fineneſs in the mould being eſſential to the execution of their labours in a perfect manner. But beſides theſe, attempts have been made in other ways to prevent the formation of theſe hills. For as it has been ſeen that "the economy of the ant requires the ſituation and ſoil to be dry, light, and friable, in order to carry on their works, it is probable that, in lands that will admit of the practice, it may be an eaſy and convenient method of deſtroying them, and preventing the bad conſequences which their labours produce on the ſurface ſward, to conduct water over them; and thus, at the ſame time, exterminate the colonies of ants, and irrigate the ground; by which two improvements may be effected at once,—the land being cleared from ant-hills, while its fertility is conſiderably increaſed." And the uſe of night-ſoil, in combination with various ſorts of earthy matters, has been adviſed with the intention of deſtroying ſuch inſects; but this is probably a practice that can only be depended upon in ſlight caſes. See ANT-*hill*.

Upon ſtiff yellow clays, a Hertfordſhire farmer has found the practice of draining, according to the Eſſex mode of carrying off the ſurface-water, uſeful, though this practice is totally unuſed by his neighbours in the ſame pariſh. Experience has convinced him, that dreſſing a cold tenacious clay not previouſly drained is an abſurd waſte of time, money, labour, and every thing moſt valuable. Having obtained a tolerably dry ſurface, his next object (with meadow-land) is to deepen the ſtaple of the ſoil, and this he does by every kind of compoſt carried on it for two or three years together, which he finds eſtabliſhes a better ſort of graſs than dreſſing once in three years on the ſurface.

It is ſuggeſted that the cuſtom of feeding the firſt year, inſtead of mowing, is a practice that muſt be preferable or not according to the nature of the ſoil, and the object of converting it into graſs-land. With reſpect to the former, he has found, that if he was to allow even the treading of ſheep the firſt year after the graſs-ſeed is ſown, he ſhould fill the ſurface with receptacles for water, and ſhould have very little, if any, graſs of a coarſe quality, notwithſtanding his drains; becauſe the ſheep or cattle would preſs the clay ſoil ſo cloſe, that the water could not penetrate into them; whereas, if he ſhuts up his field, ſuffering the graſs to ſtand till it ſheds the ſeeds, he finds the following ſeaſon that he is enabled, by giving only a ſlight dreſſing, to cut a good crop of hay from it. And in caſes of old worn out thin patches or moſſy graſs-lands, the practice of ſcarifying or cutting the ſurface ſward, in different directions, by implements for the purpoſe, has been lately adviſed as very beneficial in promoting their improvement, eſpecially where they are afterwards manured, and have ſuitable graſs-ſeeds ſown over the thin or patchy parts, as in this way the graſs-plants become more ſtrong and vigorous. In performing this buſineſs, Mr. Amos has adviſed the uſe of a machine for ſcarifying and dreſſing graſs-land, whether it is to be mown or depaſtured with animals. And he conceives that the beſt time of performing this operation, is from the middle of February to the middle of April. And that, in general, dreſſing the land one way is ſufficient; but, if the ſward be very moſſy or adheſive, it ſhould, he thinks, be dreſſed length and croſs ways, cleaned, and then rolled, the coulters of the implement being occaſionally cleaned from the rubbiſh. It is alſo ſuggeſted, that if the ſward be thin, it may be thickened very much by laying eight or ten tons of rotten dung upon it, and ſowing ſeven pounds of white clover, four pounds of wild or cow-clover, four pounds of trefoil, four pounds of rib-graſs, and one peck of beſt rye-graſs ſeeds, per acre, previous to its being dreſſed or buſh-harrowed, and then cleaned and rolled. It is ſuppoſed that by dreſſing land in this way, moſs is torn up, ant and mole-hills levelled and deſtroyed, the roots of the graſs cut and horſe-hoed, which cauſes them to throw out freſh lateral ſhoots or ſtems, the ſward thickened, and the ſurface made ſo clean as to put on the appearance of a perpetual ſpring when cloſe fed down. And that, by ſuch management, and grazing as much ſtock as will keep the graſs in a young ſucculent ſtate, and hobbing or mowing all the tufts and weeds three times in the courſe of the ſummer, the grazier will be enabled to receive every benefit from his land, and likewiſe prevent the ſtems of ſeveral graſſes from running into ſeed, and being injured in conſequence of it.

But another method of improving graſs-lands, practiſed by Mr. Salter of Norfolk, is ſaid to be original, and of great importance. It is ſtated in the Norfolk Survey lately publiſhed, that "upon his large farm of above 800 acres, he found 3 or 400 acres of old meadows entirely poiſoned by ſprings, which, from every ſort of impediment that neglect could cauſe, had formed bogs and moory bottoms, famous for rotting ſheep and miring cows; with blackthorns and other rubbiſh ſpread over large tracts. His firſt operations were, to grub and clear the land, and open all ditches to the depth of four or five feet, and to cut open drains in almoſt every direction for laying them dry; burning the earth, and ſpreading the aſhes on the ground: ſo far, the reporter ſays, all was no more than common good huſbandry; but he applied a thought entirely his own: as he found that the flinty gravel, marle, and other earths, but eſpecially the gravel, was very beneficial to the herbage, he thought of ſowing winter tares and white clover upon the places wherever any earth was ſpread, or any other operation had laid bare the ſurface, harrowing in thoſe ſeeds. The writer had the pleaſure of ſeeing ſeveral of theſe crops growing: the ſucceſs has been uncommonly great; for the land thus ſown not only has given large and very profitable crops of hay, but has alſo received a rapid improvement in the herbage; the cover and ſhade of the tares, ſo beneficial to all land, mellowed the ſurface, and ſeemed to draw up as well as protect ſuch of the old plants as received improvement from the manure, and exhibited a much ſuperior fleece of graſs to any ſpots where this ſingular management had not taken place. So that nothing can be clearer, on viewing this large tract of meadow, than the ſuperiority of the improvement reſulting from the growth of the tares: the effect of the manure is much accelerated and rendered greater."

The reporter further hints, that "the idea is certainly applicable to many of the graſs-lands of the kingdom, eſpecially ſuch as are improving by the addition of chalk, marle, clay, loam, ſand or gravel: 40 loads an acre of any of theſe bodies will much improve coarſe or wet, or moory graſs-lands; and then to add tares ſecures an immediate profit, and makes the manure work much ſooner and more powerfully. He ſows ſome ſo late as the middle of May." An idea here ſtrikes the writer, which he ſhall venture to add; that "if he was to ſcarify any moſſy, hide-bound, or poor paſtures, &c. it ſhould be with a drill-ſcarifier, drilling in winter tares by every tooth of the ſcarifier; and he has no doubt but the tares would take well, and effect a conſiderable improvement, even without manuring." It is ſtated in addition, that "Mr. Salter has practiſed the tare huſbandry on meadows for ten years, but his firſt beginning was ſeventeen years ago, at Ellingham: the cockchafer-grubs had deſtroyed a part of a meadow; he harrowed in tares and ſeeds, and the ſucceſs was great." It is alſo ſtated, that "tare-ſeed running ſhort, he this year ſowed peas and oats mixed on ſome ſpots, and they are found to do well; and this huſbandry he purſues, whether he intends mowing or paſturing. The writer conſiders this a diſcovery of vaſt advantage to graſs huſbandry in general.

And it is likewiſe obſerved, that "Mr. Bevan's arable ſand, at Riddleſworth, joining to his low boggy meadows, gave him the power of carting ſand down hill at an eaſy expence; and thus he improved ſome parts of thoſe meadows to great effect: from 100 to 150 loads an acre were ſpread at the expence of *4l.* or *5l.*

Statement of Expence.	*£.*	*s.*	*d.*
A team of five horſes, 30 loads a day, and wear and tear	0	12	6
Driver	0	1	6
Filling, at *2d.*	0	5	0
	0	19	0

In 1802 this method anſwered very greatly: theſe meads were then not capable of irrigation, but one meadow has ſince been watered, and the water has taken much greater effect on account of the ſanding, than if that operation had not been performed. The ſand has all been laid on the moſt boggy meadows." This hint ſhould not eſcape the notice of the practical farmer in other diſtricts, as there are many where it may be had recourſe to, with the greateſt advantage and ſucceſs. There is likewiſe a ſimilar method of improving old rough and boggy meadow-land deſcribed, with a plate, by a writer, under the title of Agricola Norfolcienſis, in the firſt volume of the ſecond ſeries of the Agricultural Magazine, as practiſed by Mr. Rix, of the ſame county. "This meadow was ſituated at Clipſtone, near Fakenham, in the occupation of the above, and the property of T. W. Coke, eſq." of Holkham. It is noticed that "this meadow, from the neglect of former tenants, and want of judgment in cutting what few open drains or ditches were attempted, had become very rotten in many places, and at leaſt three parts of the four ſo over-run with ſedge and ruſhes, that its utmoſt annual value could ſcarcely be eſtimated at more than eight ſhillings per acre. The lands contiguous to it are of a light friable nature, inclining to ſand, by ſpots, and fall with a gentle declivity towards it from each ſide, the meadow being the baſon and receiver of the numerous ſprings which riſe in the upper fields, and which, in courſe of time, had rendered ſome parts of it utterly impaſſable for an horſe, and ſcarcely ſafe for a man at certain ſeaſons. It is obſerved that the firſt ſtep the preſent occupier took was, as ſoon after Michaelmas as he could, to cut the drains, as he has ſhewn in the plan; all of which are covered, except the main drain, and the two ditches. Theſe latter are cut both wide and deep, and are the chief operating checks to the ſprings above. And as ſoon as the weather permitted, he next ſet the teams to work (which were enabled to enter, even upon the moſt unſound parts, very ſhortly after the firſt proceſs was concluded), to level the hills, fill up the hollows, and to cart all the ſuperfluous mould he could collect within the boundary of the meadow, (ſuch as came out of the new-cut ditches and main drain principally), to the amount of 1000 loads, over the ſurface of the whole. About the laſt week of March he drill-rolled; and where the roller could not work, from little inequalities of ground, he dibbled the ſeeds mentioned in the annexed ſtatement, harrowing the ſmall ſeeds in afterwards; and, in July laſt, he cut and ſtacked the produce, which the writer has ſeen, and can witneſs to be excellent hay.

It is added that the preſent appearance of the meadow, after being fed down very cloſe by more than fifteen ſcore of ſheep, exhibits, notwithſtanding the very wet ſeaſon we experienced, one uniformly dry, firm, and ſmooth ſurface, completely covered with a ſhort turf, conſiſting of ray-graſs, Dutch-clover, and good natural graſſes. There are certainly ſome ruſhes yet, but far leſs numerous and ſtrong than heretofore, and which it may juſtly be expected a few ſweepings with the ſcythe, and hard ſtocking with ſheep, will in time wholly deſtroy. But though there may not be much

much novelty in the ſcheme of draining, the writer is of opinion, that very great merit is due to Mr. Salter, for the introduction of vetches, which he apprehends was never before tried on paſture-grounds, or indeed on any ground whatever unbroken by the plough. It certainly anſwers ſeveral admirable purpoſes, one is, that it gives a proſpect every year of a bulky crop of hay, which otherwiſe muſt have been very ſcanty. And being ſown with oats, the vetches afford that hovering kind of ſhade and protection to the young graſſes in which they moſt delight. The eddiſh is of courſe alſo worth more.

But he is not quite ſure, whether Mr. Salter's experiment gave riſe to the following practice, which he is informed daily gains ground. Where the clover plants fall partially, or by ſpots, on a new layer, ſpring vetches are often drill-rolled upon the ſurface, not ploughed. The few clover-plants are thus left to grow with the vetches, and both together, in due ſeaſon, form nearly as good a ſwath, as if the clover had not died away. Mr. Rix is ſo thoroughly convinced of the utility and advantage of the method he has purſued, that he is now preparing a ſecond meadow, lying at the foot of the one juſt improved, for a ſimilar proceſs of improvement.

In caſes where paſture-land can be ſpared for mowing, Mr. Salter ſeems to be of opinion, that vetches may be profitably employed, even a ſecond year, upon new improved meadows. He has had ſome experience of ſuch a repeated trial, and the writer believes he thinks favourable of it. He dibbles the ſeed upon the unbroken ſurface, after feeding it down as cloſe as he can with ſheep or other ſtock.

It is ſtated that the above meadow of Mr. Rix's cannot be over-rated, if it be ſaid that it is, at this moment, more worth thirty ſhillings per acre to a tenant, than, in its former ſtate, it was eight ſhillings the acre.

"*Debtor and Creditor Accounts of Mr. Rix's Meadow, ending at Michaelmas.*

1806.

	£.	s.	d
363 of open drains, at 9½*d*. - -	14	6	3
173 under grains, at 6*d*. - -	9	6	6
700 alder faggots, laid in drains -	5	12	0
Filling and ſpreading 1000 loads of mould, at 25*s*. per hundred - - -	10	0	0
Seed.			
6 co. ſp. tares - - -	6	6	0
6 buſhels of grey peas - -	1	2	6
6 do. of oats - - -	0	16	9
2 do. of ray-graſs - - -	1	10	0
100 pounds of Dutch clover - -	3	15	0
Dibbling - - - -	1	8	0
Horſes's Time.			
5 horſes 14 days, ſetting about mould -	7	0	0
4 do. drill-rolling, 3 days - -	1	4	0
2 do. buſhing and rolling in ſeeds, 3 days	0	12	0
Men's Time.			
1 man driving team, 14 days -	1	8	0
2 men drill-rolling, 3 days - -	0	12	0
1 man buſhing, 2 days - -	0	4	0
do. gathering ſtones, 2 days -	0	4	0
Total expence	65	7	0

Produce.

18 loads of hay, at 4*l*. - -	72	0	0
Feed - - - - -	13	0	0
	£85	0	0

It is alſo neceſſary that care be taken to keep graſs-lands in a proper ſtate of production, by the judicious uſe of top-dreſſing, and by obſerving ſuitable methods of mowing and feeding them down by ſtock, and it becomes of courſe requiſite in the view of keeping ſuch lands in the moſt proper condition for the production of plentiful crops, as well as that of altering and improving the nature of the herbage, to have recourſe to the occaſional application of manure; as by this means the ſtaple and depth of the vegetable mould are not only much increaſed, but the land brought into ſuch a ſtate of fertility, as that it may afterwards be kept up with much leſs expence and trouble than before.

A late writer has ſtated, that "it is a circumſtance well known to graſs-farmers in the beſt cultivated diſtricts, that when lands of this ſort are ſuffered to get much out of condition, it is a much more difficult buſineſs to reſtore them to the proper ſtate of productiveneſs, than to preſerve them in it. From the conſtant decompoſition and decay of various vegetable materials on the ſurface of graſs-lands, new portions of vegetable mould are conſtantly added, that improve the quality of the lands, and at the ſame time afford a more ſuitable and fertile bed for the eſtabliſhment of the different kinds of graſs-plants. It is chiefly, perhaps, on theſe accounts that old graſs-lands are ſuperior to new ones, and it explains the reaſon of the greater utility of earthy compoſts with dung in the latter than the former caſes. However, with reſpect to the moſt proper periods of making ſuch applications, there is much difference of opinion; but it ſhould, probably, be regulated by circumſtances; ſuch as the ſtate of the land in regard to dryneſs, its ſituation, the heat of the ſeaſon, and its nature and condition in reſpect to ſoil and fertility. Where the land is ſuch as not to admit the dung-cart in the early ſpring-months, without the danger of injuring the ſurface by poaching or breaking the texture of the ſward, the moſt proper period would ſeem to be in the beginning of the autumn, before the heavy rains fall, as at this period the dreſſing may be laid on with the greateſt convenience and ſafety; and from the after-graſs being chiefly conſumed with the leaſt loſs in that particular. It is, however, recommended to be performed by ſome immediately after the land has been mown and cleared from the hay, in which method there may be an advantage in ſome caſes, as the growth of the after-graſs may thereby be rendered more abundant." But, in other reſpects, it has been obſerved by the author of Practical Agriculture, that, "it muſt often be not only inconvenient, but uneconomical, as, from its happening at a ſeaſon when much other buſineſs is to be performed, it can ſeldom be attended to in ſuch a manner as is neceſſary; and when the ſeaſon at this period is hot, and there is much ſun, as in general is the caſe, there muſt be conſiderable loſs ſuſtained in the extrication and diſſipation of the finer and more enriching particles, ſuch as become more immediately the food of plants, from their being in a condition nearly ſuitable for being abſorbed and taken up by the roots of the graſſes. The extent of the loſs incurred in this way is much more conſiderable than is commonly ſuppoſed, as muſt appear evident from the great exhalation and conſtant evaporation that is often kept up for many days, or even weeks, as the very offenſive ſmell that iſſues fully proves. In this diſtrict, where we have occaſionally witneſſed the practice, with ſome of the leſs intelligent farmers, the moiſture of the manure has been ſo much forced off and diſſipated, eſpecially when there is much wind, as to leave the materials in nearly a perfectly dry ſtate. The ſudden drying up of large ponds, at ſuch ſeaſons, ſhews in a more ſtriking manner the extent of the injury that the farmer ſuſtains in chooſing this ſeaſon for the application of his manure" upon his graſs-lands. And, it ſtill further ſtates, that "there is another way in which a vaſt loſs of manure may take place when applied at either of the periods that have been juſt noticed, eſpecially where the lands lie in ſloping directions, as is frequently the caſe, which is by the heavy rains in the autumnal ſeaſon carrying down the more fine and rich parts of the manure, in a ſtate of ſolution, into the ditches and runlets on the ſides or other parts of the fields. Of the great waſte of manure occaſioned in this way any one may convince himſelf, by attending to the ſtate of the water as it drains off from the higher grounds into theſe places, after the land has been previouſly dreſſed, as it will be found highly coloured, and loaded with the enriching carbonaceous particles of the manure." And "after froſts, when ſudden thaws occur, the ſame thing happens" in a ſtill more extenſive degree than in the other caſes.

In caſes where the natural dryneſs and open texture of the ſoil admit of the manure being applied in the early ſpring months, there will be leſs danger of waſte in the above manner, and at the ſame time greater advantage obtained in the growth of the produce; as, from the moderate heat and quickneſs of the vegetation at this period, the graſs will ſoon over-ſhade and conceal the dung, where laid on in a ſuitable ſtate of reduction or fineneſs, without ſuffering much exhalation to take place; and the enriching material be conveyed to the roots of the graſs-plants at the time in which it may be the moſt uſeful in promoting their growth. Where the principal object of the farmer is a large produce, and the nature of the ſoil will admit of the manure's being applied without injury, this is unqueſtionably the moſt ſuitable as well as moſt beneficial time of putting the dung upon graſs-lands. The earlier, however, it can be performed the better. See MANURE.

But it has been ſtated by ſome, that manure produces the ſtrongeſt effects upon the land when applied early in the autumn, or in meadows as ſoon as poſſible after they have had the hay taken off from them. And others ſuppoſe this laſt as the moſt proper ſeaſon for having the buſineſs performed in of any.

In regard to the kinds of manure that are moſt proper, there is ſcarcely any ſort that will not be beneficial when laid upon graſs-lands; in general, however, the more rich animal kinds will be the moſt ſuitable for the older ſorts of ſward-land; and dung, in combination with freſh earthy materials, the more proper on the new lays or graſs-lands, as by this means a fine earthy bed will be prepared for the roots of the graſs-plants to ſhoot and ſpread themſelves into, and a better ſward formed in conſequence of ſuch applications. See *Laying* LAND *down to Graſs*.

It is the practice of the beſt farmers in the hay-diſtrict of Middleſex to uſe the richeſt dung they can procure, without mixing it with any ſort of earthy material, as they find it anſwer beſt in the quantity of produce, which is the principal object. The lands on which this ſyſtem is purſued, are moſtly ſuch as have been long under ſward, and where the ſoils are chiefly of the more tenacious, loamy, or clayey kinds. It cannot, however, be doubted, but that earthy compoſts in the proportion of a third or fourth of ſuch materials may, in many caſes, according to the nature and circumſtances of the land, be had recourſe to with great and beneficial effects, both in rendering the land more productive, and in bringing the herbage into a finer ſtate, as well as in bettering the ſurface for the purpoſe of mowing. See MANURE.

It may be obſerved, that whatever the nature of the material may be that is employed in combination with dung, or the ſort of manure that is uſed, it ſhould invariably be brought into a rather fine ſtate. It is the practice, in the diſtricts mentioned above, to turn over the dung that is brought from London in a ſtate of tolerable rottenneſs once, chopping it well down in the operation, ſo as to be in a middling ſtate of fineneſs when put upon the land. It is neceſſary, however, that it ſhould be in a more rotten and reduced ſtate when applied in the ſpring, than when the autumn is the time of putting it upon the land.

In reſpect to the proportion of manure made uſe of at once, it ſhould be, in ſome meaſure, ſuited to the ſtate of the land, but, in general, ſuch as to afford a good even covering to the ſurface of the ground. Where the manure is of a very good and enriching quality, the quantity may be from four or five to ſix or ſeven loads on the acre, of ſuch as are drawn by three or four horſes. But where the manure is of an inferior quality, a much larger proportion may be requiſite and proper.

The frequency of dreſſing graſs-lands, in ſo far as it reſpects the ſoil, ſhould conſtantly be performed at ſuch diſtances of time, as that the fertility of the lands may not be ſuffered to decline, but be preſerved in an equal or increaſed ſtate of heart; in which the manner and frequency of cutting, or otherwiſe conſuming the produce, muſt be conſidered; as, where crops are more frequently taken off, the land muſt be prevented from being injured, by the great loſs of fertility that muſt ariſe in this way, by the dreſſings being applied at ſhorter intervals, or in larger quantities at a time; but the firſt is by much the beſt method, as injury may often be done by too great a dreſſing being given at once. But, in general, where ſuch lands are in a tolerable ſtate of cultivation, every third year may be ſufficient; while on ſuch as are of inferior value, it may be a better practice to do it every ſecond year, as by this frequent application of manure, the lands may attain a gradual improvement; whereas, in the contrary caſe, they would be on the decline, and in time become poor and worn out to the great injury of the farmer. It is a too common practice, in diſtricts where graſs-huſbandry is imperfectly underſtood, to almoſt wholly neglect the manuring of ſward-lands, in order to employ it on thoſe which are under the plough: but this is obviouſly bad management; as it is only by the raiſing of full crops of graſs for being converted into hay, and of proper kinds of green food, that a full ſtock of cattle can be kept, and the largeſt poſſible proportions of manure provided for the land. It may be noted there are a few articles made uſe of as top-dreſſings to graſs-lands, which cannot, it is ſaid, be frequently repeated with either ſafety or advantage, ſuch as chalk, marle, chopped woollen rags, and ſome others. It is ſtated, that "the firſt of theſe kinds, eſpecially when of a ſoft, unctuous nature, ſo as to readily fall down in the ſtate of ſolution to the roots of the graſs-plants, is found to produce the moſt beneficial effects, in rendering the lands more fertile and productive, and improving the quality of the herbage. It cannot, however, be often repeated in its ſimple ſtate with advantage, as it is ſome time in producing its full effects; but in that of compoſt, it may be applied with ſucceſs at ſhorter intervals. Marle is likewiſe a ſubſtance, eſpecially when it is of the rich, ſoapy kind; that may be made uſe of with much advantage as a top-dreſſing on graſs-lands; but as its operation is ſlow, it cannot be repeated at ſhort intervals, except when employed in the ſtate of a compoſt with dung-woollen rags, which, rendered ſmall by being chopped into pieces, may be laid on land in the ſtate of ſward; but as they require a conſiderable length of time to ſink down and become mixed with the ſoil, ſo as to be well covered by the graſs, they cannot be repeated at ſhort intervals. After they have been fully incorporated with the land, their beneficial effects are conſiderable," as have been fully ſhewn in the trials of different graſs-farmers: and there are various other matters that are occaſionally applied as top-dreſſings on graſs-lands; ſuch as lime in combination with rich vegetable earth or peat, the aſhes derived from the combuſtion of peaty ſubſtances, coal-aſhes, malt, duſt, and ſoot. Moſt of theſe have been made uſe of with good effects when thinly ſpread out over the ſurface ſwards of lands in the ſtate of graſs. The three laſt have been found to produce the beſt effects in being diſperſed over the new lays of the artificial graſs kinds. All applications of this ſort ſhould be applied in February, being ſpread over the ſurface as evenly as poſſible. "If it can be done before a ſhower of rain, it will be the better, as it is of advantage to have them carried down to the roots of the graſſes as ſoon as poſſible after they are laid upon the land." But ſome adviſe, in the "management of purchaſed manures, that experiments ſhould be formed for a year or two, before the practice is extended, to ſee which, at a given price, will ſuit the land beſt. Without this precaution, a farmer may probably expend large ſums of money to little purpoſe. Nor ſhould he truſt to the mere appearance of the effect ſoon after the manuring; for ſome of them, particularly ſoot and malt-duſt, will ſhew themſelves after the firſt heavy ſhowers, in a finer green than the reſt of the field; but the proof of the effect does not ariſe from fine greens, but from weight of hay: for it has been found from experience, that the latter is not always an attendant on the former. Contiguous half-acres, or roods, ſhould be marked out, the prices of the manures calculated, and on each piece a ſeparate one ſpread, all to the amount of 20ſ. an acre, for inſtance. At hay-time, the crops ſhould be weighed. It will then be known which manure, at the given prices, ſuits the ſoil beſt. This knowledge will prove true experience, and a very different guide from general ideas."

And here is ſtill another circumſtance neceſſary to be attended to in putting manure upon lands of this kind, which is not to ſuffer too much to be placed out in any of the heaps, but to have them ſet out as much as poſſible in moderate ſized portions, and "at regular diſtances from heap to heap; as, where the contrary is the caſe, it not only takes up more time, and cauſes much more trouble to the labourer in ſpreading them, but does not admit of the work being performed in ſo regular or ſo exact a manner. Beſides, when the heaps are ſet out too large, much injury is done to the graſs-plants on the ſurface where they ſtood, if not ſoon ſpread out, which ſhould always be the caſe, in the quickeſt manner."

It is alſo of much conſequence, in the execution of this buſineſs, to have convenient carts for the purpoſe, which, in general, are thoſe of the ſingle-horſe kind.

Some care is likewiſe neceſſary in the ſcaling or "ſpreading-out all ſorts of top-dreſſings on graſs-lands, to ſee that the work be performed in an exact and even manner, and that all the clods and lumps be well broken down and perfectly reduced by beating with the fork or ſhovel. If poſſible, a dry ſeaſon ſhould be choſen for this ſort of buſineſs, as, under ſuch circumſtances, it can be executed in the moſt regular and exact manner; as when the weather is wet, it is an operation that can never be well performed, as the materials clog round the feet and implements of the workman, and can never be effectually ſeparated or divided ſo as to be ſpread out with the neceſſary degree of evenneſs." It has been already noticed, that "after the heaps have been ſet out, they ſhould not be ſuffered to remain ſo long, as is often the caſe, before they are ſpread out, as the plants underneath them become blanched and tender, and great injury is done to the ſward in ſuch caſes, all of which may be eaſily avoided by ſpreading as ſoon as poſſible after the manure is taken out. Inconveniences of this kind may likewiſe be avoided by ſpreading the manure from the carts, as is the practice in the midland and ſome other diſtricts: but in this method it is ſuſpected the work can neither be executed in ſo exact a manner, or with ſo much economy of time or labour. In this way hill-ſteads will not be formed, and, of courſe, the diſadvantage of their getting too large a proportion of the manure prevented," as Mr. Marſhall has well obſerved in his Economy of the Midland Counties of the Kingdom.

The uſual practice, as ſoon as "the whole has been ſpread out, and remained in that ſtate for a fortnight or three weeks, or longer, according to circumſtances, and is become in ſome degree dry and powdery, to apply a buſh-harrow over the ſurface once or twice in a place, in order to reduce the manure into a finer ſtate, and bring it more fully to the roots of the graſſes. But this ſort of work, as that of ſpreading, ſhould never be attempted when the ſeaſon is wet, and the manure in a claggy, adheſive ſtate. As ſoon as this work has been executed, all the rubbiſh of every kind ſhould be carefully picked off, in order that the ground may receive the action of the roller," which ſhould be paſſed over it as frequently as may be thought neceſſary, when the land is in a ſuitable condition for receiving it. (See Rolling.) This is the principal buſineſs which is requiſite in the management of graſs-lands in general.

In Hertfordſhire, "a mode of managing ſound meadows and paſtures has lately been tried, and attended with great increaſe of produce. The graſs is mown as ſoon as it is in bloſſom, and conſequently previous to the formation of ſeed. The after-graſs is not grazed until it begins to contract a yellow appearance, in the latter end of October or the beginning of November. In this caſe the ground remains covered during the winter with a portion of dead herbage, through which the young graſs ſprings with the greateſt vigour. Mr. Knight contends, that the ſap in all plants aſcends through the alburnous veſſels of the root, and is diſperſed over the leaf, whence it is returned to form new roots and buds, and to prepare them for vegetation. According to this theory, if the leaves be eaten off on mowing ground, as ſoon as they are reproduced, the roots are deprived of their nutriment, and the plants in conſequence vegetate weakly in the ſucceeding ſpring. Whether this hypotheſis be well or ill founded, it is certain that the ground which is left with this portion of the leaves of graſs in the one ſeaſon, is much more productive, and more early in the next; and cloſe grazing will ever be found to decreaſe the quantity, although it ſhould improve the quality, of the following crops." It is evident that there is ſome truth in this, from its having been found that the crops are more early and abundant in different caſes, where the after-graſs is not fed down much in the autumnal ſeaſon with live ſtock. See Mowing and Grazing.

Comparative Quantity of Food from Graſs and Tillage Land.

With reſpect to the difference in the proportion of human food raiſed from graſs and tillage land, the firſt circumſtance neceſſary to be attended to, according to a late writer, is that commonly denominated *Price.* But theſe inquiries ſuggeſt a further idea concerning the part of the produce, of either graſs or arable land, to which that circumſtance is attached. It is evident, on the ſlighteſt view of the ſubject, that the portion of the produce conſumed in the farmer's family can have little to do with the price of the market: it never finds its way thither: it never comes to be meaſured with the demand of the conſumer, who does not produce. For this reaſon, in all inquiries that have for their object what is called plenty or ſcarcity, we never hear of any thing but price; and price is never formed but by the ſupply of towns from the produce of the country. The larger part of a modern ſociety conſiſts of the inhabitants of thoſe towns, who are ſupported either by manufactures, or on incomes not derived immediately from the cultivation of the earth. So much for juſt opening our way in a field rather intereſting: but may we not, with equal propriety, extend the circumſtance juſt alluded to, to the labouring families ſupported by the farmer? His little neighbours in the village who do the work of his huſbandry, arreſt, if we may ſo expreſs it, the amount of their ſubſiſtence from the crop before it arrives at the market. They muſt be fed; and though in many caſes, by buying their flour of a miller, they ſeem to claſs with the inhabitants of a town, yet, perhaps, in more numerous caſes they are, in fact, fed immediately from the farmer's ſtores; and in effect always ſo: for, if the farmer cannot produce his crops but by their direct aſſiſtance, and muſt multiply them exactly in proportion to the operoſeneſs of his culture, they cannot be conſidered in any other light, than mouths attached to the culture of the land, and demanding a deduction from the produce of wheat, before the ſurplus or market be reckoned, in as direct a deduction as that from his crop of oats for the food of his horſes, or other animals. It is added that there are in the Suffolk Report ſome eſtimates of what the writer calls produce free in the market, and he makes the graſs-lands yield a greater free produce (horſes, labour, &c. &c. deducted) than arable; and he knows not but it may be the ſame in other counties. Other writers ſeem alſo to have had the notion that graſs-land is more beneficial than arable. Bertrand, a Swiſs writer, ſays, that graſs-countries yield more food than arable, and therefore manufactures ſhould be fixed in them. Hartlib ſeems to be of the ſame opinion, and quotes thoſe of Europe as the moſt populous. Fortrey, who wrote in 1663, alſo ſays, that our chief care ſhould be to increaſe our ſtock of cattle. There is ſome degree of truth in theſe ſentiments; and they might be conſidered in relation to the proportionate nouriſhment, in a pound of animal food compared with that of a pound of vegetable, which ſome authors have made vaſtly greater in meat than in bread. Theſe are topics, it is ſtated, which ought to be thoroughly examined, that the public mind may be free from every erroneous bias upon ſuch points. But further in the dairy countries, where butter is the chief produce, four firkins, or 224 lbs. may be reckoned the average produce per cow; the calf ſold at about a week old, may contain about 30 lbs. of fleſh; and as the pigs ſupported by a dairy, uſed to be reckoned at the rate of 20s. per cow, when pork was 6*d.* per pound, it implies, that 40 lbs. of pork is the proportion to each cow: but the cow conſuming the produce of three acres, the acreable account would of courſe ſtand as below:

Acreable Account.	*lbs.*
In Butter - - - - -	74
Veal - - - - -	10
Pork - - - - -	13
Total	97

However, in the cheeſe counties, the products vary a good deal: in Cheſhire 4 cwt. per cow; in Shropſhire $2\frac{1}{2}$ cwt.; in Glouceſterſhire about $2\frac{3}{4}$ cwt.; in Wiltſhire 4 cwt.; in Somerſetſhire $3\frac{1}{2}$ cwt.; in Warwickſhire 3 cwt.: the average of all theſe is $3\frac{1}{5}$ cwt. and at three acres per cow, 1 cwt. and a ſmall fraction per acre; and as theſe counties are richer than thoſe applied to the produce of butter, veal may be called 15lbs. and pork 20lbs.; in all 147lbs. per acre, or thereabouts. But as to meat, authorities are not very ample: in the midland counties there is a very general notion, that an acre of graſs, at 40*s.* rent, will give 200lbs. of mutton. By an experiment made on land of an inferior quality, which is mentioned in the Annals of Agriculture, land of 16*s.* rent, gave 80lbs.; and he has heard, on good authority, that in Cambridgeſhire ſome obſervations, carefully made, confirmed this proportion of produce in land fed both with bullocks and ſheep; and the produce of beef, &c. in the Lincolnſhire marſhes, goes even further than this ratio or proportion to the acre.

With reſpect to the butter dairies, they are on land of about 16*s.* an acre rent; and if the produce be 97lbs. the proportion will be 6lbs. to every ſhilling rent. The cheeſe dairies, at 25*s.* rent, yielding 147lbs. are alſo at about 6lbs. per ſhilling rent. The meat is 5lbs. per ſhilling. It is eaſy then to decide, that dairy counties are more advantageous than grazing ones in weight of produce; but their ſuperiority is far greater in another point of view; their produce comes much more into the conſumption of the poor; for, where one poor perſon eats meat, there are probably forty that conſume butter and cheeſe. How to compare theſe products with thoſe of arable land is very difficult; and yet the inquiry is too intereſting entirely to be omitted: a long train of inveſtigation might enable one to diſentangle difficulties, but it would require much time to go deeply into ſuch a variety of ſubjects. The produce of a good loamy ſoil, under the courſe, 1. Turnips, 2. Barley, 3. Clover, 4. Wheat, may, it is ſuppoſed, be calculated in this manner.

" No. I. *Arable dry Land at 16s. an Acre Rent, five Acres each Crop; twenty Acres in all, in a Courſe of four Years' Huſbandry.*

	Time.		
	Perſons.	Years.	Weeks.
1. Turnips; eight ſheep an acre, at the increaſe of 5*s.* each ſheep, or 40*s.*; in mutton 80lbs.; and for 5 acres 400lbs. will be ſufficient (at $\frac{1}{2}$lb. per perſon per diem) for two perſons, one year and five weeks - - - -	2	1	5
2. Barley and oats; ſuppoſe an allowance of $1\frac{1}{2}$ acre of oats (at five quarters per acre) for one horſe as the proportionate team to twenty acres, and including ſeeds for $1\frac{1}{2}$ acre: in all ſixty buſhels; remain $3\frac{1}{2}$ acres for barley, at four quarters an acre; fourteen quarters or 112 buſhels; deduct fourteen for ſeed, remain ninety-eight buſhels for malt, &c.; but, if applied in bread, ſufficient at nine buſhels per head per annum, for eleven perſons a year, minus one buſhel.			
3. Clover; deduct two acres for the ſummer and winter food of the horſes, remain three acres for ſheep, at eight per acre, improved 8*s.* each, or 3*l.* 4*s.*; or (at 6*d.* per pound) 128lbs. of mutton, and for three acres 384lbs. ſuffi-			

		Time.	
	Perſons.	Years.	Weeks.
cient at $\frac{1}{2}$ a lb. a day for two perſons a year: and leaving 20lbs. over; -	2	1	20
4. Wheat; twenty-two buſhels per acre, which, after deducting feed, leave twenty, or $2\frac{1}{2}$ quarters, and for five acres $12\frac{1}{2}$ quarters, ſufficient for twelve perſons a year and two weeks	12	1	2
Whole produce in human food -	16	1	17
The ſame land, if in graſs, would give 80lbs. of mutton per acre, 400lbs. per ann. and for four years 1600lbs. ſufficient at $\frac{1}{2}$lb. a day to ſupport eight perſons one year and thirty-ſix days" - - - - - - -	8	1	36

Hence, "to make the deduction, before alluded to, of the farmer's family, and his labourers: ſuppoſe he farms an hundred acres, which is, probably, above the average ſize of farms of the kingdom, here are five perſons to that extent, or one to twenty acres. If we reckon all ſorts of labour at 21*s.* an acre, we ſhall, he ſuppoſes, not be far from the fact: the pay of a labourer may be reckoned on an average at 25*l.* which we ſhall call the food of five perſons; ſetting the earnings of the wife and children againſt rent, clothes, and other articles; this makes food 5*l.* a head: for every 5*l.* therefore that the farmer pays in labour, we may ſafely, he ſuppoſes, reckon that one perſon is fed from the produce of his farm before it reaches the market: the labour in the twenty acres in the above inſerted eſtimate being 21*l.* he calls four perſons', and the farmer's family one, making five, to be deducted from the acreable amount of the farm."

	Perſons.	Years.	Days.
Brought forward - - - -	16	1	17
Deduct - - - - -	5	0	0
Remains for market - - -	11	1	17
And the 20*s*, exceſs in the 21*l.* ſtrikes off - - - -	0	0	17
	11	1	0

Yet, "in regard to graſs land, as it is managed with ſo much more eaſe, and farms are generally ſo much larger, it will be fair to deduct only one perſon for farmer and labour."

	Perſons.	Years.	Days.
Brought forward - - -	8	1	36
Deduct - - - - - -	1	1	36
Remain for market - - -	7	1	36

"It then appears, that under the circumſtances of ſuch land thus applied, arable land, on compariſon with graſs, ſends to market in the proportion of 11 to $7\frac{1}{10}$. But if the barley, inſtead of being drunk, be eaten in bread, it adds to the arable account eleven perſons, and the account would then ſtand nearly twenty-two to $7\frac{1}{10}$, or about three to one.

"But, as the largeſt part of the kingdom is employed in ſyſtems of huſbandry very inferior to this excellent one, let us calculate how the compariſon will ſtand with open fields, and thoſe incloſures which are managed by means of fallows in the ordinary rotation of cropping that is purſued upon them.

"No. II. *Open-field arable—Soil clay or wet—Rent* 10*s. an Acre, five Acres each Crop*; *thirty in all, in a Courſe of Six Years' Huſbandry.*

		Time.	
	Perſons.	Years.	Weeks.
1. Fallow:			
2. Wheat; produce twenty-two buſhels; ſeed two; for conſumption twenty, or $2\frac{1}{2}$ quarters; $12\frac{1}{2}$ quarters for five acres, being food for twelve perſons during one year and two weeks -	12	1	2
3. Oats: produce four quarters an acre; ſeed half a quarter; remain $3\frac{1}{2}$ quarters per acre, or $17\frac{1}{2}$ quarters, or 140 buſhels: ſufficient, at twenty-five buſhels a head, to feed five perſons a year and five weeks, if uſed in bread.			
4. Fallow:			
5. Barley; ſuppoſed to be conſumed in beer, &c.: but, if eaten by man, at four quarters an acre, deducting half a quarter for ſeed, remain $3\frac{1}{2}$ quarters or twenty-eight buſhels; and at nine buſhels a head, ſufficient for three perſons one year, and one buſhel over, and five acres, enough for fifteen perſons one year and two weeks.			
6. Beans; for horſes equal to the food of $1\frac{1}{2}$ horſe (at one horſe to twenty acres) for the year.			
	12	1	2

But the ſame land laid down to graſs, and let at 20*s.* will, he ſays, feed (on the ſuppoſition of an increaſe 5lbs. per ſhilling rent) oxen and ſheep to the addition in weight of 100lbs. of beef and mutton, or 500lbs. for five acres, and 3000lbs. in ſix years; which, at half a pound a perſon per diem, or 182lbs. per head per annum, will feed $16\frac{1}{2}$ perſons one year. The courſe here detailed does not feed the horſes in ſummer; but as it affords, perhaps, more horſe-food in the beans than to that amount, no other deduction ſhould be made. It appears, that thirty acres of ſuch land, when the oats and barley are eaten by horſes, or drunk by men, ſupport twelve perſons a year and two weeks; now from this we are to deduct, as in the former caſe, the population of the farmer and his labourers; the former in the ſame ratio as before; but 15*s.* will be enough to deduct per acre in labour, inſtead of 21*s.* in the other courſe. This will, on thirty acres, be 22*l.* 10*s.* or $4\frac{1}{2}$ perſons a year: add one and a half for the farmer, it is ſix in all.

	Perſons.	Years.	Weeks.
Brought forward - - - -	12	1	2
Deduct labour and farmer - -	6	1	0
Remain for market - - -	6	1	2
The graſs - - - - -	$16\frac{1}{2}$	0	0
Deduct $1\frac{1}{2}$ for farmer and labour, that is, one per 20 acres - -	$1\frac{1}{2}$	0	0
Remain for market - - -	15	0	0

But if the barley and oats be brought into the account as human food, the account will then ſtand in this way.

	Perſons.	Years.	Weeks.
Wheat - - - - - - -	12	1	2
Oats - - - - - - -	5	1	5
Barley - - - - - - -	15	1	2
ſay	32 for	1	2
Deduct for farmer and labour - -	6	1	0
Remain - - - - - - -	26	1	2

It is conſequently ſtated, that in one caſe, the graſs has the advantage as fifteen to ſix: in the other, the arable as twenty-ſix to fifteen.

"No. III. *Poor Sand or Heath—Rent 5s.; five Acres each Crop; thirty Acres in all.*

	Perſons.	Years.	Weeks.	Days.
1. Turnips: four ſheep an acre, to the increaſe of 6*s*. each, or 24*s*.; in mutton 48lbs.; and for five acres 240lbs.; ſufficient, at ½lb. per diem, for one perſon one year ſixteen weeks and four days - -	1	1	16	4
2 Barley and oats; one horſe to thirty acres, which demands 2½ acres of oats, at three quarters (ſeed deducted); the remainder therefore 2½ acres for barley, at 2½ quarters per acre, being ſixteen buſhels (ſeed deducted), and for 2½ acres forty buſhels remain for malt; but enough in bread, at nine buſhels a head for 4½ perſons a year, minus one buſhel.				
3. Graſſes.				
4. Ditto.				
5. Ditto.				
The whole, without any horſe account, would feed, 1ſt year, three ſheep per acre, 26 weeks 2d two ditto ditto 3d one ditto ditto to the improvement (or the value in keeping) of 40*s*., and for five acres in each to 10*l*.; hence it appears that to keep one horſe would almoſt equal the whole amount.				
6. Rye: 1½ quarter; twelve buſhels; ſeed deducted, ten; ſufficient to ſupport one perſon fifteen months; and for five acres ſix perſons one year and eight weeks - - -	6	1	8	0
Within a ſmall fraction equal to	8	1	0	0
The ſame land in heath would feed, but not fatten, to the value of 10*s*. per acre; call this 20lbs. of mutton; 100lbs. for five acres, and 600lbs. in ſix years; ſufficient, at ½lb. per diem, for three perſons a year and thirty-ſix days -	3	1	5	1

	Perſons.	Years.	Weeks.
Brought forward, arable account -	8	1	0
Deduct, as farms on this ſoil are large, only half a perſon for thirty acres for the farmer; and reckoning labour at 8*s*. an acre, it is 12*l*. for thirty acres, or 2½ perſons; in all three - -	3	1	0
Remain for market - - - -	5	1	0
Graſs for ditto - - - - -	3	1	5

But "a fraction is to be deducted for farmer and ſhepherd. The difference, therefore, is as five to three. But if the barley be conſumed in bread, the account will be,

	Perſons.	Years.	Weeks.
Brought down - - - - -	5	1	0
Barley - - - - - - -	4½	1	0
Together	9½	1	0
Graſs - - - - - -	3	1	5

Conſequently the arable is therefore ſuperior as nearly three to one. Upon the whole of theſe compariſons it is ſufficiently clear, that the arable land is, and in every caſe may be, (by eating barley and oats,) far ſuperior to graſs-land in the article of feeding not only the people at large, but alſo in ſending a ſurplus to market. He cannot, however, let his papers go from his hands without requeſting them to be read with candour. He preſumes to offer them but as rough ſketches, that may approximate to truth, but cannot reach exactneſs: they may afford hints uſeful to future inquirers, and the ſubject is intereſting enough to anſwer well a very careful examination. One obſervation that goes generally to all is too material to be omitted; the production of meat in England is, it is ſuppoſed, of ſmall importance compared with that of corn, becauſe the poor do not live on the former; meat is the conſumption, generally ſpeaking, of thoſe who are in very eaſy circumſtances, compared with the great conſumers of corn; nor would the times be much complained of, whatever the price of meat might be, provided corn were at a reaſonable price. This is a circumſtance which ſhould be conſidered as deciſive of the inquiry; and ſufficient to prove, that the great intereſts of the public demand every poſſible encouragement to tillage ſo given, as ſhall preſerve corn at a fair price, neither too high for the poor, nor ſo low as to diſcourage the cultivation of it by the farmer.

With regard to what ought to be the proportion between the graſs and arable land of a farm, errors are, it is obſerved, extremely common among landlords, and not leſs ſo with farmers: in general, however, they both look to their own intereſt; the firſt to keep much in graſs, and the latter to plough all they can: with ſhort leaſes, and bad covenants, we are not to be ſurprized at either. One acre of moderate corn, ſays Adam Smith, in his Wealth of Nations, yields a greater neat profit than an acre of the beſt paſture. And experience, Mr. Davis of Longleat obſerves, ſufficiently evinces the extreme difficulty of perſuading tenants to believe that they get more, generally ſpeaking, by feeding their lands than by ploughing them; yet it requires very few arguments to convince a landlord, that in cold wet lands eſpecially, the leſs ploughed land you have, the leſs you put it in a tenant's power to ruin your eſtate. That a tenant of 60*l.* per annum in a dairy-farm will get money, while a corn-farm will ſtarve its occupier (though, perhaps, the former gives 15*s.* an acre for his land, and the other but 10*s.*), is ſelf-evident. Perhaps, ſays Mr. Billingſley, in the third volume of the Bath Memoirs, there cannot be a ſtronger proof of the inferiority of the plough, with reſpect to profit, than the ſuperior punctuality of the dairy-farmer in the payment of his rent. He never met with the ſteward of a manor devoted partly to corn and partly to dairy-farms, who controverted this ſtatement.

Clay.—Upon "this ſoil, when tenacious and not eaſily drained, a larger portion ſhould, it is obſerved, be kept in graſs than perhaps on any other; and for this reaſon,—green winter food is not to be gained at all, or, if gained, not without great difficulty and expence; conſequently, the team, and whatever cattle may be kept for conſuming ſtraw and making dung, muſt depend in a larger meaſure on meadow hay, than upon ſoils which admit turnip, cabbage, &c. Clover will do on clay, but it is more hazardous and liable to failure; in which caſe, without a certain reſource in the hay of natural graſs, the farmer would often find great inconveniences. He has examined many farms with this object in view, and found that, when half the land has been graſs, they have been more profitably conducted than with a leſs proportion; but on no account with leſs than one-third."

Loam.—It is ſtated that "one-third or one-fourth in graſs is a proportion found ſuitable to various loams; the more they tend to wetneſs, the larger the portion. It is not, however, eſſential on theſe ſoils, not only becauſe clover and other artificial graſſes are leſs apt to fail; but likewiſe by reaſon of their admitting profitably the alternate huſbandry of graſs and arable."

Sand.—It is contended "that ſome rich ſands are of ſo happy a texture, that they do very well in permanent graſs, and without burning in ſlight droughts; but, in general, it may be obſerved, that ſand in its ſeveral varieties is, of all other ſoils, that which pays beſt in tillage: it is eaſily worked; expences are light; it manures itſelf by agreeing well with ſheep; and, as the reſult of the whole, farmers are uſually rich upon it. In reſpect of the proportion, it is beſt managed, perhaps, when the whole is under the plough; for, by means of cultivated graſſes of proper ſorts, all the ſtock of the farm may be profitably ſupported, and the land reſted ſufficiently, for enſuring a perpetual production of corn. But, contrary to this maxim, and moſt unprofitably, large tracts are commonly tied up from the plough, by covenants of leaſes, under the name of ſheep-walk, heath, &c. which would, by alternate tillage and reſt, produce more corn, and keep more ſheep, than in the preſent ſtate: this is particularly the caſe in Norfolk, Suffolk, Nottinghamſhire, and ſome other counties."

Chalk and Lime-ſtone Soils.—"Nearly the ſame obſervation is to be made on this claſs; they are more productive under the plough than in graſs. But landlords tie up their tenants from ploughing downs in Suſſex, Hampſhire, Dorſetſhire, and Wiltſhire; but in Glouceſterſhire, the Eaſt Riding of Yorkſhire, and Lincolnſhire, they have, on the whole, been leſs tenacious; ſtill, however, large tracts remain, which would be ploughed were tillage permitted. Rules may be carried too far, and this among the reſt. Dorſetſhire has its ewe leaſes, which, in many caſes, ought not to be touched; and fine ſweet downs, which by very attentive management have been brought to a conſiderable degree of fertility, are ſo uſeful to ſheep in winter, that exceptions muſt occur. Another motive for ploughing is the peculiar advantage derived on this ſoil from ſaintfoin, one of the moſt uſeful graſſes that we owe to the bounty of Providence, but attainable only by tillage."

Peat.—Immenſe regions of moors ſpread widely through all the northern counties, and even in the moſt ſouthern, as Devonſhire and Somerſetſhire, Cambridgeſhire and Wales; alſo ſedgy bottoms are found every where. They admit and call for a much greater improvement than any other ſoil, comprehending the larger part of the waſte lands of the kingdom. Theſe ſoils are very rarely brought into the ſtate they are capable of, without tillage, and conſequently, to prohibit it, is to paſs a decree of perpetual ſterility. The obſtacle, however, moſt common on moors is, the rights of commonage, which do not come within the ſcope of the preſent inquiries. When improved, they are commonly much more adapted to graſs than to tillage, not however without numerous exceptions, as we ſee by the general practice in the fens of Cambridgeſhire and Lincolnſhire. The alternate huſbandry does well upon them: it is eaſy, however, to be too buſy with the plough; for, when good graſs is gained, it is the wiſer way to continue it in a productive ſtate.

But it is further ſtated, that the ſubject of the proportion between graſs and arable requires a word or two, viewed in another light, beſides the relation to ſoil. This is the prevalent application of the land. In the midland counties, where grazing very widely extends, it is common to ſee entire farms of graſs-land, and the tenant prohibited from breaking up an acre; in ſuch caſes there is a motive for ploughing not immediately connected with ſoil. To till a part would be right, whatever the ſoil may be; ſtraw, in ſuch a country, is not to be bought, and the convenience and profit of having ſome is no inconſiderable object; it would be carefully uſed as litter, and the manure ariſing would improve a portion of the land. Some cabbages, or Swediſh turnip, or common turnip, might be raiſed (which to a certain extent, and for certain objects on ſuch farms, would be highly valuable to the grazier), ſo as to outweigh large expences in procuring them on ſoils not quite adapted to their culture. There is not a queſtion but a farmer in ſuch caſes could afford to pay more rent for liberty to plough a portion of his land than under the preſent covenants. This would, it is ſuppoſed, extend to a fourth of the farms in ſoil rather unfavourable to the plough; and to a large proportion in others. But even three or four ſmall fields, though no more than one-fifth, one-ſixth, or one-tenth, would be highly advantageous to himſelf and the public, and not at all injurious to the landlord or owner. And to dairy-farms, when entirely in graſs, as many are in Wiltſhire, Glouceſterſhire, and other counties, this remark is yet more applicable, as the produce of tillage, ſtraw, cabbage, &c. is yet more neceſſary than in a mere fattening ſyſtem. In this caſe, and indeed in moſt others, the quantity might be partly regulated by the team: a dairy-farmer, who keeps four horſes to draw his butter or cheeſe to fairs, &c. ought, without queſtion, to have tillage enough to employ thoſe horſes: and it is no difficult matter to aſcertain that quantity. If the various works be examined carefully, it will be found, that a horſe to twenty acres of tillage is a fair proportion, which will leave time for carting hay in ſummer, and the products of the farm in winter. He is not ſpeaking here of tillage farms on ſands, &c. or with rotations of crops, in which the ſoil reſts for ſeveral years: on ſuch the proportion varies: but merely on graſs-farms, where ſome horſes muſt be kept, and are at preſent unemployed a large part of the year. But meadow farms, properly ſo called, are never, to his knowledge, met with but in the vicinity of great cities, where the demand for hay is great and uniform; horſes on ſuch are kept only for the purpoſe of carrying hay to market, bringing dung back, carting the hay to the ſtack, and the manure to the fields. Straw is wanting for litter and for thatch; but it is queſtionable whether it is profitable to plough for this object only in any caſe; a ſcattering of tillage is in ſome places found, but not by any certain rule; the neceſſity is ſmall, and ſtraw uſually to be purchaſed. Such diſtricts, being highly improved, demand very little attention, it is ſuppoſed. See TILLAGE, *Rotation of* CROPS, and PASTURE.

GRASS *Leaſe*, in *Agriculture*, a term frequently applied to ſuch ſward lands as are appropriated to the purpoſes of grazing, or the fattening of neat cattle and ſheep.

GRASS-*Seeds*, a term often uſed to ſignify the ſeveral different ſeeds of graſſes that are employed in laying land down to the ſtate of turf. It was, however, formerly, moſtly made uſe of to denote the mixture of all ſorts of rubbiſh that was ſcraped up from the hay lofts, or collected in the cribs or boxes below the racks in the ſtables. But, in the improved method of forming new graſs lands, the practice of uſing ſuch mixtures of ſeeds is almoſt wholly laid aſide, and only ſuch as are really uſeful and proper, had recourſe to, by which the lands are found to be much more valuable and productive. See *Laying* LANDS *down to Graſs*.

GRASS-*ſods*, in *Rural Economy*, a name applied to ſuch ſods or turfs as are pared off from the ſurface of old ſward-lands, whether they be intended for the purpoſe of burning on the land, for fuel, or for being laid down in order to form a lawn, or ſmall plot of fine even turf. In the former intentions they are generally pared off by ploughs, or ſpades, contrived for the purpoſe; but in the latter almoſt conſtantly with great regularity and exactneſs, by a turf ſpade for the purpoſe. A tool of the plough kind ſeems, however, capable of being employed in this way alſo with advantage. See the next article.

GRASS-*ſod-cutting Plough*, the name of a tool of the plough kind, which was invented on the continent by count Van Mattzen, and which has been highly uſeful in cutting graſs-ſods in a cheap and expeditious manner. It can alſo be had recourſe to with great advantage in paring the ſwards off old graſs lands, waſtes, and commons, previouſly to their being burnt and brought into the ſtate of tillage-huſbandry. It is likewiſe capable of being converted to the purpoſe of forming walks in grounds where they may be wanted, as well as in paring the bottoms and ſides of them, and of ſuch as have been already made, by which means the gardener will only have the ſimple buſineſs of raking and rolling them to perform.

By ſome ſlight alterations in the manner of placing the coulters, graſs ſods are likewiſe capable of being cut in a very ready manner, and in any form that may be required, ſo as to be employed in the conſtruction of banks, fortifications, huts, and other works of a ſimilar kind. It would ſeem, conſequently, to be a very uſeful tool in the expenſive buſineſs of conſtructing embankments againſt the ſea, or other large waters.

The inventor was led to the conſtruction of this plough, in conſequence of the want of a more cheap and expeditious method of performing the work than the uſual one of the ſpade, in cutting turfs for forming graſs-plats, &c.

It may be obſerved that in forming the tool, the beam, or fore part of any common plough will anſwer the purpoſe; this part is conſequently not repreſented in the figure, the hind or operative parts being ſimply ſhewn. The tool is capable of being managed by any perſon who is able to direct a common plough.

This plough may be ſeen at *fig.* 7. in the *Plate* on *Grazing*, in which the nine holes ſhewn by A, A, in the beam, ſerve, as in the common plough, to regulate the length of the beam merely by placing the pin C forwards or backwards, and thereby to make the cutting-iron to work to greater or leſs depth. The two coulters, E, E, which are placed on each ſide of it, in front of the cutting-iron D, ſerve to guide the ſide cut, preparatory to the ſeparation of the turf or ſod. The cutting-iron D may, by means of the ſcrews G, G, be raiſed or lowered at diſcretion. And, in order to keep it in its place properly, the two ſupports at H, are made, and provided with ſeveral holes for the purpoſe at I, formed in the cutting-iron D. The two handles are diſplayed at K, K, and the frame at L L L L; the whole of the remainder, which in the frame is marked black, is to be formed of iron.

A certain degree of practical experience is neceſſary, in order to uſe this plough, ſo as to form the turfs with exactneſs; and in the commencement of the work care ſhould be particularly taken that the workman does not cut the turfs too deep, and that the plough be not injured by his inattention. In a very ſhort time, he will, however, be ſo accuſtomed to the buſineſs as to perform with great exactneſs. In ſetting out the work, a breadth equal to the width of the two cutters ſhould be previouſly cut out, as by that means the cutting-iron takes the ſod at a proper depth, and executes the work, as ſoon as the draught commences, in the team. In the performance of the work, oxen are recommended as preferable to horſes, from their drawing more ſteadily, and being more readily managed on ſtiff lands; but we apprehend that this will not, in general, be found to hold good, and horſe-teams are far more expeditious. See TEAM.

GRASS, in *Mining*, ſignifies the natural ſurface of the earth over a mine; ſometimes alſo it is called "the day," or the top; and a mineral vein appearing on the ſurface, is ſaid to come, or appear to graſs, or to the day. Coals and other ſtratified minerals, when they come to the ſurface, are ſaid to baſſet, crop, burſt-out, go-out, to want-cover, to run-out, to out-burſt, to head-out, to run-out, &c.

GRASS *River*, in *Geography*, a river of America, in the N.W. part of the ſtate of New York, which riſes near the main branch of Black river, and runs N.N.W. about 50 miles, then N.E. 40 miles, and is loſt in the river St. Laurence. N. lat. 45° 12′. W. long. 74° 48′. It is a rapid river, affords many mill-ſeats, and near the mouth, its banks produce great quantities of hay.

GRASSE, a town of France, and principal place of a diſtrict, in the department of the Var. The place contains 12,521, and the canton 13,554 inhabitants, on a territory of 100 kiliometres, in four communes. The principal trade of the town conſiſts in dry fruit, olives, oil, perfumes, and tanned leather:—9 miles W.N.W. of Antibes. N. lat. 43° 39′. E. long. 6° 59′.

GRASSE, *La*, a town of France, in the department of the Aude, and chief place of a canton, in the diſtrict of Carcaſſone; 20 miles S.W. of Narbonne. The place contains 1123, and the canton 4524 inhabitants, on a territory of 292½ kiliometres, in 18 communes. N. lat. 43° 5′. E. long. 2° 42′.

GRASSES, *Petrified*. Mr. Whitehurſt, in his "Inquiry concerning the Earth," 1ſt edit. p. 169, mentions graſſes among the vegetable remains in the coal-meaſures of Derbyſhire: but the late Mr. William Martin, who was perhaps better acquainted with theſe ſtrata, ſays, "Outlines," p. 85, that the gramina of theſe argillaceous ſtrata are of unknown ſpecies in the recent ſtate, and appear rather allied to the canes and reeds of the Indies, than to graſſe properly ſo called. Mr. Farey alſo, in his laborious reſearches among theſe carboniferous ſtrata, has ſeen nothing reſembling graſſes imbedded in them. See Reeds.

In peat diſtricts, which are of modern or recent accumulation, and within the range of flooded rivers, it is not uncommon to meet with preſerved graſſes, probably belonging to many of the recent ſpecies, at conſiderable depths below the ſurface of, or even at the bottom of the peat, or muddy depoſits; but ſuch peat foſſils ſhould on all occaſions be diſtinguiſhed carefully from ſtratified, or real foſſil remains, as remarked in our article Coal.

GRASSHOPPER, in *Entomology*, a ſpecies of *Gryllus*; which ſee.

Grasshopper, in *Ornithology*, a name given to the *Alauda trivialis*; which ſee.

GRASSI, Cecilia, in *Biography*, afterwards Mrs. Bach, who performed the firſt woman's part for ſeveral ſucceſſive years at the opera with Guarducci and Guadagni, was inanimate on the ſtage, and far from beautiful in her perſon; but there was a truth of intonation, with a plaintive ſweetneſs of voice, and innocence of expreſſion, that gave great pleaſure to all hearers who did not expect or want to be ſurpriſed. Her performance of the part of Euridice, in Gluck's "Orfeo," with Guadagni, was perfect in all reſpects, and gave univerſal ſatisfaction.

GRASSWINKEL, Theodore, a learned lawyer and writer, who flouriſhed in the 17th century, was a native of Delft. He wrote various works upon legal and political ſubjects, by which he acquired a conſiderable reputation, and was regarded by the government as a proper perſon to fill ſome office in the ſtate; he was accordingly made fiſcal of the domains of the ſtates of Holland, and ſecretary of the bipartite chamber on the part of the ſtates-general. He died in 1666, at Mechlin, and was buried in the great church at the Hague. His works were numerous: of theſe the following may be noticed, "Libertas Veneta, ſeu Venetorum in ſe et ſuos imperandi Jus." This was publiſhed in 1634, and in 16[illegible] he defended the republic of Venice, in a diſpute with the duke of Savoy concerning precedence. For theſe ſervices, that republic created him a knight of St. Mark. Previouſly to the publication of the laſt of the two above-named works, he attempted to confute the popular maxims of Buchanan, in a treatiſe, entitled "De Jure Majeſtatis." This was dedicated to Chriſtina, queen of Sweden, who was known to be a great aſſertor of regal privileges. Graſswinkel defended the liberty of the ſeas againſt a native of Genoa, in his work "Maris Liberi Vindiciæ." He was author, likewiſe, of a treatiſe in two volumes 4to. "On the Sovereignty of the States of Holland." He was at all times a defender of particular ſtates; but a violent oppugner of the rights of the people. Moreri. Bayle.

GRATAROLUS, William, was born at Bergamo, in Italy, in the year 1510. He was educated at Padua, where he took the degree of doctor of phyſic, and afterwards became profeſſor of the ſame ſcience, and gained conſiderable diſtinction. But having embraced the Calviniſtic doctrines, on the perſuaſion of Peter Vermilli, he fled from Italy, through fear of the inquiſition, and retired to Marpurg, where he taught medicine for a year. But he was compelled to leave that place alſo, and repaired to Bâle, in the hope of a better fortune, and where, in fact, he taught and practiſed his profeſſion with ſucceſs, until May 1562, when he died, at the age of 52. He was author of a great number of works, ſome of which are honourable to his talents, and evince a large ſhare of knowledge; but in others he ſhews an attachment to the abſurdities of the alchemiſt, much ſuperſtition, and opinions which do not imply a ſound judgment. Eloy. Dict. Hiſt.

GRATCHI, in *Geography*, a town of Ruſſia, in the country of the Coſſacks; 20 miles N.W. of Tzaritzen.

GRATIAN, in *Biography*, a Roman emperor, ſon of Valentinian I. was born at Sirmium, in 359. He was appointed by his father to a ſhare in the empire when he was but eight years old. He was in his ſeventeenth year when Valentinian died. At this time Gratian was keeping his court at Treves, and was ignorant of what had happened till he was informed that the officers of the army had appointed as his partner in the throne Valentinian II. the younger ſon of the late emperor, by his ſecond wife Juſtina. Gratian, though hurt at the aſſumption of authority on the part of the army, readily ratified the election, and ever treated his brother with affection and tenderneſs. The Weſtern empire was nominally divided between them, but the ſuperior age of Gratian gave him all the power. One of his firſt acts was to recal his mother to court, who had been divorced and baniſhed; and this act of juſtice was followed by the puniſhment of certain officers in the ſtate, who had abuſed their power, by cruelty and injuſtice. While the emperor is praiſed for theſe deeds, he has not eſcaped blame, and a high degree of cenſure, for putting to death the renowned general Theodoſius, who fell a victim to the jealouſy of ſome rival courtiers. Hiſtory has alſo cenſured him for the indulgence which he afforded to the clergy, and for his ſeverity againſt thoſe who were denominated heretics, for the gratification of the orthodox. At the head of the Eaſtern empire was his uncle Valens, who was in 378 attacked by the Goths. Gratian, active and courageous, put himſelf at the head of an army, and marched to his aſſiſtance. He obtained a deciſive victory in Alſace, and, purſuing his ſucceſſes, croſſed the Rhine, and penetrated into the heart of the enemy's country, in order to join the forces of Valens. Before, however, he could reach him, that emperor had been defeated and ſlain at the battle of Adrianople. Gratian now felt that he muſt take the moſt vigorous meaſures againſt their common enemy, and immediately called from his retreat Theodoſius, ſon of the general who had ſuffered under his haſty diſpleaſure, and placed him at the head of a ſeparate army, with which he was enabled to deſtroy a large body of Sarmatians, who were on their march to join the Goths. Gratian himſelf proceeded to Conſtantinople, where he recalled thoſe orthodox biſhops who had been baniſhed by Valens, and he alſo iſſued ſome edicts relative to the exerciſe of religion. As Valens had left no male heirs, his nephew, diſregarding the ſuggeſtions of perſonal ambition, filled the vacant throne to the ſatisfaction of all, by raiſing Theodoſius to a ſtation, for which his talents were peculiarly adapted. This was in the year 379, after which Gratian returned to Italy, and in his journey he had an opportunity of being benefited by the inſtructions of the celebrated Ambroſe, at Milan, which proved beneficial to the orthodox, but occaſioned new reſtrictions upon thoſe who were regarded as ſectaries. After this he continued for ſome length of time to attend to the defence and concerns of the empire, and is highly applauded for almoſt all the amiable qualities which have decorated the beſt of ſovereigns. Still it was feared that his good principles were rather the effect of able and virtuous adviſers, than the ſpontaneous reſult of fixed habits. What the beſt friends to their country feared, proved to be the real fact: he ſuddenly fell into ſnares of unmanly pleaſures, ſpent much of his time in indolence or frivolous amuſements, which proved not only injurious to his ſubjects, but, in the end, ruinous to himſelf. Hunting became his favourite paſtime: to enjoy the purſuits of the chace, he neglected the duties incumbent upon him, as the ſovereign of a great people, and thoſe only became his favourites who were ſkilful in hunting. He offended the more ſober part of his ſubjects, by appearing in the garb of a Scythian warrior, armed with a bow and quivers, and diſcontents were on the very point of embodying themſelves into a ſerious ſhape, when a revolt took place among the legions of Britain, who, without heſitation, inveſted Maximus with the imperial diadem. Gratian attempted an oppoſition; but his own efforts were feeble, and theſe even were counteracted by the treachery of ſome of his officers. He had no ſooner unfurled his banners, and put himſelf in a warlike poſture, than he was deſerted by his houſhold troops. He had now no hope, and immediately fled with about 300 faithful troops towards the Alps. All the cities on his road manifeſted evident ſigns of diſloyalty: they even refuſed him a ſhelter or admiſſion into their towns, till he arrived at Lyons. Here, indeed, the gates were opened for his reception, but the hearts of the people were eſtranged to his cauſe, and upon the arrival of the cavalry of Maximus, the governor of the city betrayed the depoſed emperor into the hands of the commander, who cauſed him to be put to death, as he roſe from his ſupper. This was in the year 383, after Gratian had been on the throne nearly eight years. Gibbon. Univer. Hiſt.

GRATIAN, a Benedictine monk, who flouriſhed in the twelfth century, was a native of Chiuſi, in Tuſcany, and embraced the monaſtic life at Bologna. Before his time, there had been many collections of canons and laws of the church, but they were ſo defective in matter and form, that they could not be conveniently explained, or even made uſe of as ſyſtems of eccleſiaſtical polity. Gratian undertook the taſk of compiling ſuch a ſyſtem, and after more than twenty years' labour he produced, in 1151, an abridgment of canon law, drawn from the letters of the pontiffs, the decrees of the councils, and the writings of the ancient doctors, which he entitled "Concordantia diſcordantium Canonum," or as it has been tranſlated, "The Coalition of jarring Canons" In a new edition of this work, it was called "Decretum Gratiani," or "Gratian's Decretal." By this name it is generally known. Upon the firſt appearance of the work, it received the ſtamp of approbation from pope Eugenius III., who declared himſelf ſo ſatisfied with its execution, that he commanded it to be publicly read in the ſchools. The profeſſors of Bologna were the firſt who unanimouſly adopted it as a text book in their public lectures, and their example was ſoon followed by the profeſſors of Paris, and, in ſhort, by thoſe of almoſt all the European colleges. It is, however, ſaid to be full of errors, and in other reſpects extremely defective, but as it was calculated to ſupport deſpotiſm, and to extend the authority of the Roman pontiffs, it was for four centuries appealed to as the ſtandard of eccleſiaſtical law, and even in ages ſucceeding that dark period, it has occaſionally been quoted with a degree of veneration and authority, to which it has no juſt title. It was uſed in MS. till 1472, when it was printed at Mentz: this edition was followed by impreſſions at Venice in 1476, and Paris in 1508. Another edition was printed at Rome under the auſpices of pope Gregory XIII. in four vols. fol. on which a large portion of labour was beſtowed in correcting its numerous imperfections. Anthony Auguſtin, archbiſhop of Tarragona, in Spain, publiſhed a valuable treatiſe "De Emendatione Gratiani," of which the beſt edition is that publiſhed at Paris in 1672. Moreri.

GRATICULATION, a term ſome writers uſe for the dividing a draught or deſign into ſquares, in order to the reducing it thereby.

GRATINGS, in a *Ship*, are ſmall ledges of ſawed plank, framed one into another like a lattice or priſon grate, lying on the upper deck, between the main-maſt and fore-maſt, ſerving for a defence in a cloſe fight, and alſo for the coolneſs, light, and conveniency of the ſhip's company.

GRATIOLA, in *Botany*, the diminutive of *gratia*, a grace or favour, the herb to which it is applied having been called, by the earlier botanical or medical writers among the moderns, *Gratia Dei*, *the favour of God*, becauſe of its eminent virtues, which however are of a violent and cathartic nature. It is one of the plants which have been conjectured to yield the tincture called *eau medicinale*, ſo famous at preſent as a cure for fits of the gout, but this opinion, it ſeems, is contradicted by the proprietor of the ſecret.—Linn. Gen. 13. Schreb. 17. Willd. Sp. Pl. v. 1. 102. Vahl. Enum. v. 1. 88. Mart. Mill. Dict. v. 2. Ait. Hort. Kew. ed. 2. v. 1. 42. Brown. Nov. Holl. v. 1. 435. Juſſ. 121. Lamarck. Illuſtr. t. 16. Gærtn. t. 53?—Claſs and order, *Diandria Monogynia*. Nat. Ord. *Perſonatæ*, Linn. *Scrophulariæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, in five deep, awl-ſhaped or ovate, upright, permanent ſegments. *Cor.* of one petal, tubular, unequal; tube longer than the calyx, angular; limb ſmall, in five deep ſegments, of which the uppermoſt is broadeſt, emarginate and reflexed, the reſt ſtraight and equal. *Stam.* Filaments four or five, awl-ſhaped, ſhorter than the corolla, the two or three lowermoſt ſhorteſt and barren, the two uppermoſt attached to the tube of the corolla; anthers roundiſh. *Piſt.* Germen ſuperior, conical; ſtyle ſtraight, awl-ſhaped; ſtigma with two lips, cloſed after impregnation. *Peric.* Capſule ovate, pointed, of two cells and four valves, the partition from the inflexed margins at two oppoſite ſides. *Seeds* numerous, ſmall.

Eſſ. Ch. Corolla irregular, reverſed. Two ſtamens barren. Capſule ſuperior, of two cells and four valves. Calyx in five deep ſegments. Stigma with two lips.

Linnæus's *gratiola*, in the firſt edition of Sp. Pl. 17, chiefly depended on the original and primary ſpecies, the *officinalis*, for of the three others there defined, *dubia* is *Capraria gratioloides* of the ſecond edition, and *Lindernia pyxidaria* of his Mantiſſa 252; *virginiana*, though in his poſſeſſion, was made a *Gratiola* chiefly on Gronovius's authority; and *peruviana*, though a genuine *Gratiola*, had then probably never been ſeen by Linnæus at all, but was adopted from Feuillée. In the ſecond edition *G. Monnieria* takes place of the *dubia*, and a wrong Eaſt Indian ſynonym is annexed to *virginiana*, but no further ſpecies are added. In the ſecond Mantiſſa two new ones are deſcribed, *rotundifolia* and *hypopoides*, both from the Eaſt Indies, ſo that ſix ſpecies in all are enumerated in Syſt. Veg. ed. 14. To theſe Willdenow has added eight more, chiefly Eaſt Indian, prudently declining to adopt three unſeen ones from Walter's Flora Caroliniana. Vahl has far outſtepped his predeceſſors, giving 31 ſpecies in all. Unfortunately a great ſhare of theſe were deſcribed from dried ſpecimens, their genus determined chiefly by habit, and their flowers or fruit not ſufficiently inveſtigated. Indeed ſeveral of them evidently differ from the original genus in various reſpects. Mr. R. Brown, a more critical inveſtigator, has greatly reduced the genus in queſtion, though he has deſcribed three entirely new ſpecies from New Holland. We ſhall confine ourſelves to an account of ſuch as are certain, with compendious remarks on a few of the reſt.

1. G. *officinalis.* Linn. Sp. Pl. 24. Fl. Dan. t. 363. Woodv. Med. Bot. t. 47. Bulliard t. 130. Ehrh. Pl. Off. 11. (Gratiola; Matth. Valgr. v. 2. 58. Rivin. Monop. Irr. t. 106.)—Leaves ovato-lanceolate, ſerrated, five-ribbed, ſmooth, ſomewhat longer than the flower-ſtalks.—Native of moiſt places in Denmark, Germany, Switzerland, France, and Greece, flowering in June. The *roots* are perennial, rather creeping. Whole *herb* ſmooth. *Stems* annual, aſcending or erect, twelve or eighteen inches high, leafy, round, pale and very ſleek, generally ſimple. *Leaves* numerous, oppoſite, ſeſſile, dotted, above an inch long, ovato-lanceolate, bluntiſh, with many ſhallow tooth-like ſerratures in the upper part, and five, rarely ſeven, parallel ribs, of which the middle one is the moſt conſiderable. *Stipulas* none. *Flowers* pale lilac, with an orange tube, inodorous, ſcarcely an inch long, on ſimple, ſolitary, axillary ſtalks, which are generally about half the length of the leaves, often *more*, and bear a pair of bracteas cloſe to the flower, by ſome taken for additional parts of the calyx; theſe are ſpreading and a little toothed.—This ſpecies, a ſtranger to Britain, is the original one, celebrated for its purgative virtues, whence the French call it Poor-man's herb, on account of its cheapneſs and efficacy. Indeed its uſe requires great caution, and a plentiful adminiſtration of warm water, butter, or oil, at the ſame time. A ſcruple of the dried herb is mentioned as a ſufficient doſe, but its uncertainty, and its emetic properties, have juſtly brought this medicine into diſuſe; there being ſo many more unexceptionable drugs for the ſame purpoſe. Its flavour is nauſeous and intenſely bitter.

2. G. *piloſa.* Mich. Boreali-Amer. v. 1. 7. Vahl. n. 16. (G. peruviana; Walt. Carol. 62.)—Leaves ovate, crenate, hairy as well as the ſtem. Flowers axillary, nearly ſeſſile.—Native of moiſt places in South Carolina, flowering in May. *Stem* ſimple or branched, near a foot high, ſquare, leafy, very hairy. *Leaves* ovate, not an inch long, ſomewhat heart-ſhaped and claſping the ſtem with their baſe, bluntiſh, with two or three diſtant teeth on each ſide, fringed, dotted, and hairy. *Flowers* nearly ſeſſile, white, with a pair of ſpreading bracteas, which are fringed like the calyx.

3. G. *peruviana.* Linn. Sp Pl. 25. (G. latiore folio, flore albo; Feuill. Peruv. v. 3 23. t. 16.)—Leaves ovate oblong, toothed, downy, obſcurely five-ribbed. Flowers axillary, ſeſſile.—Native of Peru, Mexico, and the Brazils. The whole herb is more or leſs downy. *Stem* a ſpan high, angular, moſtly ſimple. *Leaves* oblong, ſomewhat ovate, various in breadth, bluntiſh, obſcurely five-ribbed, the margin furniſhed with diſtant teeth. *Flowers* white, nearly or quite ſeſſile, ſhorter than the leaves, with a pair of bracteas very like, and about equal to the calyx, ſtrongly countenancing the idea of their being properly calyx-leaves.

4. G. *latifolia.* Brown n. 1.—"Smooth. Leaves ovate, obtuſe, obſcurely crenate or entire. Flowers ſeſſile."—Native of the neighbourhood of Port Jackſon, New South Wales, and of Van Diemen's land.

5. G. *pubeſcens.* Brown n. 2.—"Clothed with glandular hairs. Leaves lanceolate, toothed. Flowers nearly ſeſſile."—Native of Port Jackſon, the ſouth coaſt of New Holland, and Van Diemen's land.

6. G. *pedunculata.* Brown n. 3.—"Clothed with powdery down. Leaves lanceolate, toothed in their forepart, ſcarcely longer than the flower-ſtalk."—Native of Port Jackſon.

Mr. Brown announces the exiſtence of a few unpubliſhed ſpecies, natives of North America, of which we know nothing further. He mentions the Linnæan *G. hypopoides* and *rotundifolia* as ſpecies of *Lindernia* with two barren ſtamens, undoubtedly a variable circumſtance in this tribe, and conſtituting no generic diſtinction. *G. Monnieria* is his *Herpeſtis*, and has the appearance of a good genus.

With reſpect to ſome other ſpecies.

G. *linifolia.* Vahl. n. 4. (Digitalis linifolia luſitanica paluſtris; Tourn. Inſt. 165.)—"Leaves linear, entire. Flower-ſtalks axillary, the length of the leaves."—Native of Portugal. This ſeems an unqueſtionable *Gratiola*, near the *officinalis*, with which it agrees in qualities, but differs in leaves, and in the flowers not being more than one-third the ſize of that ſpecies.

G. *lobelioides* of Retzius, Vahl. n. 10, has neither the habit, calyx, nor bracteas of this genus.

G. *trifida.* Willd. n. 9, ſeems to agree in all thoſe points with Mr. Brown's *Limnophila*, the *Hottonia indica* of Linnæus.

G. *lucida.* Vahl. n. 17. (*Capraria cruſtacea* of Linnæus), is referred by Mr. Brown to *Torenia*, a genus hitherto not much underſtood.

Gratiola *Officinalis*, *Hedge-Hyſſops*, in the *Materia Medica*, is a plant to which various medical virtues have been aſcribed. The firſt account of its cultivation in Britain, is that given by Turner in 1568, though it is ſaid that the firſt botaniſt who mentioned it was Matthiolus. It has a ſtrong bitter nauſeous taſte, with but little or no odour; and its virtues are extracted more perfectly by aqueous than by ſpirituous menſtrua. It reſembles digitalis both in the ſhape of its flowers, and in its medicinal effects, and hence has been called Digitalis minima. It is certainly a powerful and active cathartic, and operates ſo violently as generally to induce vomiting; and on this account, Chomel thought it to be a medicine adapted only to the more vigorous and robuſt conſtitutions. Many others, however, recommend it as a ſafe and uſeful purgative. But as its effects are uncertain, it ſhould be adminiſtered with the precaution of a gradual increaſe of its doſe. This plant has been commonly uſed in hydropical caſes; and in moderate doſes it is ſaid not only to act as a hydragogue, but alſo to manifeſt a diuretic character; and inſtances of its good effects in aſcites and anaſarca are related by many reſpectable practical writers. Geſner and Bergius found a ſcruple of the powder to be a ſufficient doſe, as in this caſe it frequently excited nauſea or vomiting; others have given it to half a dram, two ſcruples, a dram, and even more. The extract is ſaid to be more efficacious than the plant itſelf, and exhibited in the doſe of half a dram or a dram in dyſenteries, produces the beſt effects. Koſtrzewſki informs us, that in the hoſpitals at Vienna, three maniacal patients were perfectly recovered by its uſe; and in the moſt confirmed caſes of lues venerea, it effected a compleat cure. It uſually acted by increaſing the urinary, cutaneous, or ſalivary diſcharges. Woodv. Mat. Med.

GRATIOSA, in *Geography*, one of the ſmalleſt Canary iſlands. N. lat. 29° 15′. W. long. 13° 17′.—Alſo, one of the Azores iſlands, about 10 miles long and eight broad. It takes its name from its beautiful appearance, and fertility in corn, fruit, paſture, and cattle, with which it ſupplies Tercera, and ſeveral of the other iſlands. It is well peopled, and has a number of villages; and the coaſt is defended by forts. The chief place is La Plata. N. lat. 39° 2′. W. long. 27° 56′.

GRATITUDE, in *Ethics*, a virtue diſpoſing the mind to an inward ſenſe and outward acknowledgment of benefits received. This is a virtue in which the Egyptians pretended to excel all the reſt of mankind. See Egypt.

GRATIUS, in *Biography*, a Roman poet, ſurnamed from the place of his birth Faliſcus, was a contemporary of Virgil. They are both mentioned by Ovid in a ſingle diſtich. The work by which this author is known, and for which he claims a ſhort notice, is entitled "Cynegeticon," or the Art of hunting with Dogs. It was entirely unknown to the moderns till it was brought to light by Paul Manutius in 1534. This learned editor printed it from a MS. copy brought by Sannazaro from France. It is ſaid to be written with a purity not unworthy of the Auguſtan age. The beſt edition is that of Leipſic 1659, 4to. with notes. It has been printed in the collection of "Rei Venaticæ Scriptores," 1728, and in Mattaire's "Corpus Poetarum." Gen. Biog.

GRATTAN, in *Agriculture*, a term applied provincially in ſome ſituations to ſuch arable lands as are managed under a commonable ſtate. But in other places, as in Cornwall, it is employed to ſignify the mowing of graſs the firſt year, after the ground has been manured with ſea ſand; which is an operation that they denominate mowing in grattan. The ſtubbles of common fields are alſo frequently called grattans.

GRATZ, or Graz, in *Geography*, a town of the duchy of Stiria, on the river Muehr; containing ſeveral churches and convents, an arſenal, a caſtle on a rock, and an univerſity founded in 1585. In this town is held the aſſembly of the ſtates; and in 1784, it was erected into an archbiſhopric on the ſuppreſſion of that of Goritz. It is ſurrounded by walls. The French took it in 1797; 70 miles S.S.W. of Vienna. N. lat. 47° 10'. E. long. 15° 16'.—Alſo, a town of Sileſia, called alſo *Hradetz*, in the principality of Troppau, ſituated on the Mora; four miles S. of Troppau. N. lat. 49° 47'. E. long. 17° 50'.

GRATZEN, a town of Bohemia, in the circle of Bechin; 37 miles S.S.E. of Bechin. N. lat. 48° 47'. E. long. 14° 43'.

GRAVA Sele, a town of Naples, in the Baſilicata; 15 miles E. of Venoſa.

GRAVATTEN, a town of Pruſſia, on the Curiſch Nerung; 20 miles S. of Memel.

GRAUDENTZ, a town of Pruſſia, in the palatinate of Culm, on an iſland near the Viſtula; anciently called Grodek; 14 miles N. E. of Culm. N. lat. 53° 28'. E. long. 18° 28'.

GRAVE, in *Grammar*, a ſpecies of accent oppoſite to acute. The grave accent is expreſſed thus (`); and ſhews that the voice is to be depreſſed, and the ſyllable over which it is placed pronounced in a low, deep tone.

Grave, in *Muſic*, is applied to a ſound which is in a low or deep tone.

The thicker the chord or ſtring, the more grave the tone or note, and the ſmaller the acuter.

Notes are ſuppoſed to be the more grave, in proportion as the vibrations of the chord are leſs quick. See Gravity, in *Muſic*.

Grave is alſo an ingredient in the compoſition of divers terms in hiſtory and policy. Thus we ſay *land-grave*, *burg-grave*, *marg-grave*, *pals-grave*, &c.

The word, in this ſenſe, is formed of the German *graf*, ſignifying *comes*, *count*; called in the barbarous Latin *gravio* and *graphio*.

Grave is alſo uſed for a tomb, wherein a perſon defunct is interred.

Grave, Ital. (pronounced *graavay*) an adverb applied to ſlow movements in the ſecond degree, more quick than *adagio*, and more ſlow than *largo*. In adagio movements, the time is uſually counted by quavers, in grave, by crotchets. *Grave*, Ital. and *gravement*, French, not only imply a ſlow time, but a certain *gravity* in the execution.

Grave, in *Geography*, a ſtrong town of Brabant, belonging to Holland, ſituated in a marſhy country, on the S. ſide of the Meuſe; 34 miles S.E. of Utrecht. N. lat. 51° 46'. E. long. 5° 41'.

Grave *Creek*, a creek on the Ohio in Virginia, 12 miles from Wheeling. N. lat. 39° 46'. W. long. 80° 55'. Near this creek is a mound of earth, evidently the work of art, called an Indian grave. Although no tradition remains, that the Indians buried their dead in this manner, theſe mounds, on examination, have been found to contain a chalky ſubſtance, ſuppoſed to be bones of the human kind.

Grave *Harmonic*, in *Muſic*, is a phenomenon thus deſcribed by the late Dr. Robiſon: "The reinforcements of ſound, which are called *beatings*, are noiſes. If any noiſe whatever be repeated with ſufficient frequency, at equal intervals, it becomes a muſical note of a certain determinate pitch. If it recurs 60 times in a ſecond, it becomes the note C-*fa-ut*, or the double octave below the middle *c* of our harpſichords, or the note of an open pipe eight feet long. Now there is a ſimilar (we may call it the very ſame) reinforcement of ſound in every concord. Where the pulſe of one ſound of the concord biſects the pulſe of the other, the two ſounds are more uniformly ſpread; but where they coincide, or almoſt coincide, the condenſation of one undulation combines with that of the other, and there comes on the ear a ſtronger condenſation, and a louder ſound. This may be called a *noiſe*; and the equal and frequent recurrence of this noiſe ſhould produce a muſical note. If, for inſtance, *c* and *a* are ſounded together; there is this noiſe at every third pulſe of *c*, and every fifth pulſe of *a*; that is, 80 times in a ſecond. This ſhould produce a note which is a 12th below *c* and a 17th below *a*; that is, the double octave below *f*, which makes 320 vibrations in a ſecond. That is to ſay, along with the two notes *c* and *a* of the concord, and the compound ſound which we call *the concord of the* VI*th*, we ſhould hear a third note FF in the baſs. Now this is known to be a fact, and it is the *grave harmonic* obſerved by Rameau and Tartini about the year 1754, and verified by all muſicians ſince that time."

Mr. John Gough gives the following account of grave harmonics. "When two ſounds are heard in concert, the vibrations producing them are arranged in cycles, no one of which continues for a longer or ſhorter time than the reſt; and their effect is perceived by the ear, which becomes ſenſible of their preſence. For when each cycle of a ſeries, ſeparately conſidered, exceeds the twelfth part of a ſecond, the ſenſe of hearing recognizes each point of diviſion made by the coincidence of the vibrations which ſeparate the contiguous cycles; this circumſtance enables the ſenſe to contemplate theſe periods apart, and comprehend their origin. On the contrary, when the duration of a cycle belonging to a compound ſeries does not exceed the twelfth part of a ſecond, the interval proves too ſmall to be meaſured by the ear: it therefore eſcapes notice in a ſeparate ſtate; for the points of diviſion recur too frequently to be obſerved. When the auditory organ finds itſelf in circumſtances anſwering to the preceding deſcription, it has but one method to purſue; which is, to treat theſe derivative intervals in the ſame manner it treats all periods, which are ſingly too ſmall for its comprehenſion; it therefore reduces them to a ſimple muſical ſound, correſponding in pitch to a ſtring which vibrates once in the time of each ſucceſſive cycle. A grave harmonic is on this account always a lower note than any of its conſtituents, ſeeing the time of a cycle exceeds the greateſt vibration that enters into the compoſition of it. The ſtrength of a grave harmonic is alſo weak, when compared with the notes compoſing it, becauſe theſe ſecondary ſounds, being nothing more than certain unavoidable efforts of the imagination, they aſſume the character of a feeble ſound, which is juſt ſtrong enough to be heard in the company of one or more louder tones; for the power of the imagination is always inferior to external impreſſions, except in fits of inſanity, when the organs of ſenſe appear to be blunted by phyſical cauſes. The grave harmonics *always keep the direction of the ears*, let the poſition of the head be changed as often as you pleaſe, reſembling in this circumſtance a ſhrill piping note, called the ringing of the ears; which every one aſcribes to a ſlight affection of the auditory duct, becauſe it differs from external ſounds, in having no fixed direction. The grave harmonics agree with the ringing of the ears in this remarkable particular; which is a ſtrong proof that their immediate cauſe is ſeated in the perſon of the hearer; and it is evident from the nature of things, that this cauſe originates in the mind." Nicholſon's Journal, 8vo. vol. iv. p. 2.

We have been thus particular in quoting from two very able writers on the ſubject of the grave harmonics, or Tartinian ſounds, in order to ſhew the foundation of the rules which we ſhall here give, for determining the grave harmonic of any given perfect conſonance, *viz.*

1ſt. Find the number of vibrations made in one ſecond of time by each of the given ſounds: which, ſuppoſing C-*ſol-fa-ut*, or *c* of the German tablature, or that on which the tenor cliff is placed, to make two hundred and forty complete vibrations, is obtained, by multiplying this number by the larger term of the ratio of the given ſounds to C, and dividing the product by the ſmaller term of that ratio, if the given ſounds lie above C, or the reverſe if below it.

2d. Having thus obtained the vibrations of the given conſonance, divide the larger number of them, by the larger term of the given conſonance, and the ſmaller number by the ſmaller term, each of which, if the operation be rightly performed, will give the ſame reſult, and ſhew the number of coincidences of the pulſes of the two given ſounds in one ſecond, and alſo the vibrations in that ſame period, of the grave harmonic ſought.

3d. Compare the number of vibrations laſt found with each of the vibrations of the given conſonance, and reduce their ratios to the loweſt terms, which will then expreſs the intervals or diſtances of the grave harmonic, below each of the given ſounds.

By way of examples of theſe rules, we ſubjoin the following table, ſhewing the grave harmonic, and ſeveral other uſeful particulars, of the principal conſonances in the octave, above C-*ſol-fa-ut*.

1	2	3	4	5	6	7	8	9	10	11	12	13
VII	B	$\frac{8}{15}$	450	30	$\frac{1}{8}$	*c*	XXII	3 VIII	$\frac{1}{15}$	*c*	XXVIII	3 VIII + VII
7th	bB	$\frac{5}{9}$	432	48	$\frac{1}{5}$	※*g*	XVII	2 VIII + III	$\frac{1}{9}$	※*g*	XXIII	3 VIII + II
		$\frac{9}{16}$	$426\frac{2}{3}$	$26\frac{2}{3}$	$\frac{1}{9}$	b*b*	XXIII	3 VIII + II	$\frac{1}{16}$	b*b*	XXIX	4 VIII
VI	A	$\frac{3}{5}$	400	80	$\frac{1}{3}$	*f*	XII	VIII + V	$\frac{1}{5}$	*f*	XVII	2 VIII + III
6th	※G	$\frac{5}{8}$	384	48	$\frac{1}{5}$	※*g*	XVII	2 VIII + III	$\frac{1}{8}$	※*g*	XXII	3 VIII
V	G	$\frac{2}{3}$	360	120	$\frac{1}{2}$	*c*	VIII	VIII	$\frac{1}{3}$	*c*	XII	VIII + V
4th	F	$\frac{3}{4}$	320	80	$\frac{1}{3}$	*f*	XII	VIII + V	$\frac{1}{4}$	*f*	XV	2 VIII
III	E	$\frac{4}{5}$	300	60	$\frac{1}{4}$	*c*	XV	2 VIII	$\frac{1}{5}$	*c*	XVII	2 VIII + III
3d	bE	$\frac{5}{6}$	288	48	$\frac{1}{5}$	※*g*	XVII	2 VIII + III	$\frac{1}{6}$	※*g*	XIX	2 VIII + V
3`		$\frac{27}{32}$	$284\frac{4}{9}$	$8\frac{8}{9}$	$\frac{1}{27}$	b*e*	XXXIV	3 VIII + 3 V	$\frac{1}{32}$	b*e*	XXXVI	5 VIII
II	D	$\frac{8}{9}$	270	30	$\frac{1}{8}$	*c*	XXII	3 VIII	$\frac{1}{9}$	*c*	XXIII	3 VIII + II
II`		$\frac{9}{10}$	$266\frac{2}{3}$	$26\frac{2}{3}$	$\frac{1}{9}$	b*b*	XXIII	3 VIII + II	$\frac{1}{10}$	b*b*	XXIV	3 VIII + III
2d	※C	$\frac{15}{16}$	256	16	$\frac{1}{15}$	※*c*	XXVIII	3 VIII + VII	$\frac{1}{16}$	※*c*	XXIX	4 VIII
		$\frac{24}{25}$	250	10	$\frac{1}{24}$	*f*	XXXIII	4 VIII + V	$\frac{1}{25}$		XXXIII	4 VIII + 2 III
	C	$\frac{1}{1}$	240									
Intervals, Major and minor.	Letters.	Ratios.	Vibrations in 1″, of the Given Sounds.	Vibrations in 1″, of the Harmonic Notes.	Ratios.	Letters.	Intervals.	Ditto.	Ratios.	Letters.	Intervals	Ditto.
					Intervals below the Key or lower Note.				Intervals below the upper Note.			
Given Conſonances.				Grave Harmonics, or Implied Sounds.								

The experiments of M. Tartini, the diſcoverer of theſe ſounds, extended to ten of the conſonances in our table above, *viz.* the V, 4th, III, 6th, 3d, VI, II, II`, (ſecond minor,) 2d, (greater ſemitone,) and minor ſemitone ($\frac{24}{25}$), but in all of which he ſeems to have miſtaken an octave, in aſſigning the place of the harmonic in the ſcale, and has mentioned each of them as being higher by an octave than in our table. Mr. John Holden, the author of "An Eſſay towards a rational Syſtem of Muſic," printed at Edinburgh in 1807, p. 352, ſeems to have been aware of this latter circumſtance, but in page 350, lays down an inapplicable and falſe rule for calculating the place of the harmonic, or *implied ſound*, as he calls it; *viz.* "when two different ſounds are heard together, their combination always either really produces, or eſſentially implies, a third ſound, *whoſe vibrations are equal to the difference of the vibrations of the two ſounds* in the ſame time." Thus C 240, heard together with G 360, produces 120; which is *c* an octave below C, &c. Now it is obſervable, that this empirical rule will give the ſame reſults as ours above, only in ſuch caſes where the leaſt terms of the ratio (in column 3) differs by *unity*; which is the caſe in eight of Tartini's examples out of the ten, but not with the VI or the 6th: which, according to Holden's rule, ſtand thus, 400 — 240 = 160, and $\frac{160}{240} = \frac{2}{3}$, or the fifth below the key, inſtead of the XIIth (as Dr. Robiſon and we have calculated it above); alſo, 384 — 240 = 144, and $\frac{144}{384} = \frac{3}{8}$, or the octave and fourth, or eleventh, below the upper note, inſtead of the XXII. It is not a little ſurpriſing that Mr. H. ſhould have overlooked theſe glaring inconſiſtencies of his rule, with Tartini's experiments, on which he profeſſes to have founded it; acknowledging, however, (p. 351.) that he is unable to diſcover any philoſophical principles on which theſe phenomena can be explained, and of courſe unacquainted with the writings of the two authors, from whence we have extracted as above. We ſhould not perhaps have thus adverted to Mr. Holden's eſſay, had it not been in other reſpects a moſt reſpectable work, and one through which theſe errors are likely to be widely diſſeminated among muſicians, and were not the fanciful ſyſtem of harmony, which he builds ſolely upon them, calculated to bewilder ſtill further the muſical ſtudent, who may happen to have but a ſlight knowledge of mathematics. Among the novelties of Mr. Holden's ſyſtem, he pretends to prove, by means of the implied ſounds, (calculated by his rule,) that the minor third, $\frac{5}{6}$, is a "ſuperſtructed third," and not the fundamental leſs third of the ſcale, which he ſays is expreſſed by the ratio $\frac{27}{32}$, (though *conceived probably*, as he ſays, p. 371, by the ratio $\frac{16}{19}$,) on which account we have introduced this comma-deficient minor third into our table, and when its harmonic is ſhewn to be ♭ *e*, *five octaves* below the upper note of the conſonance, inſtead of $284\frac{4}{9} - 240 = 44\frac{4}{9}$, and $44\frac{4}{9} \div 284\frac{4}{9} = \frac{5}{32}$, which expreſſes 2 VIII + 6th, or a minor twentieth below the upper note, as Mr. H.'s rule would have given it: whereas, had he uſed the true method of aſſigning the place of this harmonic or implied ſound, his boaſted fundamental leſs third, (beſides proving leſs agreeable to the ear *on trial*, p. 384, than $\frac{5}{6}$,) muſt have been degraded from the rank of concords, as having an implied ſound more than three octaves below the loweſt of its notes, which is one of the eſſential properties of concords, according to their new conceits.

Another reſult of theſe falſe principles in the Eſſay is, the admiſſion of the integer 7 among harmonic ratios (though to the excluſion of 5 × 7; 7^2, 7^3, &c. $2^2 \times 7$, $2^3 \times 7$, &c. page 341, and alſo of page 305, although 7, 11, 13, 19, &c. have real places in the *falſe* notes of the trumpet, horn, &c.), and the conſequent introduction of what the author calls a GRAVE *fourth* (ſee that article), in his deſcending ſcale, page 316. According to which alſo, the acute or comma-redundant major ſixth ($\frac{16}{27}$), belongs eſſentially to the ſcale, inſtead of the true concord $\frac{3}{5}$! We truſt that we ſhall have performed an acceptable piece of ſervice to the well-wiſhers to the harmonic ſcience, in pointing out the ſource of ſuch incongruous abſurdities as the above; and hope, that in a ſecond edition of this uſeful work nearly all which follows page 349 will be expunged, and conſigned to its merited oblivion.

The grave harmonics found by the rules and table above, are occaſioned by the coincidences of the vibrations of perfect conſonances, or the *beats* of Mr. Sauveur, but ſince the *beats* of Dr. Robert Smith alſo, or thoſe made by imperfect concords, when they occur oftener than 12 or 13 in a ſecond, occaſion a grave harmonic note to be perceived, and no theorems for calculating ſuch beats, except that of Dr. Smith from the fractions of a comma of temperament, and Mr. Emerſon's from the lengths of ſtrings, having to our knowledge been publiſhed, we ſhall here ſupply that defect in our article BEATS, and give theorems for calculating the beats made by imperfect or tempered concords whoſe vibrations per ſecond are given, *viz.*

Let N and M be the number of complete vibrations made in one ſecond, by the grave and acute notes reſpectively, of the tempered concord whoſe perfect ratio is $\frac{n}{m}$ (n being the leaſt term, in its loweſt number), and let *b* be the number of beats in one ſecond of time.

Then, if the temperament be *ſharp*, $b = n M - m N$, the beats required.

Or, if the temperament be *flat*, $b = m N - n M$, the beats required.

Take for example, the 3d in our table above, and we have $N = 240$, $M = 284\frac{4}{9}$, $n = 5$, and $m = 6$: and by the ſecond theorem above $6 \times 240 - 5 \times 284\frac{4}{9} = 17\frac{7}{9}$ the beats in one ſecond: which are, it will be obſerved, juſt double the vibrations in column five of the table, and therefore the grave harmonic thus occaſioned, is four octaves below the upper note of this comma deficient minor third. The above theorems for beats will be found of like eaſy application, in almoſt every inſtance of muſical calculations.

GRAVE *Intervals* is a term applied by Mr. Maxwell and ſeveral other correct writers, to ſuch conſonances as are flattened or lowered by a *major* COMMA (ſee that article) and it is uſual with them to diſtinguiſh ſuch intervals by the grave accent thus, IIˋ, IIIˋ, IVˋ, Vˋ, VIˋ, &c.; and on the contrary, to apply the acute accent to ſuch as are ſharpened or raiſed a major comma, as II′, III′, 4′, &c. and to call ſuch *acute intervals* or *comma redundant* intervals, while thoſe as much flattened are called COMMA *deficient intervals*, which ſee. Mr. Holden, a modern writer, has, however, applied this term to intervals lowered by what he calls a *bearing*, whoſe ratio is $\frac{63}{64} = 11.94709\Sigma + m$. See GRAVE *fourth*, &c.

GRAVE *fourth*, according to Mr. Holden's ſyſtem lately publiſhed, is an interval leſs than a perfect fourth, by what he calls a *bearing* (which is $\frac{63}{64} = 13.94709\Sigma + m$) having the ratio of $\frac{16}{21} = 240.05291\Sigma + 5f + 21m$ in Mr. Farey's new notation; its common logarithm is .8819006, 8792, its Euler's logarithm or decimal value of the octave is .3923175, and it contains 21.89039 major commas.

GRAVE *proper ſemitone*, is an interval in Mr. Holden's Syſtem of Muſic, whoſe ratio is $\frac{20}{21} = 43.05291\Sigma + f + 4m$; its common logarithm is .9788107,1, and Euler's logarithm .070389, and the number of major commas 3.92754 which it contains.

GRAVEDO, in *Medicine*, a Latin term, derived from *gravis*, heavy, ſignifies that ſpecies of catarrh, which is uſually called *a cold in the head*; and in which, together with a ſtuffing of the noſtrils, and blunting of the voice, there is a ſenſe of fullneſs and weight in the forehead. It is, according to Celſus, nearly ſynonymous with the *coryza* of the Greeks. See CATARRH. Celſus, de Med. lib iv. cap. 2.

GRAVEDONA, or GRAVIDONA, in *Geography*, a town of Italy, in the department of the Lario, on the lake Como: 42 miles N. of Milan.

GRAVEL, in *Agriculture,* a term frequently applied to a well known material of the ſmall ſtony kind, the ſizes of the particles of which vary from thoſe of very ſmall peas to cockles, and ſometimes larger. They are often intermixed with other matters, ſuch as ſand, clay, loam, flints, pebbles, iron ocres, &c. Hence there are *ſandy, clayey, loamy, flinty, pebbly, ocrey* or *ferruginous* gravels, &c.

GRAVEL, in *Gardening,* is a ſmall ſtony ſubſtance made uſe of for the purpoſe of conſtructing roads, walks and paths. Walks formed of this material are great ornaments to gardens and pleaſure-grounds, as well as uſeful for common walking upon.

The beſt gravel for thoſe purpoſes is that which is naturally compoſed of irregular pebbles and flints, having a moderate proportion of a yellowiſh or browniſh ſandy loam, to make it bind, and give colour. It is obtained in fields and commons, in many parts, at from one, to three or four feet under the ſurface, though not equally good in all parts, in reſpect to quality and colour, ſome having a greater or leſs proportion of pebbles, a larger or ſmaller proportion of loam, which is more or leſs ſandy or clayey: it is the colour of the loam, or oxyd of iron, principally, which conſtitutes the beauty of gravel walks; that of a deepiſh yellow or reddiſh colour being the moſt eligible, as when formed into well-laid walks and rolled, it has an exceedingly beautiful and ornamental effect. Where ſuch gravel can be procured within a moderate diſtance, and eaſy expence, it is preferable to all others in ſome parts. Gravel is of an iron-mould colour, or of a duſky brown hue, which may nevertheleſs be of a proper quality for walks where the colour is diſregarded.

Whatever colour the gravel may have, its proper quality for walks is, a due proportion of moderate, light, ſandy loam, to make it bind cloſe and firm at all ſeaſons; but not ſo redundant, or ſo clayey, as to be clammy and ſtick to the feet in wet weather, or ſo ſharp and ſandy as to become open and looſe in dry weather.

In ſome places, no other gravel is met with but ſuch as is very looſe, ſandy, or pebbly, and which has ſcarcely any binding materials amongſt it; which kind never of itſelf binds, but always remains open and looſe, being at all times diſagreeable to walk upon; this may, however, be mended by a mixture of light ſandy loam, where practicable, adding about one load to every two or three of gravel, caſting them together, and turning them over two or three times, that they may be well blended and incorporated; and this, when formed into a walk, will often bind cloſe, firm, and ſmooth at all ſeaſons of the year.

In preparing the gravel for walks, it ſhould not by any means be finely ſcreened, as is often the practice: as it is dug out of the pit, it is only neceſſary to caſt it up in a heap, or long ridge, all ſuch large rough pebbles only as roll down being cleared away; as if ſcreened from the ſtones, it partakes too much of the loam, ſo as always to ſtick to the feet at every flaſh of rain.

In purchaſing gravel for walks, it is moſtly from about two to five or ſix ſhillings or more per cart-load for three horſes; though the price differs greatly in different parts, and according to the nature of the gravel, as well as the goodneſs of its colour.

In reſpect to the diſtribution of gravel-walks in pleaſure-grounds, and gardens, for ornament or uſe, large ones are neceſſary to proceed parallel to the houſe, extending each way towards the ſide diſtricts of the garden and ornamented grounds: according to the former ſtyle of gardening, a large walk of this kind was uſually extended in a ſtraight line from the front of the habitation along the middle of the pleaſure ground, ſometimes having graſs plats continued on each ſide, and ſometimes ſpacious borders furniſhed with curious ſhrubs and flowers. But in modern deſigns theſe middle walks are rarely admitted, eſpecially in ſpacious grounds, having nothing in front beyond the parallel habitation walk, but an open rural graſs lawn, free from all interſections of walks, &c. However, a good walk cloſely parallel to the houſe is indiſpenſably neceſſary, both for ornament and convenience, and from this ſide-walks ſhould branch off, communicating with the other parts of the pleaſure or garden-grounds; one in particular to be extended in a ſerpentine manner quite round the ground, others leading in the ſame manner through the interior parts, ſo as to have dry firm walking at all times to every part of the ground or garden, without coming upon the graſs.

The dimenſions for gravel-walks muſt be regulated according to the extent of the grounds or gardens, as from five to twenty feet or more in width; but all principal walks ſhould be at leaſt eight or ten feet wide; and in large grounds or gardens leading directly from the houſe, they ſhould be ten, fifteen, or twenty feet wide at leaſt. When the houſes and gardens are very large, the main walks contiguous to the manſion are ſometimes made thirty or forty feet wide; the boundaries on each ſide being ſometimes in graſs widely extended, and ſometimes in borders for flowers and other curious plants, having either narrow verges of graſs, or edgings of dwarf box, or thrift, on the ſides of the walks.

In forming walks of this ſort, they ſhould be firſt ſtaked out to the proper width, and then the boundaries formed, each ſide of equal level, correſponding to the adjacent ground; the cavity of the walk for the reception of the gravel being afterwards made, the whole ſpace being dug out at leaſt twelve inches deep, to allow for a proper depth of gravel, both to prevent weeds coming from the ground below, and worms from caſting up the earth; as alſo to allow of a proper depth for turning the gravel occaſionally when the ſurface becomes foul; the earth dug out to form the cavity of the walk may be uſed to raiſe and form the ground on each ſide, if neceſſary, which, and the edgings, ſhould always be completed before the gravel is begun to be laid down into the cavity formed for it.

When the cavity has been thus prepared, any hard rubbiſhing materials may be laid in the bottom, ſeveral inches thick; ſuch as coarſe gravel or ballaſt, rough ſtony lime, brick, or other rubbiſh, which will greatly prevent worm-caſts, and help to drain the moiſture from the top of the walk in wet weather, and in winter preſerve a dry ſurface: the proper gravel is then to be laid ſix or eight inches thick; in laying, raiſing the middle higher than the ſides, in a gradual rounding form; which is not only neceſſary to throw off the wet, but alſo to give the walk a more ornamental appearance; the proportion to be obſerved in this is, for a walk of five or ſix feet width, an inch and a half of riſe in the middle; for one of ten or twelve feet, two and a half inches; and for one of twenty feet, from three to four or five inches; the ſame proportion being regarded in other widths. At every ten or fifteen feet, as the work advances in laying, it is proper to tread, rake, and roll the gravel down, as it always rolls more firm and ſmooth whilſt freſh ſtirred; it is alſo neceſſary, for fear of rain, eſpecially in loamy gravel; for which reaſons, more ſhould never be laid in one day than can be finiſhed off, except the rough laying. The treading ſhould be performed regularly with the feet pretty cloſe, taking ſhort ſteps; ſo as to render every part equally firm, and not to ſink in holes under the feet, in the work of raking and rolling. The raking ſhould be performed regularly lengthways of the walk; and in the finiſhing off or ſmooth raking, a wooden-headed rake without teeth is moſt eligible, or the back of any common rake ; as by any of theſe, the ſurface may be rendered more regular and even without drawing off the requiſite proportion of top pebbles, or raking them into holes or heaps ; as the art of ſmooth-raking is to leave all the proper-ſized top ſtones equally diſperſed over the ſurface. As ſoon as any part is thus laid and raked, it ſhould be well rolled both acroſs and lengthways ; and when the whole is laid, a good rolling ſhould be given the whole length, repeating it till the ſurface is rendered perfectly compact, firm, and ſmooth ; and after the firſt ſhower of rain, another good rolling ſhould be given, ſo as to make it bind like a rock. This method ſhould be practiſed with all walks made with theſe materials invariably.

The management afterwards is, occaſional weeding, ſweeping, and good rolling, once or twice a week, eſpecially in the advanced part of ſpring, and all ſummer ; and alſo occaſionally in winter, in dry open weather ; and when the ſurfaces become very foul, or over-run with ſmall weeds or moſs, as is often the caſe, they muſt be broken up in ſpring, and turned the ſurface to the bottom, and the bottom to the top, by which the weeds and moſs will not only be buried, but the walks appear as freſh as when new laid. The cuſtom of breaking up gravel-walks in the beginning of winter, and laying them up in rough ridges, to deſtroy weeds and moſs, is not eligible for general practice, or only occaſionally, where any walk is exceedingly overrun ; it is moſtly more adviſable to permit all the principal gravel-walks to remain undiſturbed, at leaſt till the ſpring, when, if it appear neceſſary, the whole may be broken up, regularly turned, and re-laid in a neat manner.

The turning of gravel is a ſort of ſlight digging, the foul ſurface being turned down, and the freſh up ; ſome have it performed regularly once a year in the ſpring, in order to preſerve the colour. In theſe caſes, the laying, raking, and rolling, are performed the ſame as in the firſt conſtructing the walks.

The rolling ſhould be performed once a week at leaſt in ſummer, and if two or three times the more beautiful the walks will appear, and it will tend greatly to deſtroy weeds and moſs ; it is moſtly a rule among gardeners to ſweep and roll every Saturday. During the ſummer, it is of much advantage to give a good rolling after rain, which affords a compact ſmooth ſurface, and preſerves the walks in good order.

Gravel, in *Geology*, is a term properly applied to thoſe ſabulous ſoils, or aſſemblages of worn and rounded ſtones, which are found ſcattered on the ſurface of the earth, in almoſt all ſituations. It is an eſſential character of gravel, that it ſhall contain rounded ſtones extraneous to the place where they are found, otherwiſe the breccia, rubble, and looſened rocks and ſtrata near the ſurface, owing to the action of air, wet, and froſts, &c. will be confounded with it, as too often has happened, in the deſcriptions of countries. The earthy and ſmaller matters found among gravels, vary in different ſituations, in all degrees from clay to ſand : and yet, if ſuch alluvial mixtures contain rounded ſtones, and fragments with evident marks of attrition on them, they ſhould, in deſcribing ſuch ſoils, all be denominated gravel, adding other words to diſtinguiſh the nature and quantity of their earthy mixtures : where rounded ſtones only are found, with little elſe among them, as on the ſea beach often, and in ſome gravel-pits, ſuch may be denominated very clean gravel ; if a ſmall admixture of ſand, loam, (a mixture of ſand and clay,) or clay, be found among the ſtones, ſuch may be denominated clean ſandy, clean loamy, or clean clayey gravel : where a conſiderable portion of the maſs is ſand, loam, or clay, ſuch ſhould be called ſandy, loamy, or clayey gravel : and laſtly, where the earths greatly predominate, the terms very ſandy, very loamy, or very clayey gravel ſhould be uſed ; or in place of theſe laſt, in extreme caſes, alluvial ſand, alluvial loam, or alluvial clay may be ſubſtituted : the laſt of which terms would apply to the horizontal earthy depoſits or meadow ſoils, by the ſides of rivers, the mud of lakes, &c. We have here made uſe of the term alluvial, in its ſtrict and proper ſenſe, as denoting matters worn, moved, diſperſed, mixed, and depoſited in water, in diſtinction from the regular or undiſturbed matters of the terreſtrial ſtrata : which, though they ſhew evident marks of having been depoſited in a fluid, the perfect homogenity of each lamina of the ſtrata, and their vaſt extenſion, without rude or accidental mixtures, ſhew that the laws which governed the two kinds of terreſtrial depoſit, were not leſs diſtinct and marked, than are the proceſſes of the precipitation of matters before mechanically mixed and ſuſpended in a fluid, and the cryſtallization of ſubſtances from menſtrua ſuper-ſaturated therewith. During the depoſition of the ſtrata, all was tranquil and quiet, except the movements of animated beings, which occupied ſucceſſively the vaſt ſubaqueous plains of ſtrata : during the formation and depoſition of the gravels, of all deſcriptions, all was violence and confuſion, and apparently ſo continued for a long period of time.

No problem is of more practical and theoretical importance in geology, than whether gravel is any where found *under* regular and undiſturbed ſtrata ? Were the deciſion of this queſtion to be referred to the opinions of writers on geology, mineralogy, &c. there would be little room to doubt, from their deſcription, that ſuch is ſometimes, nay frequently, the caſe ; but Mr. William Smith, from having devoted great part of twenty years to the accurate diſcrimination of ſtratified and alluvial matters, on the principles above ſtated, after examining vaſt numbers of the deepeſt and moſt extenſive wells, ſhafts, mines, quarries, &c. and converſing with quarrymen, miners, &c. who collectively have made an almoſt infinite number of obſervations, is decidedly of opinion, that no ſuch caſe can be pointed out in England. It is true, that ſandy, loamy, and clayey maſſes occur, with a very few rounded or broken and mixed ſtony fragments among them, ſo that the niceſt diſcriminations are neceſſary to diſtinguiſh ſuch, in ſome places, from ſtratified ſand, loam, (or natural brick-earth) or clay ; and under great thickneſs of ſuch doubtful maſſes, beds of rounded and mixed ſtones are found, ſometimes at very conſiderable depths, but in all ſuch inſtances, the doubtful character has continued from the very ſurface downward, to ſuch gravel-beds, and no where are regular ſtrata of ſtone, clay, or ſand found upon even theſe doubtful maſſes, when due caution is uſed in making and extending the obſervations. It is true alſo, that there are, in various parts of the Britiſh ſeries of ſtrata, ſiliceous, or grit-ſtone beds, and rocks, compoſed of diſtinct grains of ſilex, or cryſtallized quartz, of all ſizes, from ſuch as require a glaſs for viewing them, to others the ſize of a man's fiſt ; and in ſeveral inſtances, contrary to the more common caſe, of ſmall and ſizeable, or uniform grains, which diſtinguiſh moſt of our grit-ſtones, there are beds in which grains, as fine as poſſible, are mixed with the largeſt mentioned above, and have, in the cliffs and places where theſe coarſe ſtone-beds, or looſe blocks of them, are ſeen expoſed, ſo exactly the appearance, at firſt ſight, of gravel-rock, or indurated ſandy gravel, that it is no wonder they ſhould have been ſo generally claſſed with the gravels. Thoſe, however, who, like Mr. Smith, and the writer of this article, will be at the pains to trace the blocks of coarſe ſtone alluded to, to their natural bed, and to examine the newly cut, or broken faces of them, and their beds and accompanying ſtrata, and of comparing them with the heterogeneous mixtures and uncertain and irregular ſtratification of the real gravel-rocks, of which there are great tracts in Nottinghamſhire, Derbyſhire, Leiceſterſhire, Staffordſhire, Cheſhire, and others of the midland counties, in ſome places of immenſe thickneſs, will ſee abundant cauſe for diſtinguiſhing even the coarſeſt and moſt irregular of our grit-ſtone ſtrata, from the ſuperficial gravel-rocks above-mentioned, and, indeed, from alluvial, or water-worn mixtures of any kind. And ſuch obſervers will be ſtruck with ſurprize, that ſuch a regular and conſtant law, as ſeems to have regulated the formation of grains of ſilex, of all the ſizes mentioned, ſhould not have been obſerved and reſorted to, for explaining the formation of coarſe as well as fine grit-ſtones, and have guarded againſt our confounding them with the water-worn gravels. Accumulations of gravel are to be diſtinguiſhed into native and foreign, according as the pebbles and earth and extraneous bodies among them, can be referred to known and adjacent ſtrata, or conſiſts of ſtones and earths not elſewhere found, or but in very diſtant countries. For it will be found, that except on the ſea ſhore, where the waves continually carry away, and again throw up the ſtones, which fall from, or are waſhed out of the marine cliffs, that the gravel of no ſpot correſponds with the ſtrata on which it is lodged, and if in any ſituations in land this ſhould ſeem to be the caſe, it will probably be found, that thoſe ſtrata extend far to the eaſt or ſouth-eaſt of the place where their alluvial remains are lodged, and the circumſtances appear to be explainable, on the principle of a general moving of native alluvia from the ſouth-eaſt quarter towards the north-weſt quarter, as obſerved in the Philoſophical Magazine, vol. xxxv. p. 135. It is a remarkable fact, that all the very coarſe, and irregular grit-ſtone ſtrata, which have been noticed by the writer of this article in England, precede or occur beneath a ſeries of carboniferous ſtrata, or coal-meaſures; the loweſt being found in the firſt and third grit rocks of the great Derbyſhire denudation, and the others occur, both above and below the grey lime rock, which forms the floor and border of the great South-Wales coal-field (Phil. Tranſ. 1806), alſo the floor and edges of the foreſt of Dean coal-baſon, and the weſtern edge of the Somerſet and Glouceſter, or Bath coal-field, the northern edge of the Newcaſtle-underline, or pottery coal-field, &c. And which fact it ſeems to be that Mr. Kirwan alludes to, under the name of ſemiprotolite in ſome of the caſes mentioned pages 257, 293, 300, 307, 312, and 336, of his "Geological Eſſays:" it is plain, however, that theſe coarſe grit-ſtones, under our coals, do not indicate the near approach of the fundamental rock of granite, as Mr. Kirwan would have us believe. We cannot cloſe this article, without again adverting to the importance of accurately diſcriminating the alluvia found on different parts of every country, and of tracing their connection with the regular and continuous maſſes of ſtrata on which they reſt, and from whence they have been torn. Much information on the alluvia and ſtrata of the midland counties of England will be found in Mr. Farey's Report on Derbyſhire.

Gravel *Rock*, ſignifies a concreted or indurated maſs of ſandy **Gravel**, (ſee that article,) and is carefully to be diſtinguiſhed from the coarſe grit-ſtone ſtrata, which it often cloſely reſembles.

Gravel *Foſſils*, is a term applied to ſuch reliquia, or extraneous foſſils, as are found in a rounded or worn ſtate, or lodged among gravel, or alluvial mixtures, the ruins of abraded and worn ſtrata. See our article Coal, where the diſtinctions between this and other claſſes of extraneous foſſils are explained.

Gravel, in *Medicine*, the popular term for the diſorder occaſioned by the formation of ſmall calculous, or ſand-like concretions in the kidnies and bladder. It is the *Nephralgia arenoſa* of Sauvage; (ſee his Noſol. Method. Claſs VII. Genus XXV. ſpec. 2.) and to be diſtinguiſhed from the nephralgia *calculoſa* of the ſame noſologiſt, in which larger calculi, or *ſtones*, are formed and impacted in the kidnies, ureters, or bladder.

The ſymptoms which indicate the preſence of gravel in the kidnies, or in the paſſages from the kidnies to the bladder, called the ureters, are chiefly a ſevere pain in the loins, which is often accompanied by a ſenſe of numbneſs, extending down the thighs of the ſide affected, with a retraction of the teſticle in the male, and with a ſickneſs of the ſtomach, often amounting to vomiting. During the paſſage of the ſmall calculus through the canal of the ureter, the diſtenſion and irritation occaſioned by the calculus, eſpecially if its ſurface ſhould be rugged and uneven, excites thoſe ſymptoms in a more or leſs ſevere degree, or for a longer or ſhorter duration, according to its ſize and form; and they ſuddenly ceaſe when it has entered the bladder. Pain is again excited in the urinary organs, when the calculus either lies over the aperture, or enters the canal of the urethra, and a pain and difficulty of paſſing the urine is excited. Theſe ſymptoms, attending the tranſit of a ſmall ſtone from the kidney, or its expulſion from the bladder, conſtitute what is uſually called a fit of the gravel. The more common forms of the diſeaſe, however, conſiſt in the formation of a ſort of ſandy matter, of a red colour, which impedes the free paſſage of the urine, and occaſions conſiderable pain in the attempt, as well as an aching pain in the loins, through the ſympathy of the kidnies with the bladder. A whitiſh mucous matter is ſometimes diſcharged with the urine, under both theſe forms of the diſorder, probably from the irritation excited in the ſecreting veſſels, that open on the internal ſurface of the bladder: the paſſage of the ſmall calculi occaſionally cauſes a laceration of the ſmall blood-veſſels, and bloody urine is therefore diſcharged.

The little calculi, excited in thoſe caſes, are ſometimes of a bright red colour, and conſiſt, as well as the red ſand which paſſes with the urine, or is depoſited from it, of the uric or lithic acid in a concrete ſtate.

The gravel is a diſeaſe chiefly of advanced life. It is common in gouty habits, in which it often alternates with the paroxyſms of gout. It has been obſerved, too, that it deſcends by hereditary tranſmiſſion, like that diſeaſe; and that of the children of gouty parents ſome have been attacked with the gravel, while others have had the gout. It is a curious fact, alſo, that the concretions, called chalkſtones, which are depoſited in the joints in the gout, conſiſt of the ſame ſubſtance as theſe gravelly concretions, *viz* the uric acid. It is to be diſtinguiſhed from the rheumatic affection of the loins, called lumbago, by the ſickneſs which attends the more ſevere caſes, the numbneſs of the thigh and retraction of the teſticle, as well as by the mucous or bloody urine, the pain and difficulty of paſſing it, and the appearance of the ſandy ſediment in it.

Chemiſtry has enabled the phyſician to adminiſter great relief to the ſufferings occaſioned by gravel. The diſcovery, by chemical experiments, that the ſubſtance of theſe calculous and ſabulous concretions is an acid, and therefore capable of ſolution in or combination with alkaline ſubſtances, led to the adminiſtration of the alkalies internally, as remedies for the diſeaſe: and, although it has not been found, that the larger ſtones of the bladder are diſſolved or diminiſhed by the action of alkaline medicines, yet the ſmaller concretions appear to be prevented from forming, and great relief from the pain and irritation, under all the varieties of concretion, is produced by the uſe of them. Perry's ſolvent, Mrs. Stephens' medicines, and Chittick's Receipt for the ſtone, are all of the alkaline claſs. It is probable that theſe alkaline medicines operate principally on the fluids in the firſt paſſages, by neutralizing the acids occaſioned by indigeſtion, rather than by paſſing in the circulation, and combining with the uric acid in the kidnies or bladder. This would appear, partly from the fact, that the carbonated alkalies are equally or even more beneficial than the pure or cauſtic alkalies, in relieving the ſymptoms of ſtone or gravel; but it is principally proved by a circumſtance, recently aſcertained by the experiments of Mr. Home and Mr. Brande, that the abſorbent earths, eſpecially magneſia, are conſiderably more efficacious in relieving thoſe ſymptoms, and in diminiſhing the quantity of uric acid in the urine, than the alkalies themſelves. The magneſia is to be given in moderately large doſes, two or three times a day; and if it proves purgative to the bowels, a few drops of the tincture of opium may be added to it. (See Philoſoph. Tranſact. part i. for 1810.)

Of the alkalies, it would appear that the potaſs is, on the whole, more beneficial in theſe complaints than the ſoda: the pure or cauſtic potaſs may be given freely, beginning with doſes of fifteen or twenty drops, and gradually increaſing it, well diluted with any thin drink; and it may be continued for a conſiderable time with perfect ſafety. But the carbonate of potaſs is not leſs uſeful, and, eſpecially when diſſolved in water ſaturated with carbonic acid gas, it is more agreeable, and probably more efficacious. The efficacy of theſe acidulous alkaline waters was at firſt indeed attributed to the carbonic acid which they contain, and not to the alkali. (See a Medical Commentary on Fixed Air, by Dr Dobſon.) The ſoda water acidulated by the ſame gas operates in a ſimilar way, and is another agreeable mode of taking the medicine. Lime-water is likewiſe poſſeſſed of ſome remedial powers, but is leſs efficacious than the alkaline water.

All theſe aqueous liquors operate in ſome meaſure, perhaps, upon another principle; that of increaſing the quantity of fluids which paſs through the urinary organs, and thus of diluting the irritating uric ſalts, and conſequently diminiſhing the diſtreſs which they occaſion: and they may likewiſe operate negatively, by rendering the patient unable to drink the uſual quantity of wine or other ſtrong liquors. Other matters, which tend to increaſe the flow of urine, ſeem to relieve the ſymptoms of gravel, upon the principle of dilution; eſpecially ſmall doſes of the nitrous æther, or ſpiritus ætheris nitroſi, of the pharmacopœias.

When extreme pain is excited, either by the paſſing of a ſmall concretion along the canal of the ureter or of the urethra, opiates will afford a temporary relief to the ſufferings of the patient, and will perhaps aid in relaxing any ſpaſmodic contraction that may take place in theſe paſſages, and thus expedite the paſſage of the calculus. The ſame object may be promoted by the uſe of the warm bath, by fomentations to the loins and pubes, and by warm glyſters.

For the modes of relieving the ſymptoms, connected with the preſence of the larger calculi of the bladder, and of extracting theſe concretions by ſurgical means, ſee Stone:—ſee alſo Nephralgia and Nephritis.

GRAVELAINAS, in *Geography*, a town on the S.W. coaſt of the iſland of Negropont, on the ſcite of the ancient Eretria; 10 miles S. E. of Negropont.

GRAVELINES, a ſea-port town of France, in the department of the North, and chief place of a canton in the diſtrict of Bergues, ſituated in the Engliſh channel, at the mouth of the river Aa. Although it is not large, it is well fortified with baſtions, half-moons, and horn-work, and the adjacent country is interſected by canals, one paſſing to Dunkirk by Bourbourg, and another directly to Bergues. It was built in 1160, and ceded to France by the peace of the Pyrenées; 9 miles W.S.W. of Dunkirk. N. lat. 50° 59′. E. long. 2°.

GRAVELLANO, a town of Italy, in the department of the Gogna; 30 miles N. of Novara.

GRAVELLING, among *Farriers*, a diſorder incident to travelling horſes, occaſioned by little gravel-ſtones getting in between the hoof and the ſhoe, which, ſettling to the quick, fret and feſter the part.

It is cured by pulling off the ſhoe, drawing the place to the quick, picking out all the gravel, and poulticing the foot, rather than ſtopping it, according to the old practice, with horſe-greaſe and turpentine poured in hot.

GRAVELLY Land, a term applied to ſuch land as reſts upon a ſub-ſtratum of the gravel kind, or which is much intermixed with that ſort of material. This ſort of land is generally light and dry when under the plough, but apt to burn in the ſummer ſeaſon, when in the condition of graſs.

The manures ſhould be adapted to the particular natures of theſe lands; but where they are of the more light deſcriptions, they may be greatly improved by the uſe of marle, loamy clay, chalk, mud, and other ſimilar matters, as well as different ſorts of earthy compoſts. See Soil.

Gravelly *Soil*, a term ſignifying that ſort of ſoil, which is chiefly conſtituted of gravelly matters. See Soil.

GRAVEN, in *Geography*, a town of Norway, in the dioceſe of Bergen; 42 miles S.S.W. of Bergen.

GRAVENAU, a town of Bavaria; 20 miles N. of Paſſau. N. lat. 48° 48′. E. long. 13° 22′.

GRAVENWERT, a town of Bavaria; 15 miles N. of Amberg.

GRAVER, a ſteel inſtrument, ſerving to engrave on metals. The graver conſiſts of four ſides or faces, and the point uſually terminates in a lozenge: in ſome it is round, and in others ſquare. The round point is beſt for ſcoring lines, the ſquare for cutting broad and deep, and the lozenge for more delicate and fine ſtrokes and ſcratches. Le Boſſe recommends thoſe of a form betwixt the ſquare and lozenge. See Engraving.

The gravers ſhould be made of the beſt ſteel, which muſt be drawn out into ſmall rods with a charcoal fire. Theſe rods, after having been cut into the proper lengths for gravers, ſhould be ſoftened, by heating them in a charcoal fire, and ſuffering them to cool very ſlowly: let them next be filed into the deſired form, and brought back to a hard temper by heating them red-hot, and in this ſtate dipping their ends into ſoft ſoap. This ſhould be done in a perpendicular direction; for, if they be turned in the leaſt degree obliquely, the graver will warp and be crooked. If the temper of the graver be too hard after this treatment, and prevent the whetting it properly to an edge, it may be ſoftened, by laying its end on a large burning piece of charcoal till it begins to grow yellow, and then thruſting it into a lump of tallow, or dipping it in water; but if water be uſed, the graver muſt not be too hot. It may be known whether the graver be tempered to a proper hardneſs by touching the edge of it with a file, which, if any effect attends it, proves the temper to be too ſoft. The beſt proof of too great hardneſs is the breaking of the point in engraving; after which, if a new edge be made by whetting the graver, it will be frequently found very good without any other alteration. Handmaid to the Arts, vol. ii. p. 56.

The other end is fitted into a wooden handle.

Beſides engravers, the ſeal-cutters, lock-ſmiths, gun-ſmiths, gold-ſmiths, armourers, ſpurriers, &c. likewiſe make uſe of gravers.

GRAVEROL, Francis, in *Biography*, was born at Niſmes in 1635. He was educated for the profeſſion of the law, and practiſed, as an advocate, in the parliament of Toulouſe, and in the preſidial chamber of Niſmes, and as director and ſecretary of the academy in the latter place. He was not only well verſed in the ſtudies connected with his profeſſion, but deeply read in ſubjects of general literature, and particularly diſtinguiſhed for his knowledge of medals and inſcriptions. In religion he adhered ſtrictly to Calviniſtic principles, which impeded his advancement in life, and at length involved him in perſecution. To avoid the laſh of cruel laws he retired to Orange, but, not thinking himſelf ſafe there, he attempted to paſs into Switzerland. In his journey he was apprehended by the officers of the civil power, and thrown into priſon in the citadel of Montpellier. He was, after a long confinement, liberated, and died in the year 1694. His works conſiſt of ſeveral diſſertations on particular medals, and other monuments of antiquity. His "Obſervations on the Arrets of the Parliament of Toulouſe," in 4to. were much eſteemed. He was well known to all the learned in Europe, and was admitted a member of the Ricovrati at Padua. At his death he had in hand ſome other literary works. Moreri.

S'GRAVESAND, William James le, in *Biography*, was born at Bois-le-Duc in the year 1688. Having received the elements of learning at a common ſchool, he was ſent to Leyden to ſtudy the civil law, but he ſoon exhibited a decided taſte for philoſophical and mathematical ſtudies, which he determined to purſue in preference to the learning of the courts. He produced, when he was only eighteen years old, an excellent "Eſſay on Perſpective," which gave him a conſiderable reputation among the mathematicians of the age in which he flouriſhed. In 1707 he took his doctor's degree, quitted the univerſity, and ſettled at the Hague, where he practiſed at the bar, and cultivated an acquaintance with learned men. He joined ſome other perſons in conducting a periodical work, entitled "Le Journal Litteraire," which was continued without interruption from the year 1713 to 1722. S'Graveſand contributed to it the original diſſertations relating chiefly to geometry and phyſics. Among the diſcourſes moſt worthy of notice, and which were original pieces of his own compoſition, were the following, "Remarks on the Conſtruction of Pneumatical Engines:" and "An Eſſay on the Colliſion of Bodies," which was attacked by Dr. Clarke and other learned men, on account of its oppoſing the principles of the Newtonian philoſophy. In 1715 the States General ſent an embaſſy to England, to congratulate king George I. on his acceſſion to the throne of Great Britain. S'Graveſand was on this occaſion appointed ſecretary to the perſons compoſing this body, and during his ſtay in London, he became intimately acquainted with ſir Iſaac Newton, and was, upon the recommendation of that great man, admitted a member of the Royal Society. Upon his return to Holland, he was appointed profeſſor of mathematics and aſtronomy at the univerſity at Leyden. He immediately undertook to teach and illuſtrate the Newtonian philoſophy to the ſtudents of the univerſity, and in 1734 he had the additional profeſſorſhip of philoſophy conferred upon him. So great were his exertions in the ſeveral duties of his office, and in preparing for publication his ſeveral works on the ſciences, that he injured his conſtitution, and finally ſunk under his labours in 1742, when he was only fifty-four years of age. His principal publications were: (1) "Phyſices Elementa Mathematica, Experimentis confirmata, ſive Introductio ad Philoſophiam Newtonianam," which conſiſts of the author's lectures: (2) "Matheſeos Univerſalis Elementa," containing a ſyſtem of algebra for the uſe of ſtudents, with a commentary on Newton's Univerſal Arithmetic: (3) "Philoſophiæ Newtonianæ Inſtitutiones," which is an abridgment of his Elements of Phyſics: (4) "Introductio ad Philoſophiam, Metaphyſicam, et Logicam continens." His mathematical and philoſophical works, excepting the firſt article, were collected and publiſhed at Amſterdam, in 2 vols. 4to., with an account of the life and writings of the author. The private character of S'Graveſand was highly reſpectable and amiable: his morals were exemplary, and he was beloved for his generoſity, benevolence, and obliging manners. He was conſulted by the miniſters of the republic on all matters of finance, and he was of great ſervice to them in deciphering and detecting the ſecret correſpondence of their enemies.

GRAVESANDE, in *Geography*, a town of Holland, diſtant about four miles from the ſea, ſix miles W.S.W. of Delft.

GRAVESEND, a town in the hundred of Toltingtrough, in the county of Kent, England, conſiſts of ſeveral ſtreets, built on a declivity leading to the Thames; and is partly ſituated in the pariſh of Milton, which adjoins to that of Graveſend on the eaſt ſide. The early proſperity of this town received a conſiderable check in the reign of Richard II., when the French and Spaniards ſailed up the Thames in gallies, plundered and burned many of the houſes, and took a great number of the inhabitants priſoners. To alleviate the loſs, the king was induced to give the towns-people a legal claim to the water-paſſage to London, by a grant to the abbey of St. Mary le Grace. In the tenth of queen Elizabeth the pariſhes of Graveſend and Milton were incorporated by her letters patent: but the principal charter was granted by Charles I. in the year 1632. The chief officer, who had before this time been called the portreve, was by this charter conſtituted mayor; and in him, twelve jurats, twenty-four common councilmen, a ſeneſchall or high ſteward, and other inferior officers, the government of the town is now veſted. The liberty of holding two additional weekly markets on Wedneſdays and Saturdays, and an annual fair of four days, was alſo granted at the ſame time, together with a full confirmation of the excluſive privilege, conferred by king Richard, of conveying paſſengers and goods by water to the metropolis. In Auguſt 1727 the greater part of the town was deſtroyed by a fire, which commenced in a barn-yard adjoining to the church, and conſumed that fabric, with about 120 houſes, beſides outbuildings, ſtables, &c. The preſent church, which is dedicated to St. George, was erected on the old ſcite in the year 1732, under an act of the fourth of George II. which appropriated 5000*l.* for that purpoſe, from the duties on coals and culm, levied under the acts of the ninth and tenth of queen Anne, for building fifty new churches in or near London.

Graveſend has been greatly improved ſince the year 1764, when a new town-hall, having an area beneath where the poultry market is kept, was erected by the corporation. In 1767 a new wharf, crane, and cauſeway, were made, the expence of keeping which in repair is defrayed by ſmall tolls for cranage and wharfage. The increaſe of the trade, population, and buildings has been particularly rapid ſince the middle of the laſt century. Under the late act, the number of inhabitants was returned at 2483, and that of houſes at 412; yet theſe numbers are very incorrect, and the population can ſcarcely amount to leſs than 4000, nor the number of houſes be fewer than 700. Moſt of the inhabitants are engaged in maritime purſuits or employments. A ſmall manufactory for cables and ropes is carried on here; and about the year 1780, a yard for ſhip-building, which had long been diſuſed, was hired by a quaker, named Cleverly, and ſeveral men of war and frigates, beſides ſmaller veſſels, have been built here. About eighteen or twenty ſmacks find employment in the cod and haddock fiſhery; and moſt of the Dutch turbot veſſels lie off this town, and ſend their cargoes to the London markets in ſmall boats. Moſt of the Eaſt and Weſt India trade, and, indeed, of the outward-bound ſhips in general, are ſupplied with live and dead ſtock at Graveſend; and alſo with vegetables; about eighty acres of ground in the two pariſhes being cultivated for that purpoſe, and for ſupplying the London markets with aſparagus, which is remarkable for its ſize and fine flavour. Graveſend is ſituated 22 miles E. from London. Haſted's Hiſtory of Kent, vol. i. 8vo. Beauties of England and Wales, vol. vii.

GRAVESEND, a townſhip and village of America, in Long iſland, New York, ſeven miles from the city, containing 489 inhabitants.

GRAVIMETER. See HYDROMETER.

GRAVINA, DOMENICO DA, in *Biography*, who flouriſhed in the fourteenth century, was a native of Gravina, in the kingdom of Naples. He was by profeſſion a notary, but in literature an hiſtorian. He ſeems to have taken an active part in the civil wars which agitated his country at that period, and on account of the ſide which he eſpouſed, he was ſtripped of all his property, and driven into exile with his wife and children. He wrote a hiſtory of Naples in the Latin language, and likewiſe a hiſtory of the tranſactions in that part of Italy during his own times, from 1330 to 1350. A fragment of this work only is in exiſtence, the beginning and end being loſt; it is, however, reckoned a valuable document for the fidelity of the narration, and is to be found in Muratori's collection of Italian hiſtorians.

GRAVINA, JOHN VINCENT, was born in 1664 at Rogiana, a caſtle in Calabria. He enjoyed all the advantages of a very liberal education, and became well verſed in the learned languages; geometry, phyſics, hiſtory, and antiquities. He alſo made himſelf acquainted with the principles of theology. Having thus attained to a general knowledge of the learning of the times, he went to Naples to ſtudy the civil and canon law. After this he paſſed to Rome, and lived with Paul Coardo of Turin. He was one of the original founders of the academy of Arcadi, and had the charge of drawing up their laws in the ſtyle of the Roman tables. He arrogated to himſelf the merit of having deviſed theſe laws, a circumſtance which involved him in a quarrel with the other members, particularly with Creſcimbeni, the founder of the ſociety, ſo that theſe two learned men were for ſeveral years at the head of two factions which divided the [illegible]. In 1698, he was nominated profeſſor of civil law at the college of Sapienza, and, in two years after, he ſucceeded to the chair of the canon-law. His method of inſtruction was excellent; he avoided trifling verbal diſputes, and vain ſcholaſtic ſpeculations, and entered into the ſpirit of the laws, illuſtrating their theory by obſervations drawn from ancient writers, and by a criticiſm founded on his extenſive erudition. This mode of inſtruction excited much public attention, but the haughtineſs of his temper prevented him from being popular. By the public at large, his manners could be no obſtacle to the celebrity of his writings, and his reputation daily increaſed. His works were numerous, and the ſubjects on which he treated very various. His "Origines Juris Civilis," has been ever eſteemed a claſſical performance, lucid in its arrangements, and replete with ſolid and very important learning. This was firſt publiſhed at Leipſic in 1708, and afterwards there was a more correct edition of it in 1713; to the latter impreſſion was ſubjoined a treatiſe "De imperio Romano," eſteemed a maſter-piece, though not free from error. Gravina undertook to eſtabliſh a poetical code, for which purpoſe he wrote two books, entitled "Della Region Poetica:" one entitled "Della Tragedia," and a treatiſe "De Inſtitutione Poetarum." Another work was printed contrary to his inclination; this was his "Inſtitutes of Civil and Canon Law," which he intended to have reviſed and given in a corrected and augmented form. In 1714, Gravina re-viſited his native country, where he ſtaid about two years and then returned to Rome. He was preparing to depart for Turin, whither he had been invited by the duke of Savoy, in order that he might take the general direction of the learned inſtitutions, when he was ſeized with an illneſs which carried him off in 1718, in the arms of his beloved pupil Metaſtaſio, whoſe poetical talents he firſt diſcovered and cheriſhed, and whom he left heir of all his property out of Calabria. Gravina was of a contentious diſpoſition, exceſſive in his praiſe of perſons whom he eſteemed, and alſo in his cenſure of thoſe who offended him; he was arrogant, from a high opinion of his own ſuperiority. This created him many enemies, with whom he was perpetually at war. Of his great learning there can be no doubt; but with reſpect to his poetical talents, it has been remarked, that he was more ſucceſsful as a legiſlator than as a practiſer in the art; for his five tragedies written on the model of the ancients were not favourably received by the public, and the author's angry expoſtulation, proving that they ought to have been applauded as uſual, was totally inefficacious. Moreri.

GRAVINA, in *Geography*, a town of Naples, in the province of Bari, the ſee of a biſhop, ſuffragan of Acerenza, 24 miles S. of Trani.

GRAVINA'S *Iſlands*, a range of iſlands in the N. Pacific ocean, each from 20 to 50 miles in circumference, interſperſed with ſome iſlets, ſtretching N. W. to S. E. about 40 miles, between the duke of Clarence's ſtrait and the canal of Revilla Gigedo. N. lat. 54° 52′ to 55° 27′. E. long. 228° 24′ to 229° 5′.

GRAVING, the act or art of cutting lines, figures, and other deſigns, on metals; more properly called *engraving;* which ſee.

GRAVING, in the *Sea Language*, is the bringing a ſhip a-ground, and then burning off with furze, reed, or broom, all the filth and foulneſs that ſtick to her bottom without board, in order to pay her anew. See BROOMING and CAREENING.

GRAVING-*dock*, or *Dry Dock*, is a place from which the water can be let out or pumped, after ſhips and boats are floated into it to be cleaned or repaired; ſometimes, graving-docks are above the level of the water, and boats are dragged upon inclined planes into the ſame. By the ſides of tidal rivers or harbours there are conſtructed with ſtrong cloſe gates meeting in an angle to ſhut out the tide; which gates are furniſhed with a ſmall ſluice or valve for emptying or filling the dock, when a veſſel has entered at high water, or is about to leave the dock at ſuch time. See Docks, and Canal.

GRAVISKOI, in *Geography*, a fortreſs of Ruſſia, in the government of Kolivan, on the Irtiſch; 240 miles S. S. W. of Kolivan. N. lat. 50° 15′. E. long. 75° 14′.

GRAVITAS, Βαρυτης, in the *Ancient Muſic*, was uſed to ſignify a ſound produced by the remiſſion or falling of the voice. Gravitas differs from remiſſion, as the effect from the cauſe.

Gravitas is alſo uſed to denote the ſtate of a woman going with child. See Pregnancy.

GRAVITATION, the exerciſe of gravity, or the action which a body exerts on another body by the power of gravity. It is ſometimes diſtinguiſhed from gravity. Thus, Maupertuis takes gravity for that force by which a body would fall to the earth ſuppoſed at reſt; and gravitation for the ſame but diminiſhed by the centrifugal force. See figure of the earth determ. p. 206 of Mr. Murdoch's tranſlation.

It is only gravitation, or gravity thus blended with the centrifugal force, that we can meaſure by our experiments. However, methods have been found to diſtinguiſh what remains of primitive gravity, and what has been deſtroyed by the centrifugal force.

It is one of the laws of nature, diſcovered by ſir Iſaac Newton, and now received by moſt philoſophers, that every particle of matter in nature gravitates towards every other particle; which law is the hinge on which the whole Newtonian philoſophy turns. See Newtonian *Philoſophy*.

What we call *gravitation*, with reſpect to the gravitating body, is properly called *attraction* with reſpect to the body towards which the other gravitates.

The planets, both primary and ſecondary, and alſo the comets, do all gravitate towards the ſun, and towards each other; and the ſun towards them: and that in proportion to the quantity of matter in each.

The Peripatetics, &c. hold, that bodies only gravitate when out of their natural places, and that gravitation ceaſes when they are reſtored to the ſame, the intention of nature being then fulfilled. The final cauſe of this faculty, as they maintain, is only to bring elementary bodies to their proper place, where they may reſt. But the moderns ſhew, that bodies exerciſe gravity even when at reſt and in their proper places.

This is particularly ſhewn of fluids; and it is one of the laws of hydroſtatics demonſtrated by Mr. Boyle and others, that fluids gravitate *in proprio loco*, the upper parts preſſing on the lower, &c.

For the laws of gravitation of bodies in fluids ſpecifically lighter, or heavier than themſelves, ſee *Specific* Gravity, Fluid, &c.

Gravitation, *Theory of Univerſal*. Newton is very juſtly conſidered as the author of this great hypotheſis, though ſeveral preceding and cotemporary writers ſeem to have formed conjectures on this ſubject that did not differ very widely from the truth. From the time of Kepler it had every day become more and more evident, that ſome mechanical cauſe had a very material influence on the laws of the planetary motions. The problems which the diſcoveries of that great aſtronomer had left for future ages to ſolve were theſe: Why do the planets and ſatellites deſcribe *elliptic* orbits, the former round the ſun, the latter round their primary planet? Why is the centre of motion in the focus rather than in the centre of the ellipſe? Why are equal areas deſcribed in equal times about the centre; and what can be the cauſe of that remarkable law that is found conſtantly to ſubſiſt between the diſtances of the planets from the ſun and the times of their revolution?

Des Cartes firſt attempted a ſolution of theſe difficulties, by ſuggeſting a ſimple mechanical cauſe. He ſuppoſed the exiſtence of a ſubtile fluid, which, though imperceptible to the ſenſes, was in conſtant motion round the ſun, and that it involved the planets in its powerful agency. This theory, on its firſt enunciation, does not ſeem deficient in plauſibility, but upon more careful examination, it is found incapable of explaining any one aſtronomical phenomenon correctly, and indeed the action of ſuch a fluid would produce effects in many caſes exactly the reverſe of what it was intended to explain. The ſpirit of rational enquiry that now began to be exerted on all philoſophical ſubjects, rendered this theory of ſhort duration.

Kepler at a much earlier period had formed more correct opinions on this ſubject than Des Cartes: indeed he ſeems to have had a very diſtinct idea of the exiſtence of gravitation, though he never could have been aware of its agency being ſo extenſive, or that it would ever explain in ſo ſatisfactory a manner as it has done his own great diſcoveries. Gravity, he ſays, in his "Commentary on Mars," is only a mutual and corporeal affection between ſimilar bodies. Heavy bodies do not tend to the centre of the world, but to that of the round body of which they form a part; and if the earth were not ſpherical, heavy bodies would not fall towards its centre, but towards different points. This conjecture has been fully verified by theory and obſervation; the earth appears not to be a perfect ſphere, and accordingly a plumb-line does not tend to the exact centre of gravity of the whole earth, but to a point conſiderably remote from it, as has been explained under Degree, Earth, *figure of*, &c. &c.

Kepler likewiſe ſtrongly ſuſpected that the attraction of the moon was the cauſe of the tides, and that the lunar irregularities aroſe from the action of the earth and ſun. Perhaps, from the earlieſt times, ſome indiſtinct conceptions are to be occaſionally traced in different authors concerning the exiſtence of this univerſal principle.

Fermat, who preceded Kepler, affirmed, that the weight of a body was the ſum of the tendencies of all its particles to all the particles of the earth; and Kepler was of opinion that two bodies left alone in free ſpace would approach each other with velocities inverſely proportional to their maſſes or quantities of matter.

A ſhort time previous to the great diſcovery of Newton, Dr. Hooke made a ſtill nearer approach to the truth. At a meeting of the Royal Society, May 3, 1668, he expreſſed himſelf in the following manner: "I will explain a ſyſtem of the world very different from any yet received, and it is founded on the three following poſitions:

1. That all the heavenly bodies have not only a gravitation of their parts to their own proper centres, but that they alſo mutually attract each other within their ſpheres of action.

2. That all bodies having a ſimple motion will continue to move in a ſtraight line, unleſs continually deflected from it by ſome extraneous force, cauſing them to deſcribe a circle, an ellipſe, or ſome other curve.

3. That this attraction is ſo much the greater as the bodies are nearer. As to the proportion in which thoſe forces diminiſh by an increaſe of diſtance, I own I have not yet diſcovered it, although I have made ſome experiments to this purpoſe. I leave this to others who have time and knowledge ſufficient for the taſk."

This is a very preciſe enunciation of a proper philoſophical theory. The phenomenon, the change of motion, is conſidered as the mark and meaſure of a change of force, and his audience is referred to experience for the nature of this force. He had before exhibited to the ſociety a very pretty experiment contrived to ſhew the nature of this force. A ball, ſuſpended by a long thread from the ceiling, was made to ſwing round another ball, laid on a table immediately below the point of ſuſpenſion. When the impulſe given to the pendulum was nicely adjuſted to its deviation from the perpendicular, it deſcribed a perfect circle round the ball on the table; but when the impulſe was very great, or very ſmall, it deſcribed an ellipſe, having the other ball in its centre.

Hooke ſhewed that this was the operation of a deflecting force proportioned to the diſtance from the other ball. He added, that although this illuſtrated the planetary motions in ſome degree, yet it was not ſuitable to their caſe: for the planets deſcribe ellipſes, having the ſun not in their centre but in their focus. Therefore they are not retained by a force proportional to the diſtance from the ſun.

The exalted genius of Newton can ſuffer no diminution by the enumeration of the above opinions, for though the idea of ſuch a principle as gravitation was not ſuggeſted firſt by Newton, yet ſo very obſcure were the notions of even the moſt enlightened philoſophers on this ſubject, that it had never been ſucceſsfully applied to the explanation of a ſingle aſtronomical phenomenon.

So intimately connected is this great diſcovery with the hiſtory of the human mind, that every known circumſtance relating to it has been recorded with the greateſt care. Dr. Pemberton relates that Newton, in the year 1666, having retired from Cambridge to the country on account of the plague, was there led to meditate on the probable cauſe of the planetary motions, and upon the nature of that central force that retained them in their orbits. It then occurred to him that poſſibly the ſame force, or ſome modification of the ſame force which cauſed with us a heavy body to deſcend with a certain velocity to the earth, might likewiſe retain the moon in her orbit by cauſing a conſtant deflection from a rectilinear path. Before, however, this conjecture could be put to the teſt of calculation, it was neceſſary that Newton ſhould have formed ſome conditional hypotheſis relative to the modification of the force with reſpect to the diſtance. That any agency emanating from a central point ſhould decreaſe as the ſquare of the diſtance from that point increaſes, is an hypotheſis ſo natural, that we cannot be ſurprized that Newton ſhould have ſelected it; but whether or not he had previouſly tried any other, or whether he had even at this time deduced it from the nature of the planetary orbits, does not now appear. The calculation which it was neceſſary to inſtitute, we ſhall give with great minuteneſs in its proper place; it is therefore only neceſſary to remark at preſent, that it requires that the proportion between the radius of the earth and the lunar orbit ſhould be exactly known. When Newton firſt attempted to verify this hypotheſis, theſe requiſite data had not been exactly determined, and a ſlight diſcordance between the reſult of the calculation and the ſuppoſed fact, induced him for a time to abandon his hypotheſis. This circumſtance has, with great propriety, been recorded as a ſtriking inſtance of the cool and diſpaſſionate frame of mind which this great philoſopher preſerved, at a moment when he had flattered himſelf with the hope of having diſcovered one of the moſt important ſecrets of nature.

Some few years afterwards he was again tempted to renew theſe calculations, as in this interval a degree of the meridian had been meaſured in France by Picard. This ſecond attempt ſucceeded. It is related, that towards the end of the calculation he became ſo much agitated, as to be obliged to requeſt a friend to aſſiſt him in finiſhing it; and certainly a moment of greater importance in philoſophy will never be recorded in the annals of ſcience.

The computation which was made by Newton to determine the identity of the force of terreſtrial gravity, with that which retains the moon in her orbit, is ſtill a ſubject of great intereſt to aſtronomers, as they now reverſe the proceſs; and taking the theory of gravitation as admitted, they deduce from the ſame computation the diſtance of the moon from the earth. We ſhall give it in the words of La Place.

The force which at every inſtant deflects the moon from the tangent of her orbit, cauſes it to deſcribe, in one ſecond, a ſpace equal to the verſed ſine of the arc which it deſcribes in that time; ſince this ſine is the quantity that the moon at the end of a ſecond deviates from the direction it had at the beginning. This quantity may be determined by the diſtance of the earth, inferred from the lunar parallax in parts of the terreſtrial radius; but to obtain a reſult independent of the inequalities of the moon, we muſt take for the mean parallax that part of it which is independent of theſe inequalities. This part is, according to obſervation, 50′ 54″.9, relatively to the radius drawn from the centre of gravity of the earth, to the parallel, of which the ſquare of the ſine of the latitude is equal to $\frac{1}{3}$. We ſelect this parallel becauſe the attraction of the earth, on the points correſponding to its ſurface, is at the diſtance of the moon, very nearly equal to the maſs of the earth divided by the ſquare of the diſtance from its centre of gravity. The radius drawn from a point of this parallel to the centre of gravity of the earth is 6369374 metres, from whence it may be computed the force which ſolicits the moon towards the earth cauſes it to fall 0′00101727 in one ſecond of time. It will be ſhewn hereafter, that the action of the ſun diminiſhes the lunar gravity $\frac{1}{358}$th part. The preceding height muſt therefore be augmented $\frac{1}{358}$th part, to render it independent of the action of the ſun; it then becomes 0^{me}.00102011. But in its relative motion round the earth, the moon is ſolicited by a force equal to the maſſes of the earth and moon divided by the ſquare of their mutual diſtance; therefore to obtain the height which the moon would fall through in one ſecond, by the action of the earth alone, the preceding ſpace muſt be diminiſhed in the ratio of the maſs of the earth to the ſun, and of the maſſes of the earth and moon: but by the phenomena of the tides, it appears that the maſs of the moon is equal to $\frac{1}{58.7}$ of that of the earth, multiplying therefore this ſpace by $\frac{58.7}{59.7}$, we have 6^{me}.00100300 for the height which the moon falls through in one ſecond by the action of the earth.

Let us now compare this height with that which reſults from obſervations made on the pendulum. Under the parallel above-mentioned the length of the pendulum vibrating ſeconds is equal to 3^{me}.65706: but on this parallel the attraction of the earth is leſs than the force of gravity by $\frac{2}{3}$ of the centrifugal force due to the motion or rotation of the earth at the equator; and this force is $\frac{1}{289}$th part of that of gravity; the preceding ſpace muſt therefore be augmented $\frac{1}{432}$d part, to get the ſpace due to the action of terreſtrial gravity alone, which on this parallel is equal to the maſs divided by the ſquare of the terreſtrial radius: we ſhall therefore have 3^{me}.66553 for this ſpace. At the diſtance of the moon it ſhould be diminiſhed in the ratio of the ſquare of the radius of the terreſtrial ſpheroid to the ſquare of the diſtance of the moon: for this purpoſe it is ſufficient to multiply it by the ſquare of the tangent of the lunar parallax, or 56′ 55″.2, this will give 0^{me}.00100483 for the height which the moon ſhould fall through in one ſecond by the attraction of the earth. This quantity, derived from experiments on the pendulum, differs very little from that which reſults from direct obſervation of the lunar parallax; to make them coincide, it is ſufficient to diminiſh the parallax 2″, and to reduce it to 56′ 53″.3. This is the parallax reſulting from the theory of gravity, differing only $\frac{1}{1600}$dth part from that derived from actual obſervation, to which La Place thinks it preferable, conſidering the exactneſs of the elements from which it is computed. It would be ſufficient to diminiſh a little the maſs of the moon to obtain, by this theory of gravity, the ſame parallax that is given by obſervation: but all the phenomena of the tides concur in giving this ſatellite a maſs more conſiderable, and very nearly ſuch as has been uſed in the above computation. But however that may be, the ſmall difference between the two parallaxes is within the limits of the errors of obſervation, and of the elements employed in the calculation. It is then certain that the force which retains the moon in its orbit, is the terreſtrial gravity diminiſhed in proportion to the ſquare of the diſtance.

Having thus ſhewn how the nature of the force which retains the moon in its orbit is inveſtigated, it next remains to inquire if the ſame force of gravity pervades the reſt of the ſolar ſyſtem. The ſame great mathematician, above quoted, obſerves, that "of all the phenomena of the ſolar ſyſtem, the elliptic motion of the planets, and of the comets, ſeems the moſt proper to conduct us to the general law of the forces by which they are animated.

Obſervation has ſhewn, that the areas deſcribed by the radii vectores of the planets and comets about the ſun are proportional to the times. Now we ſee, in the article Central *Forces*, that, for this to take place, the force which deflects the path of theſe bodies from a right line muſt conſtantly be directed towards the origin of their radii vectores. The tendency of the planets and comets to the ſun is therefore a neceſſary conſequence of the proportionality of theſe areas to the times in which they are deſcribed. To determine the law of this tendency, let us ſuppoſe that the planets move in circular orbits, which ſuppoſition does not greatly differ from the truth. The ſquares of their real velocities will then be proportional to the ſquares of the radii of theſe orbits, divided by the ſquares of the times of their revolutions. But, by the law of Kepler, the ſquares of theſe times are to each other as the cubes of their radii; the ſquares of the velocities are therefore as theſe radii. It has been ſhewn, that the central forces of bodies, moving in circular orbits, are as the ſquares of the velocities, divided by the radii of the circumferences deſcribed; the tendency, therefore, of the planets to the ſun, is reciprocally as the ſquares of the radii of their orbits, ſuppoſed circular. This hypotheſis, it is true, is not rigorouſly exact; but the conſtant relation of the ſquares of the times to the cubes of the greater axes of their orbits being independent of their excentricities, it is natural to think it would ſubſiſt alſo in the caſe of the orbits being circular. Thus, the law of gravity towards the ſun, varying reciprocally as the ſquare of the diſtance, is clearly indicated by this relation: analogy would lead us to ſuppoſe that this law, which extends from one planet to another, ſhould ſubſiſt equally for the ſame planet at its different diſtances from the ſun; and its elliptic motion confirms this beyond a doubt. To comprehend this, let us attend to this motion, beginning at the departure from its perihelion. Its velocity is then at its maximum, and its tendency to recede from the ſun ſurpaſſing its gravity towards it, its radius vector augments, and forms an obtuſe angle with the direction of its motion. The force of gravity towards the ſun, decompoſed according to this direction, continually diminiſhes the velocity till it arrives at the aphelion; at this point the radius vector becoming perpendicular to the curve, its velocity is a minimum; and its tendency to recede from the ſun being leſs than its gravity towards it, the planet will approach it while deſcribing the ſecond part of its ellipſe. In this part, the gravity towards the ſun increaſes its velocity in the ſame manner as it before decreaſed it; and the planet will arrive at its perihelion with its primitive velocity, and recommences a new revolution, ſimilar to the firſt. Now the curvature of the ellipſe at the aphelion and perihelion being the ſame, the radii of curvature are the ſame, and, conſequently, the centrifugal forces of theſe two points are as the ſquares of the velocities. The ſectors deſcribed in the ſame time being equal, the aphelion and perihelion velocities are reciprocally as the correſponding diſtances of the planet from the ſun; the ſquares of theſe velocities are therefore reciprocally as the ſquares of theſe diſtances; but at the perihelion and aphelion diſtances, the centrifugal forces in the oſculatory circumferences are evidently equal to the gravity of the planet towards the ſun, which is therefore in the inverſe proportion to the ſquares of theſe diſtances. Thus the theorems of Huygens on the centrifugal force were ſufficient to demonſtrate the tendency of the planets towards the ſun: for it is highly probable that this law, which extends from one planet to another, and which is verified in the ſame planet, at its aphelion and perihelion, extends alſo to every part of the planetary orbit, and at the ſame time to every diſtance from the ſun. But to eſtabliſh it in an inconteſtible manner, it was requiſite to determine the general expreſſion of the force which, directed towards the focus of an ellipſe, would oblige the projectile to deſcribe that curve. And it was Newton who demonſtrated that this force was reciprocally as the ſquare of the radius vector. It was eſſential alſo to demonſtrate rigorouſly that the force of gravity towards the ſun only varies in one planet from the ſame force in another, according to their different diſtances from it.

This great geometrician ſhewed, that this followed neceſſarily from the law of the ſquares of the periodic times being reciprocally as the cubes of the diſtances; ſuppoſing therefore all the planets at reſt at the ſame diſtance from the ſun, and abandoned to their gravity towards its centre, they would deſcend from the ſame height in equal times: this reſult ſhould alſo extend to the comets, notwithſtanding the greater axes of their orbits are unknown; for we have ſeen in the ſecond book, that the magnitude of the areas deſcribed by their radii vectores, ſuppoſes the law of the ſquares of the periodic times proportional to the cubes of their axes.

A general analyſis, which embraces every poſſible reſult from a given law, ſhews us that not only an ellipſe, but any other conic ſection, may be deſcribed by virtue of the force which retains the planets in their orbits; a comet may therefore move in an hyperbola, but then it would be only once viſible, and after its apparition would recede from the limits of the ſolar ſyſtem, to approach other ſuns, which it would again abandon, thus viſiting the different ſyſtems that are ſcattered in the immenſity of the heavens. It is probable, conſidering the infinite variety of nature, that ſuch bodies exiſt. Their apparition ſhould be a very rare occurrence; the comets, we uſually obſerve, are thoſe which, having cloſed orbits, return, at the end of intervals more or leſs conſiderable, into the regions of ſpace that are in the vicinity of the ſun. The ſatellites tend alſo perpetually to the ſun. If the moon was not ſubject to its action, inſtead of deſcribing an orbit almoſt circular round the earth, it would ſoon abandon it; and if this ſatellite, and thoſe of Jupiter, were not ſolicited towards the ſun, according to the ſame law as the planets, perceptible inequalities would reſult in their motions which have not been recognized by obſervation.

The planets, comets, and ſatellites are therefore ſubject to the ſame law of gravity towards the ſun. At the ſame time that the ſatellites move round their planet, the whole ſyſtem of the planet and its ſatellites is carried by a common motion, and retained by the ſame force, round the ſun. Thus the relative motion of the planet and its ſatellites is nearly the ſame as if the planet was at reſt, and not acted upon by any external force.

We are thus conducted, without the aid of hypotheſis, by a neceſſary conſequence of the laws of the celeſtial motions, to conſider the ſun as the centre of a force, which, extending infinitely into ſpace, diminiſhes as the ſquare of the diſtance increaſes, and which attracts all bodies that are within the ſphere of its activity. Every one of the laws of Kepler diſcovers a property of this attractive force. The law of the proportionality of the areas to the times ſhews us, that it is conſtantly directed towards the centre of the ſun. The elliptic orbits of the planets ſhew that this force diminiſhes as the diſtance increaſes; finally, the law of the proportionality of the ſquares of the periodic times to the cubes of the diſtances demonſtrates, that the gravity of all the planets towards the ſun is the ſame at equal diſtances. This gravity may be called the ſolar attraction when it is conſidered as relative to the centre of the ſun, towards which it is directed; for without knowing the cauſe, we may by one of thoſe ſuppoſitions, common among geometricians, imagine an attractive power reſiding in the centre of the ſun.

The errors to which obſervations are liable, and the ſmall alterations in the elliptic motions of the planets, leave a little uncertainty in the reſults deduced from the laws of motion; and it may be doubted if the ſolar attraction diminiſhes exactly in the inverſe ratio of the ſquare of the diſtance. But a very ſmall variation in this law would produce a very perceptible difference in the motions of the planetary orbits. The perihelion of the terreſtrial orbit would have an annual motion of 1° 5′ if we only increaſed by one ten thouſandth part the power of the diſtance to which the ſolar orbit is reciprocally proportional; this motion is only 11″.6 according to obſervation, and of this we ſhall hereafter ſee the cauſe. The law of the ſquare of the diſtance is then, at leaſt, extremely near, and its extreme ſimplicity ſhould induce us to adopt it, as long as obſervations do not compel us to abandon it. At the ſame time we muſt not meaſure the ſimplicity of the laws of nature by our facility of conception, but when thoſe which appear to us the moſt ſimple accord perfectly with obſervations of the phenomena, we are juſtified in ſuppoſing them rigorouſly exact.

The gravity of the ſatellites towards the centre of their planet, is the neceſſary conſequence of the proportionality of the areas deſcribed by their radii vectores to the times, and the law of the diminution of this force, according to the ſquare of the diſtance, is indicated by the ellipticity of their orbits. But this ellipticity is hardly to be perceived in the orbits of the ſatellites of Jupiter, Saturn, and Uranus, which renders the law of the diminution of the force difficult to aſcertain by the motion of any one ſingle ſatellite; but the conſtant ratio of the ſquares of the times of their revolutions to the cubes of their diſtances, indicates it beyond a doubt, by demonſtrating, that from one ſatellite to another, the gravity towards the planet is reciprocally as the ſquare of the diſtance from its centre.

This proof is wanting for the earth, it having but one ſatellite, but it may be ſupplied from the following conſiderations:

The force of gravity extends to the ſummits of the higheſt mountains, and the ſmall diminution which it there experiences, leaves no doubt but that this force would be perceptible at much greater altitudes. Is it not natural to extend this to the moon, and to ſuppoſe that the force which retains it in its orbit, is its gravity towards the earth, in the ſame manner as the ſolar gravity retains the planets in their orbits round the ſun? for, in fact, theſe two forces ſeem to be of the ſame nature; they both of them penetrate the moſt intimate parts of matter, animating them with the ſame velocities; for we have ſeen that the ſolar gravity ſolicits equally all bodies placed at equal diſtances from the ſun, and that the terreſtrial gravity alſo cauſes all bodies to fall through the ſame height in equal times.

A heavy body, projected with force horizontally from a great height, falls on the earth at a conſiderable diſtance, deſcribing a curve, which is apparently parabolic; it will fall ſtill further, if the force is greater, and ſuppoſing it about ſeven thouſand metres in a ſecond, it would not fall to the earth, but would circulate round it like a ſatellite, ſetting aſide the reſiſtance of the air: for it has been fully ſhewn above, that, to form a moon of this projectile, it muſt be taken to the height of that body, and there receive the ſame motion of projection; and the identity of the moon's tendency to the earth, has been already demonſtrated, by ſhewing that to obtain this tendency, it is ſufficient to diminiſh the terreſtrial gravity according to the general law of the variation of the attractive force of the celeſtial bodies: and we have ſeen, that the law of the diminution of gravity, which in planets, accompanied by ſeveral ſatellites, is proved by a compariſon of their periodic times, with their diſtances, is demonſtrated for the moon, by comparing its motion with that of projectiles, at the ſurface of the earth.

The obſervations of the pendulum made at the ſummits of mountains, had already indicated this diminution of the terreſtrial gravity; but they were inſufficient to diſcover the law, becauſe of the ſmall height of the moſt elevated mountains, compared with the radius of the earth: it was requiſite to find a body very remote from us, as the moon, to render the law perceptible, and to convince us, that the force of gravity on the earth is only a particular caſe of a law that pervades the whole univerſe.

Every phenomenon throws new light on, and confirms the laws of nature. Thus the compariſon of experiments on gravity with the lunar motion ſhews us, that the origin of the diſtances of the ſun and planets, in the calculation of their attractive forces, ſhould be placed in their centres of gravity; for it is evident, that this takes place on the earth, whoſe attractive force is of the ſame nature as that of the ſun and planets.

The ſun, and thoſe planets which are accompanied by ſatellites, being thus proved to be endowed with an attractive force, varying inverſely as the ſquare of the diſtance, a ſtrong analogy leads us to attribute the ſame property to the other planets. The ſpherical figure common to all theſe bodies, indicates that their particles are united round their centres of gravity by a force which, at equal diſtances, equally ſolicits them towards theſe points; but the following conſiderations leave no doubt upon this ſubject.

We have ſeen, that if the planets and comets were placed at the ſame diſtance from the ſun, their gravity towards it would be in proportion to their maſſes: now, it is a general law in nature, that action and re-action are equal and contrary; all theſe bodies, therefore, re-act on the ſun, and attract in proportion to their maſſes; they are therefore endowed

dowed with an attractive force proportional to their maſſes, and varying inverſely as the ſquare of the diſtance. By the ſame principle, the ſatellites attract the planets and the ſun according to the ſame law. This attractive property, then, is common to all the celeſtial bodies: it does not diſturb the elliptic motion round the ſun, when we conſider only their mutual action; for the relative motion of the bodies of a ſyſtem are not changed by giving them a common velocity: by impreſſing, therefore, in a contrary direction to the ſun and to the planet, the motion of the firſt of theſe two bodies, and the action which it experiences on the part of the ſecond, the ſun may be conſidered as immoveable, but the planet will be ſolicited towards it with a force varying reciprocally as the ſquare of the diſtance, and proportional to the ſum of the maſſes; its motion round the ſun will therefore be elliptic. And we ſee by the ſame reaſoning, that it would be ſo if the planet and ſun were carried through ſpace with a motion common to each of them. It is equally evident that the elliptic motion of a ſatellite is not diſturbed by the motion of tranſlation of its planet, nor would it be by the action of the ſun, if it was always exactly the ſame on the ſatellite and the planet.

Nevertheleſs, the action of the planet on the ſun influences the length of its revolution, which is diminiſhed as the maſs of the planet is more conſiderable; ſo that the relation of the ſquare of its periodic time, to the cube of the major axis of its orbit, depends on its maſs. But ſince this relation is nearly the ſame for all the planets, their maſſes muſt evidently be very ſmall compared with that of the ſun, which is equally free for the ſatellites with reſpect to their principal planets.

This we may readily ſuppoſe from their ſmallneſs.

The attractive property of the heavenly bodies not only belongs to them in a maſs, but to each of their particles. If the ſun only acted on the centre of the earth without attracting particularly every one of its particles, oſcillations would ariſe in the ocean, infinitely more conſiderable and very different from thoſe which we obſerve. The gravity of the earth to the ſun, therefore, is the reſult of the gravity of all its particles, which conſequently attract the ſun in proportion to their reſpective maſſes; beſides, each body on the earth tends towards its centre proportionally to its maſs, it re-acts therefore on it, and attracts it in the ſame ratio. If that was not the caſe, and if any part of the earth, however ſmall, attracted another part without being attracted by it, the centre of gravity would move in ſpace, in virtue of the force of gravity, which is impoſſible.

The celeſtial phenomena, compared with the laws of motion, conduct us therefore to this great principle of nature, namely, that all the particles of matter attract each other in proportion to their maſſes, and inverſely as the ſquares of their diſtance.

Already we may perceive in this univerſal gravitation, the cauſe of the perturbations to which the heavenly bodies are ſubject; for the planets and comets being ſubject to the action of each other, they muſt deviate a little from the laws of the elliptic motion, which they would otherwiſe exactly follow, if they only obeyed the action of the ſun. The ſatellites alſo, deranged in their motions round their planets by their mutual action, and that of the ſun, deviate a little from theſe laws.

We perceive then that the particles of the heavenly bodies, united by their attraction, ſhould form a maſs nearly ſpherical; and that the reſult of their action at the ſurface of the body ſhould produce all the phenomena of gravitation.

We ſee moreover that the motion of rotation of the celeſtial bodies ſhould ſlightly alter their ſpherical figure, and flatten them at the poles; and then the reſulting force of all their mutual actions not paſſing through their centres of gravity, ſhould produce in their axes of rotation ſimilar motions to thoſe diſcovered by obſervation. Finally, we may perceive why the particles of the ocean, unequally acted on by the ſun and moon, ſhould have oſcillations ſimilar to the ebbing and flowing of the tides. But theſe different effects of the principle of gravitation muſt be particularly developed, to give it all the certainty of which phyſical truth is ſuſceptible.

It is in the univerſal application of this theory to all the known celeſtial phenomena, that the modern ſcience of phyſical aſtronomy conſiſts, a ſcience which owes its origin to Newton, and which has been cultivated by every eminent mathematician, from the time of that great philoſopher to the preſent day. It is to La Place that the merit muſt be given of having completed this theory, by ſhewing that there remains not a ſingle phenomenon that it is not capable of explaining: he juſtly obſerves, that there is no queſtion here of vague cauſes, which cannot be ſubmitted to analyſis, and which the imagination modifies at pleaſure, to accommodate them to the phenomena. The law of univerſal gravitation has this ineſtimable advantage, that it may be reduced to calculation, and by a compariſon of its reſults with obſervation, it preſents the moſt certain method of verifying its exiſtence; and ſo far are we from having to fear that new obſervations will diſprove this theory, we may be aſſured before hand that they will only confirm it more and more, and that its conſequences are equally certain as if they had actually been obſerved.

The aſtronomical phenomena produced by the mutual gravitation of the heavenly bodies, will be found in the different parts of this work. As each ſubject will be particularly treated under its appropriate article, ſee *Figure of the* EARTH; *Preceſſion of the* EQUINOXES; NUTATION *of the Earth's axis*; PERTURBATION *of the Planets, Moon,* and *Satellites*; TIDES, LIBRATION *of the Moon*, &c.

But as the inveſtigation of laws by which particles of matter gravitate to ſpheres and other ſolids cannot with propriety be referred to any other article, and as it forms ſo very eſſential a part of phyſical aſtronomy, we ſhall enter on the ſubject very fully. The more ſimple and eaſy inveſtigations of aſtronomy ſuppoſe the action to be confined to ſimple gravitating points; now as no ſuch points exiſt in nature, it becomes requiſite to conſider the effect which an aſſemblage of theſe points will produce when arranged in different forms. Newton, who firſt entered upon theſe ſpeculations, inveſtigated almoſt all the caſes which ſeem applicable to phyſical aſtronomy, but profeſſor Playfair has lately extended theſe reſearches, and has preſented a paper on the ſubject to the Philoſophical Society of Edinburgh, which would reflect honour on the firſt mathematicians of Europe. A few of the leading propoſitions of this excellent memoir, will follow the inveſtigation of the law of gravitation to a ſphere.

Of the gravitation of particles of matter to ſpheres, and other mathematical figures.

1. *A particle of matter placed within a ſphere of uniform denſity, remains in equilibrio.*

Let A L B M, *a l b m*, (*Plate* XV. *Aſtronomy, fig.* 124.) be two ſpherical ſurfaces, of which C is the common centre, and let the ſpace between them be filled with gravitating matter, uniformly denſe. Let *p* be a particle placed any where within this ſpherical ſhell, to every particle of which it gravitates with a force inverſely as the ſquare of its diſtance from it. This particle will have no tendency to move in any direction, becauſe its gravitation in any one direction is exactly balanced by an equal gravitation in the oppoſite direction.

Draw through p the two ſtraight lines $dp\varepsilon$, $ep\delta$, making a very ſmall angle at p. This may repreſent the ſection of a very ſlender double cone $dpe\delta p\varepsilon$, having p for the common vertex, and $de\delta\varepsilon$ for the diameter of the circular baſes. The gravitation of p to the matter in the baſe de is equal to its gravitation to the matter in the baſe $\delta\varepsilon$. For the number of particles in de is to the number in $\delta\varepsilon$, as the ſurface of the baſe de to that of the baſe $\delta\varepsilon$, that is, as de^2 to $\delta\varepsilon^2$, that is, as pd^2 to $p\delta^2$, that is, as the gravitation to a particle in $\delta\varepsilon$ to the gravitation to a particle in de. Therefore the whole gravitation to the matter in de, is the ſame with the whole gravitation to the matter in $\delta\varepsilon$: ſince it is alſo in the oppoſite direction, the particle p is in equilibrio. The ſame thing may be demonſtrated of the gravitation to the matter in qr and st, and in a ſimilar manner, of the gravitation to the matter in the ſections of the cones dpe, $\delta p\varepsilon$, by any other concentric ſurface. Conſequently, the gravitation to the whole matter contained in the ſolid $dqre$, is equal to the gravitation to the whole matter in the ſolid $\delta ts\varepsilon$, and the particle p is ſtill in equilibrio.

Now ſince the lines $dp\varepsilon$, $ep\delta$, may be drawn in any direction, and thus be made to occupy the whole ſphere, it is evident that the gravitation of p is balanced in every direction, and therefore it has no tendency to move in any direction, in conſequence of this gravitation to the ſpherical ſhell of matter comprehended between the ſurfaces A L B M and $albm$.

It is alſo evident, that this holds true with reſpect to all the matter comprehended between A L B M, and the concentric ſurface pnv paſſing through p; in ſhort p is in equilibrio in its gravitation, to all the matter more remote than itſelf from the centre of the ſphere, and appears as if it did not gravitate at all to any matter more remote from the centre.

We have ſuppoſed the ſpherical ſhell to be uniformly denſe. But p will ſtill be in equilibrio, although the ſhell be made up of concentric ſtrata of different denſities, provided that each ſtratum be uniformly denſe.

For ſhould we ſuppoſe, that in the ſpace comprehended between A L B M and pnv, there occurs a ſurface $albm$ of a different denſity from all the reſt, the gravitation to the intercepted portions qr and st are equal, becauſe thoſe portions are of equal denſity, and are proportioned to pq^2 and ps^2 inverſely. The propoſition may therefore be expreſſed in the following very general terms, "a particle placed any where within a ſpherical ſhell of gravitating matter, of equal denſity, at all equal diſtances from the centre, will be in equilibrio, and will have no tendency to move in any direction."

The equality of the gravitation to the ſurface ed, and to the ſurface $\varepsilon\delta$ is affirmed, becauſe the numbers of particles in the two ſurfaces are inverſely as the gravitations towards one in each.

For the very ſame reaſon, the gravitations towards the ſurfaces ed and qr and ts are all equal. Hence may be derived an elementary propoſition; which is of great uſe in all enquiries of this kind, namely,

If a cone, or pyramid $dp\varepsilon$, of uniform gravitating matter, be divided by parallel ſections de, qr, &c. the gravitation of a particle p in the vertex, to each of thoſe ſections, is the ſame, and the gravitations to the ſolids pqr, pde, $qder$, &c. are proportional to their lengths pq, pd, qd, &c. the firſt part of this propoſition is already demonſtrated. Now, conceive the cone to be thus divided into innumerable ſlices of equal thickneſs: it is plain that the gravitation to each of theſe is the ſame; and, therefore, the gravitation to the ſolid qpr, is to the gravitation to the ſolid $qder$, as the number of ſlices in the firſt, to the number of ſlices in the ſecond, that is, as pq, the length of the firſt, to qd, the length of the ſecond. The cone dpe was ſuppoſed extremely ſlender. This was not neceſſary for the demonſtration of the particular caſe where all the ſections were parallel; but in this elementary propoſition, the angle at p is ſuppoſed ſmaller than any aſſigned angle, that the cone or pyramid may be conſidered as one of the elements into which we may reſolve a body of any form. In this reſolution, the baſes are ſuppoſed, if not otherwiſe expreſsly ſtated, to be parallel, and perpendicular to the axes; indeed, they are ſuppoſed to be portions xr, ye, $z\varepsilon$, of ſpherical ſurfaces, having their centres in p: the ſmall portions xrq, yed, $z\varepsilon\delta$, &c. are held as inſignificant, vaniſhing in the ultimate ratios of the whole ſolids.

It is eaſy, alſo, to ſee that the equilibrium of p is not limited to the caſe of a ſpherical ſhell, but will hold true of any body compoſed of parallel ſtrata, or ſtrata ſo formed, that the lines pd, $p\delta$, are cut in the ſame proportion by the ſections de, qr, &c. In a ſpheroidal ſhell, for inſtance, whoſe inner and outer ſurfaces are ſimilar, and ſimilarly poſited ſpheroids, the particle p will be in equilibrio any where within it; becauſe, in this caſe, the lines $p\delta$ and ne are equal; ſo are the lines $p\varepsilon$ and od, the lines $t\delta$ and re, the lines $s\varepsilon$ and qd, &c.: in moſt caſes, however, there is but one ſituation of the particle p that inſures this equilibrium. But we may at the ſame time infer this very uſeful propoſition,

2. *If there be two ſolids, perfectly ſimilar, and of the ſame uniform denſity, the gravitation to each of theſe ſolids, by a particle ſimilarly placed on or in each, is proportional to any homologous lines of the ſolids.*

For, the ſolids being ſimilar, they may be reſolved into the ſame number of ſimilar pyramids ſimilarly placed in the ſolids. The gravitations to each of any correſponding pair of pyramids are proportional to the lengths of thoſe pyramids. Theſe lengths have the ſame proportion in every correſponding pair. Therefore, the abſolute gravitations to the whole pyramids of one ſolid have the ſame ratio to the abſolute gravitation to the whole pyramids of the other ſolid. And ſince the ſolids are ſimilar, and the particles are at the ſimilarly placed vertices of all the ſimilar and ſimilarly placed pyramids, the gravitation compounded of the abſolute gravitations to the pyramids of one ſolid, has the ſame ratio to the gravitation ſimilarly compounded of the abſolute gravitations to the pyramids of the other.

3. *The gravitation of an external particle to a ſpherical ſurface, ſhell, or entire ſphere, which is equally denſe at all equal diſtances from the centre, is the ſame as if the whole matter were collected in its centre.*

Let A L B M (*fig.* 124.) repreſent ſuch a ſphere, and let P be the external particle. Draw P A C B through C, the centre of the ſphere, and croſs it by L C M at right angles. Draw two right lines P D, P E, containing a very ſmall angle at P, and cutting the great circle A L B M, in D, E, D′, E′. About P, as a centre with the diſtance P C, deſcribe the arc C dm, cutting D P in d, and E P in e. About the ſame centre deſcribe the arc D O. Draw dF, eG, parallel to A B, and cutting L C in f and g. Draw C K perpendicular to P D, and dH, D δ, and I F φ, perpendicular to A B. Join C D and C F.

Now, let the figure be ſuppoſed to turn round the axis P B. The ſemi-circumference A L B will generate a complete ſpherical ſurface; the arc C dm will generate another ſpherical ſurface, having P for the centre; the ſmall

area

arcs D E, *d e*, F G, will generate rings, or zones, of thoſe ſpherical ſurfaces; D O will alſo generate a zone of a ſurface having P for its centre; *f g* and F I will generate zones of flat circular ſurfaces.

It is evident that the zones generated by D E and D O, (which we may call the zones D E, D O,) having the ſame radius D δ, are to each other as their reſpective breadths D E, D O. In like manner, the zones generated by *de*, *fg*, F I, F G, being all at the ſame diſtance from the axis A B, are alſo as their reſpective breadths *de*, *fg*, F I, F G. But the zone D O is to the zone *de*, as PD^2 to Pd^2: for D O is to *de*, as P D to P *d*, and the radius of rotation D δ is to the radius *d* H, alſo as P D to P *d*. The circumferences, deſcribed by D O and *de*, are, therefore, in the ſame proportion as P D to P *d*; therefore the zones being as their breadths, and as their circumferences jointly, are as PD^2 and Pd^2.

C K and *d* H, being the ſines of the ſame arc C *d*, are equal; therefore K D and *f* F, the halves of chords equally diſtant from the centre, are alſo equal; therefore the triangles C D K and C F *f* are equal and ſimilar. But C D K is ſimilar to E D O, for the right angles P D O and C D E are equal. Taking away the common angle C D O, the remainders C D K and E D O are equal. In like manner, C F *f* and G F I are ſimilar; and, therefore, (ſince C D K and C F *f* are ſimilar,) the elementary triangles E D O and G F I are ſimilar, and D O : D E = F I : G F. The abſolute gravitation, or tendency of P, to the zone D O, is equal to its abſolute gravitation to the zone *d e*, becauſe the number of particles in the firſt, is to the particles in the laſt, as PD^2 to Pd^2, that is, inverſely as the gravitation to a particle in the firſt, to the gravitation to a particle in the laſt; therefore let *c* repreſent the circumference of a circle, whoſe radius is 1. The ſurface of the zone generated by D O, will be $DO \times c \times D\delta$, and the gravitation to it will be $\frac{DO \times c \times D\delta}{PD^2}$, to which $\frac{de \times c \times dH}{Pd^2}$, or $\frac{de \times c \times dH}{PC^2}$, is equal. This expreſſes the abſolute gravitation to the zone generated by D O, this gravitation being exerted in the direction P D.

But it is evident that the tendency of P, ariſing from its gravitation to every particle in the zone, muſt be in the direction P C. The oblique gravitation muſt, therefore, be eſtimated in the direction P C, and muſt be reduced in the proportion of P *d* to P H. It is plain that P *d* : P H = *de* : *fg*, becauſe *d e* and *f g* are perpendicular to P *d* and P H; therefore the reduced, or central gravitation of P, to the zone generated by D O, will be expreſſed by $\frac{fg \times c \times dH}{PC^2}$.

But the gravitation to the zone generated by D O, is to the gravitation to the zone generated by D E, as D O to D E, that is, as F I (or *fg*) to F G. Therefore the central gravitation to the zone generated by D E, will be expreſſed by $\frac{FG \times c \times dH}{PC^2}$. Now, $FG \times c \times dH$ is the value of the ſurface of the zone generated by F G; and if all this matter were collected in C, the gravitation of P to it would be exactly $\frac{FG \times c \times dH}{PC^2}$, and it would be in the direction P C. Hence it follows, that the central gravitation of P to the zone generated by D E, is the ſame as its gravitation to all the matter in the zone generated by F G, if that matter were placed in C.

What has been demonſtrated reſpecting the arc D E, is true of every portion of the circumference. Each has a ſubſtitute F G, which being placed in the centre *c*, the gravitation of P is the ſame. If P T touch the ſphere in T, every portion of the arc T L B will have its ſubſtitute in the quadrant L B, and every part of the arc A T has its ſubſtitute in the quadrant A T L, as is eaſily ſeen. And hence it follows, that the gravitation of a particle, P, to a ſpherical ſurface, A L B M, is the ſame as if all the matter of that ſurface were collected in its centre.

We ſee alſo that the gravitation to the ſurface generated by the rotation of A T round A B is equal to the gravitation to the ſurface generated by T L B, which is much larger but more remote.

What we have now demonſtrated with reſpect to the ſurface generated by the ſemicircle A L B, is equally true with regard to the ſurface generated by any concentric ſemicircle, ſuch as *a l b*. It is true, therefore, with regard to the ſhell comprehended between thoſe two ſurfaces; for this ſhell may be reſolved into innumerable concentric ſtrata, and the propoſition may be affirmed with reſpect to each of them, and therefore with reſpect to the whole. And this will be ſtill true if the whole ſphere be thus occupied.

Laſtly, it follows that the propoſition is ſtill true, although theſe ſtrata ſhould differ in denſity, provided that each ſtratum is uniformly denſe in every part.

It may, therefore, be affirmed in the moſt general terms, that a particle, P, placed without a ſpherical ſurface, ſhell, or entire ſphere, equally denſe at equal diſtances from the centre, tends to the centre with the ſame force, as if the whole matter of the ſurface, ſhell, or ſphere were collected there.

This will be found to be a very important propoſition.

4. *The gravitation of an external particle to a ſpherical ſurface, ſhell, or entire ſphere, of uniform denſity at equal diſtances from the centre, is as the quantity of matter in that body directly; and as the ſquare of the diſtance from its centre inverſely.*

For, if all the matter were collected in its centre, the gravitation would be the ſame, and it would then vary in the inverſe duplicate ratio of the diſtance.

Cor. 1.—Particles placed on the ſurfaces of ſpheres of equal denſity, gravitate to the centres of thoſe ſpheres with forces proportional to the radii of the ſpheres.

For the quantities of matter are as the cubes of the radii. Therefore the gravitation *g* is as $\frac{d^3}{d^2}$, that is, as *d*.

Cor. 2.—The ſame thing holds true if the diſtance of the external particles from the centres of the ſpheres are as the diameters or radii of the ſpheres.

Cor. 3.—If a particle be placed within the ſurface of a ſphere of uniform denſity, its gravitation at different diſtances from the centre will be as thoſe diſtances. For, it will not be affected by any matter of the ſphere that is more remote from the centre, and its gravitation to what is leſs remote, is as its diſtance from the centre by the laſt Cor.

5. *The mutual gravitation of two ſpheres of uniform denſity in their concentric ſtrata, is in the inverſe duplicate ratio of the diſtance between their centres.*

For the gravitation of each particle in the ſphere A, is to the ſphere B, the ſame as if all the matter in B were collected at its centre. Suppoſe it ſo placed:

The gravitation of B to A will be the ſame as if all the matter in A were collected at its centre. Therefore it will be as d^2 inverſely. But the gravitation of A to B is equal to that of B to A. Therefore, &c.

The abſolute gravitation of two ſpheres whoſe quantities of matter are A and B, and *d* the diſtance of their centres, is $\frac{A \times B}{d^2}$. For the tendency of one particle of A to B, being the aggregate of its tendencies to every particle of B, is $\frac{B}{d^2}$. Therefore, the tendency of the whole of A to B muſt be $\frac{A \times B}{d^2}$. And the tendency of B to A is equal to that of A to B.

6. *But if the centripetal forces which tend to the different points of ſpheres are proportional to the ſimple diſtances from the attracted bodies, then the compounded force with which two ſpheres attract each other mutually, is as the diſtance between the centres of the ſpheres.*

Caſe 1.—Let A E B F (*fig.* 125.) be a ſphere; S its centre; P a particle attracted; P A S B the axis of the ſphere paſſing through the centre of the particle; E F, *e f*, two planes cutting the ſphere and perpendicular to the axis, and equidiſtant one on one ſide, the other on the other, from the centre of the ſphere; G and *g* the interſections of the planes and the axis; and H any point in the plane E F. The centripetal force of the point H on the particle P, exerted in the direction of the line P H, is as the diſtance P H; and the ſame exerted in the direction of the line P G, or towards the centre S, is as the length P G. Therefore, the force of all the points in the plane E F, (that is, of the whole plane) by which the particle P is attracted towards the centre S, is as the diſtance P G multiplied by the number of thoſe points, that is, as the ſolid contained under that plane E F, and the diſtance P G. And, in like manner, the force of the plane *e f*, by which the particle P is attracted towards the centre S, is as that plane multiplied into its diſtance P *g*; or as the equal plane E F multiplied into that diſtance P *g*; and the ſum of the forces of both planes is as the plane E F, multiplied into the ſum of the diſtances P G + P *g*, that is, as that plane multiplied into twice the diſtance P S of the centre and the particle; that is, as twice the plane E F, multiplied into the diſtance P S, or as the ſum of the equal planes E F + *e f* multiplied into the ſame diſtance. And by a ſimilar train of reaſoning, the forces of all the planes in the whole ſphere, equidiſtant on each ſide from the centre of the ſphere, are as the ſum of thoſe planes, multiplied into the diſtance P S, that is, as the whole ſphere, and the diſtance P S jointly.

Caſe 2.—Let the particle P now attract the ſphere A E B F, and, by the ſame reaſoning, it will appear that the force with which the ſphere is attracted is as the diſtance P S.

Caſe 3.—If another ſphere be now compoſed of innumerable particles P, and becauſe the force with which every particle is attracted is as the diſtance of the particle from the centre of the firſt ſphere, and as the ſame ſphere conjointly, and is therefore the ſame as if the whole proceeded from a ſingle particle ſituated in the centre of the ſphere; the entire force with which all the particles in the ſecond ſphere are attracted, that is, with which the whole ſphere is attracted, will be the ſame as if that ſphere were attracted by a force proceeding from a ſingle particle in the centre of the firſt ſphere, and is therefore proportional to the diſtance between the centres of the ſpheres.

Caſe 4.—Let the ſpheres attract each other mutually, and the force will be doubled, but the proportion will remain the ſame.

Caſe 5.—Let the particle P be placed within the ſphere A E B F, (*fig.* 126.) and becauſe the force of the plane *e f*, upon the particle, is as the ſolid contained under that plane and the diſtance *p g*; and the contrary force of the plane E F, is as the ſolid contained under that plane and the diſtance *p* G; the force compounded of both will be as the difference of the ſolids, that is, as the ſum of the equal planes multiplied into half the difference of the diſtances; that is, as that ſum multiplied into *p* S, the diſtance of the particle from the centre of the ſphere. And, by a ſimilar train of reaſoning, the attraction of all the planes E F, *e f*, throughout the ſphere, that is, the attraction of the whole ſphere is conjointly as the ſum of all the planes or as the whole ſphere, and as *p* S the diſtance of the particle from the centre of the ſphere.

Caſe 6.—And if a new ſphere be now compoſed of innumerable particles, ſuch as *p*, ſituated within the firſt ſphere A E B F, it may be proved, as before, that the attraction, whether ſingle of one ſphere towards the other, or mutual of both towards each other, will be as the diſtance *p* S of the centres.

7. *If the ſtructure of the ſpheres be diſſimilar and unequal, proceeding directly from the centre towards the circumference, but ſimilar and equal throughout every circumference, at equal diſtances from the centre, and if the attractive force be as the diſtance of the attracted body, then the entire force with which two ſpheres of this kind attract each other mutually is proportional to the diſtance between the centres of the ſpheres.*—This is demonſtrated from the preceding propoſition.

The above inveſtigations relate to the principal caſes of attraction, namely, when the centripetal forces decreaſe in a duplicate ratio, or increaſe in the ſimple ratio of the diſtance. And it is remarkable that both theſe ſuppoſitions cauſe bodies to revolve in conic ſections, and compoſe ſpherical bodies, whoſe centripetal forces obſerve the ſame law of increaſe or decreaſe, in the receſs from the centre, as the forces of the particles themſelves do.

8. *If a circle* A E B (*fig.* 127.) *be deſcribed round the centre* S, *and two circles* E F, *e f*, *be alſo deſcribed round the centre* P, *interſecting the former in* E *and e*, *and the line* P S *in* F *and f*; *and if* E D, *e d*, *be drawn perpendicular to* P S; *then if the diſtance of the arcs* E F, *e f*, *be ſuppoſed to be infinitely diminiſhed, the limiting ratio of the evaneſcent line* D *d* *to the evaneſcent line* F *f* *is the ſame as that of the line* P E *to the line* P S.

For if the line P *e* interſect the arc E F in *q*, and the right line E *e*, which coincides with the evaneſcent arc E *e*, be produced and meet the right line P S in T; and the perpendicular S G be drawn from S to P E, becauſe the triangles D T E, *d* T *e*, D E S, are ſimilar, D *d* will be to E *e* as D T to T E, or D S to E S; and becauſe the triangles E *e q*, E S G, are ſimilar, E *e* will be to *e q* or F *f* as E S to S G; and *ex æquo* D *d* is to F *f* as D E to S G; that is, (becauſe the triangles P D E, P G S, are ſimilar,) as P E to P S.

9. *If a ſuperficies, as* E F *f e* (*fig.* 128.) *be ſuppoſed to have its breadth infinitely diminiſhed, and that by its revolution round the axis* P S *it deſcribes a ſpherical concavo-convex ſolid to the ſeveral equal particles of which equal centripetal forces tend: then the force with which that ſolid attracts a particle placed at* P *is in a ratio compounded of the ratio of the ſolid* $DE^2 \times Ff$, *and the ratio of the force with which the given particle in the place* F *f* *would attract the ſame particle.*

For if the force be firſt conſidered of the ſpherical ſuperficies F E, which is generated by the revolution of the arc F E, and is interſected any where, as in *r*, by the line *d e*, the annular part of the ſuperficies generated by the revolution of the arc rE will be as the ſmall line Dd, the radius of the ſphere remaining the ſame; as Archimedes has demonſtrated in his book on the ſphere and cylinder. And the force of this ſuperficies exerted in the direction of the lines PE or Pr ſituated all round in the conical ſuperficies, will be as this annular ſuperficies itſelf; that is, as the line Dd, or, which is the ſame, as the rectangle under the given radius PE of the ſphere, and the line Dd; but that force, exerted in the direction of the line PS, tending to the centre S, will be leſs in the ratio of PD to PE, and therefore will be as $PD \times Dd$. If the line DF be now conſidered as divided into innumerable equal particles, each of which may be called Dd, then the ſuperficies FE will be divided into ſo many equal annuli, whoſe forces will be as the ſum of all the rectangles $PD \times Dd$; that is, as $\frac{1}{2}PF^2 - \frac{1}{2}PD^2$ and therefore as DE^2. Let now the ſuperficies FE be multiplied into the altitude Ff, and the force of the ſolid $EFfe$ exerted upon the particle P will be as $DE^2 \times Ff$: that is, if the force be given which any given particle, as Ff, exerts upon the particle P at the diſtance PF. But if that force be not given, the force of the ſolid $EFfe$ will be as the ſolid $DE^2 \times Ff$, and that force not given conjointly.

10. *If to the ſeveral equal parts of a ſphere* ABE *fig.* 129.) *deſcribed about the centre* S, *there tend equal centripetal forces; and if from the ſeveral points* D, *perpendiculars* D, E, *be drawn to the axis of the ſphere* AB, *in which a particle* P *is placed, meeting the ſphere in* E; *and if in theſe perpendiculars the lengths* D, N, *be taken as the quantity* $\frac{DE^2 \times PS}{PE}$, *and as the force which a particle of the ſphere ſituated in the axis exerts at the diſtance* PE *upon the particle* P *conjointly; then the whole force with which the particle* P *is attracted towards the ſphere is as the area* ANB, *comprehended under the axis of the ſphere* AB, *and the curve line* ANB, *the locus of the point* N.

For ſuppoſing the conſtruction in the laſt lemma and theorem to remain, let the axis of the ſphere AB be ſuppoſed to be divided into innumerable equal particles D, d, and the whole ſphere to be divided into ſo many ſpherical concavo-convex laminæ $EFfe$, and let the perpendicular dn be drawn. By the laſt theorem the force with which the laminæ $EFfe$, attracts the particle P, is as $DE^2 \times Ff$, and the force of one particle exerted at the diſtance PE or PF conjointly. But (by the laſt lemma) Dd is to Ff as PE to PS, and therefore Ff is equal to $\frac{PS \times Dd}{PE}$; and $DE^2 \times Ff$ is equal to $Dd \times \frac{DE^2 \times PS}{PE}$; and therefore the force of the laminæ $EFfe$, is as $Dd \times \frac{DE^2 \times PS}{PE}$, and the force of a particle exerted at the diſtance PF conjointly; that is, by the ſuppoſition, as $DN \times Dd$, or as the evaneſcent area $DNnd$. Therefore the forces of all the laminæ exerted upon the particle P are as the areas $DNnd$, that is, the ſphere will be as the whole area ANB.

Cor. 1.—Hence if the centripetal force tending to the ſeveral particles remain always the ſame at all diſtances, and DN be made as $\frac{DE^2 \times PS}{PE}$, the whole force with which the particle is attracted by the ſphere is as the area ANB.

Cor. 2.—If the centripetal force of the particles vary reciprocally as the diſtance of the particle attracted by it, and DN be made as $\frac{DE^2 \times PS}{PE^2}$, the force with which the particle P is attracted by the whole ſphere will be as the area ANB.

Cor. 3.—If the centripetal force of the particles vary reciprocally as the cube of the diſtance of the particle attracted by it, and DN be made as $\frac{DE^2 \times PS}{PE^4}$, the force with which the particle is attracted by the whole ſphere will be as the area ANB.

Cor. 4.—And univerſally of the centripetal force tending to the ſeveral particles of the ſphere be ſuppoſed to be reciprocally as the quantity V; and DN be made as $\frac{DE^2 \times PS}{PE \times V}$, the force with which a particle is attracted by the whole ſphere will be as the area ANB.

11. *Suppoſing every thing to remain as above, it is required to meaſure the area* ANB *fig.* 130

From the point P let the right line PH be drawn touching the ſphere in H; and having drawn HI perpendicular to the axis PAB, biſect PI in L, and PE^2 will be equal to $PS^2 \times SE^2 \times 2PSD$. But becauſe the triangles SPH, SHI, are ſimilar, SE^2 or SH^2 is equal to the rectangle PSI. Therefore PE^2 is equal to the rectangle contained under PS and $PS \times SI \times 2SD$; that is, under PS and $2LS \times 2SD$; that is, under PS and $2LD$. Moreover DE^2 is equal to $SE^2 - SD^2$, or $SE^2 - LS^2 + 2SLD - LD^2$, that is, $2SLD - LD^2 - ALB$. For $LS^2 - SE^2$, or $LS^2 - SA^2$, is equal to the rectangle ALB. Therefore if inſtead of DE^2 we write $2SLD - LD^2 - ALB$, the quantity $\frac{DE^2 \times PS}{PE \times V}$, which is as the length of the ordinate DN, will now reſolve itſelf into three parts, $\frac{2SLD \times PS}{PE \times V} - \frac{LD^2 \times PS}{PE \times V} - \frac{ALB \times PS}{PE \times V}$; where, if inſtead of V we write the inverſe ratio of the centripetal force, and inſtead of PE, the mean proportional between PS and $2LD$, thoſe parts will become the ordinates of ſo many curve lines, whoſe areas may be found by the common methods.

Ex. 1.—If the centripetal force tending to the ſeveral particles of the ſphere be reciprocally as the diſtance, inſtead of V write PE the diſtance, then $2PS \times LD$ for PE^2; and DN will become as $SL - \frac{1}{2}LD - \frac{ALD}{2LD}$. Suppoſe DN equal to the double $2SL - LD - \frac{ALB}{LD}$ and $2SL$ the given part of the ordinate drawn into the length AB will deſcribe the rectangular area $2SL \times AB$;; and the indefinite part LD drawn perpendicularly into the ſame length with a continued motion, according to ſuch a law that its motion in either direction may, by increaſing or decreaſing, remain always equal to the length LD, will deſcribe the area $\frac{LB^2 - LA^2}{2}$, that is the area $SL \times AB$; which taken from the former area $2SL \times AB$, leaves the area $SL \times AB$. But the third part $\frac{ALB}{LD}$, drawn in a ſimilar manner with a continued motion perpendicularly into the ſame length, will deſcribe the area of an hyperbola, which ſubtracted from the area $SL \times AB$ will leave ANB the area ſought. Whence this conſtruction of the problem ariſes. At the points L, A, B, (*fig.* 131.) erect the perpendiculars L *l*, A *a*, B *b*; making A *a* equal to L B, and B *b* equal L A. Making L *l* and L B aſſymptotes, deſcribe through the points *a*, *b*, the hyperbolic curve *a b*: and the chord *b a* being drawn, will encloſe the area *a b a* equal to the area required A N B.

Example 2.—If the centripetal force tending to the ſeveral particles of the ſphere be repicrocally as the cube of the diſtance, or, (which is the ſame thing,) as that cube applied to any given plane; ſubſtitute $\frac{PE^3}{2AS^2}$ for V, and $2PS \times LD$ for PE^2; and D N will become as $\frac{SL \times AS^2}{PS \times LD} - \frac{AS^2}{2PS} - \frac{ALB \times AS^2}{2PS \times LD^2}$; that is, (becauſe P S, A S, S I, are continually proportional,) as $\frac{LSI}{LD} - \frac{1}{2} SI - \frac{ALB \times SI}{2LD^2}$. If theſe three parts be then drawn into the length A B, the firſt, $\frac{LSI}{LD}$, will generate the area of an hyperbola; the ſecond, $\frac{1}{2}$ S I, the area $\frac{1}{2} AB \times SI$; the third, $\frac{ALB \times SI}{2LD^2}$, the area $\frac{ALB \times SI}{2LA} - \frac{ALB \times SI}{2LB}$, that is, $\frac{1}{2} AB \times SI$: from the firſt ſubtract the ſum of the ſecond and third, and there will remain A N B, the area ſought. Whence ariſes this conſtruction of the problem. At the points L, A, S, B, (*fig.* 132.) erect the perpendiculars L *l*, A *a*, S *s*, B *b*, of which ſuppoſe S *s* equal S I; and through the point *s*, to the aſſymptotes L *l*, L B, deſcribe the hyperbola *a s b*, meeting the perpendiculars A *a*, B *b*, in *a* and *b*, and the rectangle 2 A S I, ſubtracted from the hyperbolic area A *a s b* B, will leave A N B, the area required.

Example 3.—If the centripetal force, tending to the ſeveral particles of the ſphere, decreaſe in a quadruplicate ratio of the diſtance from the particles, ſubſtitute $\frac{PE^4}{2AS^3}$ for V, then $\sqrt{2PS + LD}$ for P E, and D N will become as $\frac{SI^2 \times SL}{\sqrt{2SI}} \times \frac{1}{\sqrt{LD^3}} - \frac{SI^2}{2\sqrt{2SI}} \times \frac{1}{\sqrt{LD}} - \frac{SI^2 \times ALB}{2\sqrt{2SI}} \times \frac{1}{\sqrt{LD^5}}$. Theſe three parts, drawn into the length A B, produce as many areas, namely, $\frac{2SI \times SL}{\sqrt{2SI}}$ into $\overline{\frac{1}{\sqrt{LA}} - \frac{1}{\sqrt{LB}}}$, $\frac{SI^2}{\sqrt{2SI}}$ into $\overline{\sqrt{LB} - \sqrt{LA}}$, and $\frac{SI^2 \times ALB}{3\sqrt{2SI}}$ into $\overline{\frac{1}{\sqrt{LA^3}} - \frac{1}{\sqrt{LB^3}}}$; and theſe, after the proper reduction, become $\frac{2SI^2 \times SL}{LI}$, SI^2, and $SI^2 + \frac{2SI^3}{3LI}$: and theſe, by ſubtracting the latter terms from the former, become $\frac{4SI^3}{3LI}$; therefore the entire force with which the particle P is attracted towards the centre of the ſphere, is as $\frac{SI^3}{PI}$, that is, reciprocally as $PS^3 \times PL$.

The attraction of a particle, ſituated within the ſphere, may be determined by the ſame method; but more expeditiouſly by the following theorem.

12. *If* S I, S A, S P, (*fig.* 133.) *be taken continually proportional, in a ſphere deſcribed round the centre* S, *with the radius* S A; *then the attraction of a particle within the ſphere, in any place* I, *is to its attraction, without the ſphere, in a place* P, *in a ratio compounded of the ſub-duplicate ratio of* I S, P S, *the diſtances from the centre, and the ſub-duplicate ratio of the centripetal forces tending to the centre in thoſe places,* P *and* I.

As, if the centripetal forces of the particles of the ſphere be reciprocally as the diſtances of the particle attracted by them, the force with which the particle ſituated at I is attracted by the entire ſphere, will be to the force with which it is attracted at P, in a ratio compounded of the ſub-duplicate ratio of the diſtance S I to the diſtance S P, and the ſub-duplicate ratio of the centripetal force in the place I, ariſing from any particle in the centre to the centripetal force in the place P, ariſing from the ſame particle in the centre; that is, in the ſub-duplicate ratio of the diſtances S I, S P, to each other reciprocally. Theſe two ſub-duplicate ratios compoſe the ratio of equality; and, therefore, the attractions in I and P, produced by the whole ſphere, are equal. By a ſimilar calculation, if the forces of the particles of the ſphere are reciprocally in a duplicate ratio of the diſtance, it will be found that the attraction in I is to the attraction in P, as the diſtance S P to the ſemi-diameter S A of the ſphere. If thoſe forces are reciprocally in a triplicate ratio of the diſtances, the attractions in I and P will be to each other as SP^2 to SA^2; if in a quadruplicate ratio, as SP^3 to SA^3. Therefore, ſince the attraction in P, in this laſt caſe, was found to be reciprocally as $PS^3 \times PI$, the attraction in I will be reciprocally as SA^3 into P I; that is, becauſe SA^3 is given reciprocally as P I; and the progreſſion is the ſame indefinitely. The demonſtration of this theorem is as follows:

Retaining the ſame conſtruction as above, and a particle being in any place P, the ordinate D N was found to be as $\frac{DE^2 \times PS}{PE \times V}$; therefore, if I E be drawn, that ordinate for any other place of the particle, as I, will become (ſubſtituting P S and P E for I S and I E) as $\frac{DE^2 \times IS}{IE \times V}$. Suppoſe the centripetal forces proceeding from any point of the ſphere, as E, to be to each other at the diſtances I E and P E, as PE^n to IE^n (where the number *n* denotes the index of the powers of P E and I E,) and thoſe ordinates will become as $\frac{PE^2 \times PS}{PE \times PE^n}$, and $\frac{PE^2 \times IS}{IE \times IE^n}$, whoſe ratio to each other is as $PS \times IE \times IE^n$ to $IS \times PE \times PE^n$. Becauſe S I, S E, S P, are continually proportional, the triangles S P E, S E I, are alike; and thence I E is to P E, as I S to S E, or S A. Subſtitute the ratio of I S to S A for the ratio of I E to P E, and the ratio of the ordinates becomes that of $PS \times IE^n$ to $SA \times PE^n$. But the ratio of P S to S A is ſub-duplicate of that of the diſtances P S, S I; and the ratio of IE^n to PE^n, (becauſe I E is to P E as I S to S A) is ſub-duplicate of that of the forces at the diſtances P S, I S; therefore the ordinates, and conſequently the areas which the ordinates deſcribe, and the attractions proportional to them, are in a ratio compounded of thoſe ſub-duplicate ratios.

13. *To find the force with which a particle, placed in the centre*

centre of a ſphere, is attracted towards any ſegment of that ſphere.

Let P (*fig.* 134.) be a particle in the centre of a ſphere, and R B S D a ſegment thereof contained between the plane R D S, and ſpherical ſuperficies R B S. Let D B be interſected in F by a ſpherical ſuperficies E F G, deſcribed from the centre P, and let the ſegment be divided into the parts B R E F G S, F E D G: let that ſurface be ſuppoſed not purely mathematical, but phyſical, having ſome but a very inconſiderable thickneſs: let that thickneſs be called O, and (by what Archimedes has demonſtrated) that ſuperficies will be as $\mathrm{PF} \times \mathrm{DF} \times \mathrm{O}$: let us ſuppoſe beſides, the attractive forces of the particles of the ſphere, to be reciprocally as that power of the diſtances of which n is the index; and the force with which the ſurface E F G attracts the body P will be as $\frac{\mathrm{DE}^2 \times \mathrm{O}}{\mathrm{PF}^n}$; that is, as $\frac{2\,\mathrm{DE} \times \mathrm{O}}{\mathrm{PF}^{n-1}} - \frac{\mathrm{DF}^2 \times \mathrm{O}}{\mathrm{PF}^n}$. Let the perpendicular F N, drawn into O, be proportional to this quantity, and the curvilinear area D B I, which the ordinate F N, drawn through the length D B, with a continued motion deſcribes, will be as the whole force with which the whole ſegment R B S D attracts the body P.

14. *To find the force with which a particle, placed without the centre of a ſphere, in the axis of any ſegment, is attracted by that ſegment.*

Let the body P, placed in the axis A D B, of the ſegment E B K (*fig.* 135.) be attracted by that ſegment: round the centre P, with the radius P E, let the ſpherical ſurface E F K be deſcribed; and let it divide the ſegment into two parts E B K F E and E F K D E. Let the force of the former part be found by Prop. 11. and, the force of the latter part by Prop. 13. and the ſum of the forces will be the force of the whole ſegment E B K D E.

Theſe are the principal propoſitions by which Newton has inveſtigated the nature of the attraction exerciſed by ſpherical bodies. In the thirteenth ſection of the Principia, the author ſhews the manner in which the law of attraction is inveſtigated for other bodies; the moſt intereſting reſults are contained in the following propoſitions.

Of the attractive forces of bodies which are not of a ſpherical figure.

15. *If a body be attracted by another, and its attraction be conſiderably ſtronger when it is contiguous to the attracting body, than when they are ſeparated from one another by a very ſmall interval; the forces of the particles of the attracting body decreaſe, as the attracted body recedes, in more than a duplicate ratio of the particles attracted.*

16. *If the forces of the particles, of which an attractive body is compoſed, decreaſe as the attracted body recedes, in a triplicate, or more than triplicate ratio of the diſtance from the particles, the attraction will be conſiderably ſtronger in the place of contact, than when the attracting and attracted bodies are ſeparated from each, though by the moſt minute interval.*

17. *If two bodies, ſimilar to each other, and conſiſting of matter equally attractive, attract ſeparately two particles, proportional to thoſe bodies, and in a ſimilar ſituation to them; the accelerative attractions of the particles towards the entire bodies will be as the accelerative attractions of the particles towards particles of the bodies proportional to the whole, and ſimilarly ſituated in them.*

18. *If the attractive forces of the equal particles of any body be as the diſtance of the places from the particles, the force of the whole body will tend to its centre of gravity; and will be the ſame with the force of a globe, conſiſting of ſimilar and equal matter, and having its centre in the centre of gravity.*

19. *If there be ſeveral bodies, conſiſting of equal particles, whoſe forces are as the diſtances of the places from each, the force compounded of all the forces by which any particle is attracted, will tend to the common centre of gravity of the attracting bodies; and will be the ſame as if theſe attracting bodies, preſerving their common centre of gravity, ſhould unite there, and be formed into a globe.*

20. *If a ſolid be plane on one ſide, and infinitely extended on all other ſides, and conſiſt of equal particles equally attractive, whoſe forces decreaſe, as they recede from the ſolid in the ratio of any power greater than the ſquare of the diſtances; and a particle placed towards either part of the plane is attracted by the force of the whole ſolid; then the attractive force of the whole ſolid, as it recedes from its plane ſuperficies, will decreaſe in the ratio of a power whoſe ſide is the diſtance of a particle from the plane, and is indeed leſs by three than the index of the power of the diſtances.*

Though the above propoſitions are ſufficient for all aſtronomical inveſtigations, yet there are many queſtions in natural philoſophy, particularly thoſe which relate to the attraction of mountains, which require that theſe enquiries ſhould be extended to a greater variety of caſes; and the following propoſitions form a part of the intereſting inveſtigations of profeſſor Playfair, as he has communicated them to the public, in the ſixth volume of the Edinburgh Tranſactions, as above-mentioned: they were ſuggeſted to the learned author by the experiments which have been made of late years, concerning the gravitation of terreſtrial bodies, particularly by Dr. Maſkelyne on the attraction of mountains, and by Mr. Cavendiſh, on the attraction of leaden balls, as has been deſcribed at length under the article DENSITY, to which the reader is referred.

I. *To find the ſolid into which a maſs of homogeneous matter muſt be formed, to attract a particle given in poſition with the greateſt force poſſible in a given direction.*

Let A (*fig.* 136.) be the particle given in poſition, A B the direction in which it is to be attracted; and A C B H a ſection of the ſolid required, by a plane paſſing through A B.

Since the attraction of the ſolid is a maximum by hypotheſis, any ſmall variation in the figure of the ſolid, provided the quantity of matter remain the ſame, will not change the attraction in the direction A B. If, therefore, a ſmall portion of matter be taken from any point C in the ſuperficies of the ſolid, and placed at D, another point in the ſame ſuperficies, there will be no variation in the force which the ſolid exerts on the particle A in the direction A B.

The curve A C B, therefore, is the locus of all the points, in which a body, being placed, will attract the particle A in the direction A B, with the ſame force. This condition is ſufficient to determine the nature of the curve A B C. From C any point in that curve, draw C E perpendicular to A B; then if a maſs of matter, placed at C be called m^3, $\frac{m^3}{\mathrm{AC}^2}$ will be the attraction of that maſs on A, in the direction A C, and $\frac{m^3 \times \mathrm{AE}}{\mathrm{AC}^3}$ will be its attraction in the direction A B: as this is conſtant, it will be equal to $\frac{m^3}{\mathrm{AB}^2}$, and, therefore, $\mathrm{AB}^2 \times \mathrm{AE} = \mathrm{AC}^3$.

All the ſections of the required ſolid, therefore, by planes paſſing through A B, have this property, that AC^3 = A.

$= AB^2 \times AE$; and as this equation is ſufficient to determine the nature of the curve to which it belongs, therefore all the ſections of the ſolid, by planes that paſs through A B, are ſimilar and equal curves; and the ſolid, in conſequence, may be conceived to be generated by the revolution of A C B, any one of thoſe curves, about A B as an axis.

The ſolid ſo generated may be called the *ſolid of greateſt attraction*, and the line A C B the *curve of equal attraction.*

II. *To find the equation between the co-ordinates of* A C B, *the curve of equal attraction.*

From C (*fig.* 136.) draw C E perpendicular to A B; let $AB = a$, $AE = x$, $EC = y$.

It has been found that $AB^2 \times AE = AC^3$, that is $a^2 x = (x^2 + y^2)^{\frac{3}{2}}$, or $a^4 x^2 = (x^2 + y^2)^3$, which is an equation to a line of the ſixth order.

To obtain y in terms of x, $x^2 + y^2 = a^{\frac{4}{3}} x^{\frac{2}{3}}$, $y^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$ and $y = x^{\frac{1}{3}} \sqrt{a^{\frac{4}{3}} - x^{\frac{4}{3}}}$.

Hence $y = 0$, both when $x = 0$, and when $x = a$. Alſo, if x be ſuppoſed greater than a, y is impoſſible. No part of the curve, therefore, lies beyond B.

The parts of the curve on oppoſite ſides of the line A B are ſimilar and equal, becauſe the poſitive and negative values of y are equal. There is alſo another part of the curve on the ſide of A, oppoſite to B, ſimilar and equal to A C B; for the values of y are the ſame, whether x be poſitive or negative.

III. *The curve may be eaſily conſtructed without having recourſe to the value of y juſt obtained.*

Let $AB = a$ (*fig.* 136.) $AC = z$, and the angle $BAC = \varphi$. Then $AE = AC \times \text{coſ.}\ \varphi = z\ \text{coſ.}\ \varphi$, and ſo $a^2 z\ \text{coſ.}\ \varphi = z^3$, or $a^2\ \text{coſ.}\ \varphi = z^2$; hence $z = a \sqrt{\text{coſ.}\ \varphi}$.

From this formula a value of A C or z may be found, if φ or the angle B A C be given; and if it be required to find z in numbers, it may be conveniently calculated from this expreſſion. A geometrical conſtruction may alſo be eaſily derived from it. For if with the radius A B, a circle B F H be deſcribed from the centre A; if A C be produced to meet the circumference in F, and if F G be drawn at right angles to A B, then $\frac{AG}{AB} = \text{coſ.}\ \varphi$, and ſo $z = a \times \sqrt{\frac{AG}{AB}} = \sqrt{AB \times AG} = AC$.

Therefore, if from the centre A, with the diſtance A B, a circle B F H be deſcribed; and if a circle be alſo deſcribed on the diameter A B as A K B, then drawing any line A F from A, meeting the circle B F H in F, and from F letting fall F G the perpendicular on A B, interſecting the ſemicircle A K B in K; and if A K be joined, and A C made equal to A K, the point C is in the curve.

For $AK = \sqrt{AB \times AG}$, from the nature of the ſemi-circle, and therefore $AC = \sqrt{AB \times AG}$, which has been ſhewn to be a property of the curve. In this way a number of points of the curve may be determined; and the *ſolid of greateſt attraction* will be deſcribed, as already explained, by the revolution of this curve about the axis A B.

IV. *To find the area of the curve* A C B.

1. Let A C E, A F G (*fig.* 137.) be two radii indefinitely near to one another, meeting the curve A C B in C and F, and the circle deſcribed with the radius A B in E and G. Let $AC = z$ as before, the angle $BAC = \varphi$, and $AB = a$. Then $GE = a\dot{\varphi}$, and the area $AGE = \frac{1}{2} a^2 \dot{\varphi}$, and ſince $AE^2 : AC^2 :: \text{ſect.}\ AEG : \text{ſect.}\ ACF$, the ſector $ACF = \frac{1}{2} z^2 \dot{\varphi}$. But $z^2 = a^2\ \text{coſ.}\ \varphi$, whence the ſector $ACF = \frac{1}{2} z^2 \varphi$. But $z^2 = a^2\ \text{coſ.}\ \varphi$, (III.) whence the ſector A C F, or the fluxion of the area $ABC = \frac{1}{2} a^2 \dot{\varphi}\ \text{coſ.}\ \varphi$, and conſequently the area $ABC = \frac{1}{2} a^2\ \text{ſin.}\ \varphi$, to which no conſtant quantity need be added, becauſe it vaniſhes when $\varphi = 0$, or when the area A B C vaniſhes.

The whole area of the curve therefore is $\frac{1}{2} a^2$, or $\frac{1}{2} AB^2$; for when φ is a right angle $\text{ſin.}\ \varphi = 1$. Hence the area of the curve on both ſides of A B is equal to the ſquare of A B.

2. The value of x, when y is a maximum, is eaſily found. For when y, and therefore y^2, is a maximum, $\frac{2}{3} a^{\frac{4}{3}} - x^{\frac{1}{3}} = 2x$, or $3x^{\frac{4}{3}} = a^{\frac{4}{3}}$, that is, $x = \frac{a}{3^{\frac{3}{4}}} = \frac{a}{\sqrt[4]{27}}$.

Hence calling b the value of y when a maximum, $b^2 = a^{\frac{4}{3}} \times \frac{a^{\frac{2}{3}}}{27^{\frac{1}{6}}} - \frac{a^2}{27^{\frac{1}{2}}} = a^2 \left(\frac{27^{\frac{1}{3}} - 1}{27^{\frac{1}{2}}}\right) = \frac{2a^2}{\sqrt{27}}$, and ſo $b = a \frac{\sqrt{2}}{\sqrt[4]{27}}$, and therefore $a : b :: \sqrt[4]{27} : \sqrt{2}$, or as 11 : 7 nearly.

3. It is material to obſerve, that the radius of curvature A is infinite: for ſince $y^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$, $\frac{y^2}{x} = \frac{a^{\frac{4}{3}}}{x^{\frac{1}{3}}} - x$.

But when x is very ſmall, or y indefinitely near to A, $\frac{y^2}{x}$ becomes the diameter of the circle, having the ſame curvature with A C B at A; and when x vaniſhes, this value of $\frac{y^2}{x}$, or $\frac{a^{\frac{4}{3}}}{x^{\frac{1}{3}}} - x$ becomes infinite, becauſe of the diviſor $x^{\frac{1}{3}}$ being in that caſe $= 0$. The diameter, therefore, and the radius of curvature at A, are infinite. In other words, no circle, having its centre in A B produced, and paſſing through A, can be deſcribed with ſo great a radius, but that at the point A it will be within the curve of equal attraction.

The ſolid of greateſt attraction then, at the extremity of its axis, where the attracted particle is placed, is exceedingly flat, approaching more nearly to a plane than the ſuperficies of any ſphere can do, however great its radius.

4. To find the radius of curvature at B, the other extremity of the axis, ſince $y^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$, if we divide by $a - x$, we have $\frac{y^2}{a - x} = \frac{a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2}{a - x}$.

But at B, when $a - x$, or the abſciſſa reckoned from B vaniſhes, $\frac{y^2}{a - x}$ is the diameter of the circle, having the ſame curvature with A C B in B. But when $a - x = 0$, or $a = x$ both the numerator and denominator of the fraction $\frac{a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2}{a - x}$ vaniſhes, ſo that its ultimate value does not appear. To remove this difficulty, let $a - x = z$, or $x = a - z$, then we have $y^2 = (a - z)^{\frac{2}{3}} - (a - z)^2$.

But when z is extremely ſmall, its powers higher than the firſt may be rejected; and therefore $(a - z)^{\frac{2}{3}} = a^{\frac{2}{3}} \left(1 - \frac{z}{a}\right)^{\frac{2}{3}} = a^{\frac{2}{3}} \left(1 - \frac{2z}{3u} \&c.\right)$ Therefore the equation to the curve becomes in this caſe, $y^2 = a^{\frac{4}{3}} \times a^{\frac{2}{3}} \left(1 - \frac{2z}{3a}\right) - a^2 + 2az = a^2 - \frac{2}{3} az - a^2 + 2az = \frac{4}{3} az$.

Hence $\frac{y^2}{2z}$, or the radius of curvature at $B = \frac{2}{3}a$. The curve therefore at B falls wholly without the circle B K A, deſcribed on the diameter A B, as its radius of curvature is greater. This is alſo evident from the conſtruction.

V. *To find the force with which the ſolid above defined attracts the particle* A *in the direction* A B.

Let B (*fig.* 137.), be a point indefinitely near to B, and let the curve A *c b* be deſcribed ſimilar to A C B; through C draw C *c* D perpendicular to A B, and ſuppoſe the figure thus conſtructed to revolve about A B; then each of the curves A C B, A *c b*, will generate a ſolid of greateſt attraction; and the exceſs of the one of theſe ſolids above the other, will be an indefinitely thin ſhell, the attraction of which is the variation of the attraction of the ſolid A C B when it changes into A *c b*.

Again, by the line D C, when it revolves along with the reſt of the figure about A B, a circle will be deſcribed; and by the part C *c*, a circular ring, on which, if we ſuppoſe a ſolid of indefinitely ſmall altitude to be conſtituted, it will make the element of the ſolid ſhell A C *c*. Now the attraction exerted by this circular ring upon A will be the ſame as if all the matter of it were united in the point C, and the ſame, therefore, as if it were all united in B.

But the circular ring generated by C *c* is $= \pi\,(DC^2 - Dc^2) = 2\pi\, DC \times Cc$. Now, $2\,DC \times Cc$ is the variation of y^2, or DC^2, while D C paſſes into D *c*, and the curve B C A into the curve *b c* A; that is, $2\,DC \times Cc$ is the fluxion of y^2, or of $a^{\frac{4}{3}}x^{\frac{2}{3}} - x^2$, taken on the ſuppoſition that x is conſtant and a variable, namely $\frac{4}{3}a^{\frac{1}{3}}\dot{a} \times x^{\frac{2}{3}}$. Therefore the ſpace generated by $Cc = \frac{4\pi}{3}a^{\frac{1}{3}}x^{\frac{2}{3}}\dot{a}$.

If this expreſſion be multiplied by $\dot{x}$, we have the element of the ſhell $= \frac{4\pi}{3}a^{\frac{1}{3}}x^{\frac{2}{3}}\dot{a}\dot{x}$.

In order to have the ſolidity of the ſhell A C B *b c*, the above expreſſion muſt be integrated relatively to x, that is, ſuppoſing only x variable, and it is then $\frac{3}{5} \times \frac{4\pi}{3}a^{\frac{1}{3}}x^{\frac{5}{3}}\dot{a} + C$.

But $C = 0$, becauſe the fluent vaniſhes when x vaniſhes, therefore the portion of the ſhell A C $c = \frac{4}{5}x^{\frac{5}{3}}a^{\frac{1}{3}}\dot{a}$, and when $x = a$ the whole ſhell $= \frac{4\pi}{5}a^2\dot{a}$.

Now, if the whole quantity of matter in the ſhell were united at B, its attractive force exerted on A would be the ſame with that of the ſhell, therefore the whole force of the ſhell $= \frac{4\pi}{5}\dot{a}$. The ſame is true for every other indefinitely thin ſhell, into which the ſolid may be ſuppoſed to be divided; and, therefore, the whole attraction of the ſolid is equal to $\int\frac{4\pi}{5}\dot{a}$, ſuppoſing a variable, that is, $= \frac{4\pi}{5}a$.

Hence we may compare the attraction of this ſolid with that of a ſphere of which the axis is A B, for the attraction of that ſphere $= \frac{\pi}{6}a^3 \times \frac{4}{a^2} = \frac{2\pi}{3} \times a$: the attraction of the ſolid A D B H (*fig.* 136), is, therefore, to that of the ſphere on the ſame axis as $\frac{4\pi}{5}a$ to $\frac{2\pi}{3}a$, or as 6 to 5.

VI. *To find the content of the ſolid* A D B H, we need only integrate the fluxionary expreſſion for the content of the ſhell, namely, $\frac{4\pi}{5}a^2\dot{a}$. We have then $\frac{4\pi}{15}a^3 =$ the content of the ſolid A D B H. Since the ſolidity of the ſphere on the axis A is $= \frac{\pi}{6}a^3$, the content of the ſolid A D B H is to that of the ſphere on the ſame axis as $\frac{4\pi}{15}a^3$ to $\frac{\pi}{6}a^3$; that is, as $\frac{4}{15}$ to $\frac{1}{6}$, or as 8 to 5.

VII. *Laſtly, to compare the attraction of this ſolid with the attraction of a ſphere of equal bulk.*—Let $m^3 =$ any given maſs of matter formed into the ſolid A D B H; then for determining A B, we have this equation $\frac{4\pi}{15}a^3 = m^3$, and $a = m^3\sqrt{\frac{15}{4\pi}}$; and, therefore, alſo, the attraction of the ſolid, $\left(\text{which is } \frac{4\pi}{5}a\right) = \frac{4\pi}{5}m^3\sqrt{\frac{15}{4\pi}} = m\left(\frac{4\cdot5^{\frac{1}{3}}\cdot3^{\frac{1}{3}}\cdot\pi^{\frac{2}{3}}}{4\cdot5^{\frac{1}{3}}}\right) = m\left(\frac{4^{\frac{2}{3}}\cdot3^{\frac{1}{3}}\cdot\pi^{\frac{2}{3}}}{5^{\frac{2}{3}}}\right) = m\,\frac{\sqrt[3]{48\pi}}{25}$.

Again, if m^3 be formed into a ſphere, the radius of that ſphere $= m^3\frac{\sqrt{3}}{4\pi}$, and the attraction of it on a particle at its ſurface $\frac{m^3}{m^2\left(\frac{3}{4\pi}\right)^{\frac{2}{3}}} = m\frac{(16\pi^2)^{\frac{1}{3}}}{9^{\frac{1}{3}}}$.

Hence the attraction of the ſolid A D B H, is to that of a ſphere equal to it, as $m\left(\frac{48}{25}\pi^2\right)^{\frac{1}{3}}$ to $m\left(\frac{16}{9}\pi^2\right)^{\frac{1}{3}}$; that is, as $(27)^{\frac{1}{3}}$ to $(25)^{\frac{1}{3}}$, or as 3 to the cube root of 25.

The ratio of 3 to $\sqrt[3]{25}$, is nearly that of 3 to $3 - \frac{2}{27}$, or of 81 to 79; and this is therefore alſo nearly equal to the ratio of the attraction of the ſolid A D B H, to that of a ſphere of equal magnitude.

VIII.—*It has been ſuppoſed in the preceding inveſtigation, that the particle on which the ſolid of greateſt attraction exerts its force, is in contact with that ſolid. Let it now be ſuppoſed, that the diſtance between the ſolid and the particle is given; the ſolid being on one ſide of the plane and the particle at a given diſtance from the ſame plane on the oppoſite ſide. The maſs of matter which is to compoſe the ſolid being given, it is required to conſtruct the ſolid.*

Let the particle to be attracted be at A (*fig.* 137), from A draw A A′ perpendicular to the given plane, and let E F be any ſtraight line in that plane drawn through the point A′, it is evident that the axis of the ſolid required muſt be in A A′ produced. Let B be the vertex of the ſolid, then it will be demonſtrated as has been done above, that this ſolid is generated by the revolution of the curve of *equal attraction*, that of which the equation is $(y^2 = a^{\frac{4}{3}}x^{\frac{2}{3}} - x^2)$ about the axis of which one extremity is at A, and of which the length muſt be found from the quantity of matter in the ſolid.

The ſolid required then, is a ſegment of the ſolid of greateſt attraction, having B for its vertex, and a circle of which A′ E or A′ F is the radius, for its baſe.

To find the ſolid content of ſuch a ſegment, C D being $= y$, and $AC = x$, we have $y^2 = a^{\frac{4}{3}}x^{\frac{2}{3}} - x^2$, and $\pi y^2\dot{x} = \pi a^{\frac{4}{3}}x^{\frac{2}{3}}\dot{x} - \pi x^2\dot{x} =$ the cylinder, which is the element of the ſolid ſegment.

Therefore $\int\pi y^2\dot{x}$, or the ſolid ſegment intercepted between B and D, muſt be $\frac{3}{5}\pi a^{\frac{4}{3}}x^{\frac{5}{3}} - \frac{1}{3}\pi x^3 + C$. This muſt vaniſh when $x = a$, or when C comes to B, and therefore

fore $C = \frac{4\pi}{15} a^3$. The ſegment therefore intercepted between B and C, the line A C being x, is $\frac{4\pi}{15} a^3 - \frac{3\pi}{5} a^{\frac{4}{3}} x^{\frac{5}{3}} + \frac{\pi}{3} x^3$.

This alſo gives $\frac{4\pi}{15} a^3$, for the content of the whole ſolid, when $x = 0$, the ſame value that was found by another method at VI.

Now, if we ſuppoſe x to be $=$ A A′, and to be given $= b$, the ſolid content of the ſegment becomes $\frac{4\pi}{15} a^3 - \frac{3}{5}\pi a^{\frac{4}{3}} b^{\frac{5}{3}} + \frac{\pi}{3} b^3$ which muſt be made equal to the given ſolidity, which we ſhall ſuppoſe m^3, and from this equation a, which is yet unknown, is to be determined. If then for $a^{\frac{1}{3}}$ we put u, we have $\pi (\frac{4}{15} u^9 - \frac{3}{5} b^{\frac{5}{3}} u^4 - \frac{1}{3} b^3) = m^3$, or $\frac{4}{15} u^9 - \frac{3}{5} b^{\frac{5}{3}} u^4 = \frac{m^3}{\pi} - \frac{1}{3} b^3$, and $u^9 - \frac{9}{4} b^{\frac{5}{3}} u = \frac{15 m^3}{4\pi} - \frac{15}{12} b^3$.

The ſimpleſt way of ſolving this equation would be by the rule of falſe poſition. In ſome particular caſes it may be reſolved more eaſily; thus, if $\frac{15 m^3}{\pi} - \frac{15}{12} b^3 = 0$, $u^9 - \frac{9}{4} b^{\frac{5}{3}} u^4 = 0$, and $u^5 = \frac{9}{4} b^{\frac{5}{3}}$ that is $a^{\frac{5}{3}} = \frac{9}{4} b^{\frac{5}{3}}$, or $a = b \times (\frac{9}{4})^{\frac{3}{5}} = b \sqrt[5]{\frac{729}{64}}$.

IX.—1. *If it be required to find the equation to the ſuperficies of the ſolid of greateſt attraction, and alſo to the ſections of its parallel to any plane paſſing through the axis; this can readily be done by help of what has been demonſtrated above.*

Let A H B (*fig.* 138), be a ſection of the ſolid, by a plane paſſing through A B its axis. Let G be any point in the ſuperficies of the ſolid, G F a perpendicular from G on the plane A H B, and F E a perpendicular from F on the axis. Let A E $= x$, E F $= z$, F G $= v$, then x, z, and v are the three co-ordinates by which the ſuperficies is to be defined. Let A B $= a$, E H $= y$, then from the nature of the curve A H B, $y^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$. But, becauſe the plane G E H is at right angles to A B, G and H are in the circumference of a circle of which E is the centre; ſo that G E $=$ E H $= y$. Therefore $EF^2 + FG^2 = EH^2$, that is $z^2 + v^2 = y^2$, and by ſubſtitution for y^2 in the former equation, $z^2 + v^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$, or $(x^2 + z^2 + v^2) = a^4 x^2$ which is the equation to the ſuperficies of the ſolid of greateſt attraction.

2. If we ſuppoſe E F, that is z, to be given $= b$, and the ſolid to be cut by a plane through F G and C D (C D being parallel to A B) making on the ſurface of the ſolid the ſection D G C; and if A K be drawn at right angles to A B, meeting D C in K, then we have, by writing b for z in either of the preceding equations, $b^2 + v^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2$, and $v^2 = a^{\frac{4}{3}} x^{\frac{2}{3}} - x^2 - b^2$ for the equation to the curve D G C, the co-ordinates being G F and F K, becauſe F K is equal to A E or x.

This equation alſo belongs to a curve of equal attraction; the plane in which that curve is being parallel to A B, the line in which the attraction is eſtimated, and diſtant from it by the ſpace b.

Inſtead of reckoning the abſciſſa from K, it may be made to begin at C. If A E or C K $= b$, then the value of b is determined from the equation $b^2 = a^{\frac{4}{3}} b^{\frac{2}{3}} - b^2$, and if $x = b + u$, u being put for C F, $v^2 = a^{\frac{4}{3}} (b + u)^{\frac{2}{3}} - (b + u)^2 - a^{\frac{4}{3}} b^{\frac{2}{3}} + b^2$, or $v^2 + (b + u)^2 + b^2 = a^{\frac{4}{3}} (b + u)^{\frac{2}{3}}$, or $(v^2 + (b + u)^2 + b^2)^3 = a^4 (b + u)^2$.

When b is equal to the maximum value of the ordinate E H (IV. 2) the curve C D G goes away into a point; and if b be ſuppoſed greater than this, the equation to the curve is impoſſible.

X.—*The ſolid of greateſt attraction may be found, and its properties inveſtigated, in the way that has now been exemplified, whatever be the law of the attractive force. It will be ſufficient in any caſe to find the equation of the generating curve, or the curve of equal attraction.*

Thus, if the attraction, which the particle C (*fig.* 136.) exerts on the given particle at A, be inverſely as the m power of the diſtance, or as $\frac{1}{AC^m}$, then the attraction in the direction A E will be $\frac{AE}{AC^{m+1}}$, and if we make this $= \frac{1}{AB^m}$, we have $\frac{AE}{AC^{m+1}} = \frac{1}{AB^m}$, or making A E $= x$, E C $= y$, and A B $= a$, as before $\frac{x}{(x^2 + y^2)^{\frac{m+1}{2}}} = \frac{1}{a^m}$, or $a^m x = (x^2 + y^2)^{\frac{m+1}{2}}$ and $x^2 + y^2 = \frac{2m}{a^{m+1}} \frac{2}{x^{m+1}}$, or $y^2 = \frac{2m}{a^{m+1}} \frac{2}{x^{m+1}} - x^2$.

If $m = 1$, or $m + 1 = 2$, this equation becomes $y^2 = ax - x^2$, being that of a circle of which the diameter is A B. If, therefore, the attracting force were inverſely as the diſtance, the ſolid of greateſt attraction would be a ſphere.

If the force be inverſely as the cube of the diſtance, or $m = 3$, and $m + 1 = 4$, the equation is $y^2 = a^{\frac{3}{2}} x^{\frac{1}{2}} - x^2$, which belongs to a line of the fourth order.

If $m = 4$, and $m + 1 = 5$, the equation is $y^2 = a^{\frac{8}{5}} x^{\frac{2}{5}} - x^2$, which belongs to a line of the tenth order.

In general, if m be an even number, the order of the curve is $m + 1 \times 2$; but if m be an odd number, it is $m + 1$ ſimply.

In the ſame manner that the ſolid of greateſt attraction has been found, may a great claſs of ſimilar problems be reſolved. Whenever the property that is to exiſt in the greateſt or leaſt degree belongs to all the points of a plane figure, or to all the points of a ſolid, given in magnitude, the queſtion is reduced to the determination of the locus of a certain equation, as in the preceding example.

Let it, for inſtance, be required to find a ſolid given in magnitude, ſuch, that from all the points in it, ſtraight lines being drawn to any number of given points, the ſum of the ſquares of the lines ſo drawn ſhall be a *minimum.* It will be found, by reaſoning, as in the caſe of the ſolid of greateſt attraction, that the ſuperficies bounding the required ſolid muſt be ſuch, that the ſum of the ſquares of the lines drawn from any point in it, to all the given points, muſt be always of the ſame magnitude. Now, the ſum of the ſquares of the lines drawn from any point, to all the given points, may be ſhewn by plane geometry, to be equal to the ſquare of the line drawn to the centre of gravity of theſe given points, multiplied by the number of points together with a given ſpace. The line, therefore, drawn from any point in the required ſuperficies, to the centre of gravity of the given points, is given in magnitude, and therefore the ſuperficies is that of a ſphere, having for its centre the centre of gravity of the given points.

The magnitude of the ſphere is next determined from the condition that its ſolidity is given.

In general, if x, y and z are three rectangular co-ordinates, that determine the poſition of any point of a ſolid given in magnitude, and if the value of a certain function φ of x, y, and z be computed for each point of the ſolid, and if the ſum of all theſe values of φ added together be a maximum or a minimum, the ſolid is bounded by a ſuperficies, in which the function φ is every where of the ſame magnitude. That is, if the triple integral $\int \dot{x} \int \dot{y} \int \varphi \dot{z}$ be the greateſt or leaſt poſſible, the ſuperficies bounding the ſolid is ſuch, that $\varphi = A$, a conſtant quantity.

The ſame holds of plane figures. The propoſition is then more ſimple, as there are only two co-ordinates, ſo that $\int \dot{x} \int \varphi \dot{z}$ is the quantity that is to be a maximum or minimum, and the line bounding the figure is defined by the equation $\varphi = A$.

All the queſtions therefore that come under this deſcription, though they belong to an order of problems, which requires in general the application of one of the moſt refined inventions of new geometry, the *calculus variationum*, form a particular diviſion, admitting of ſolution by much more ſimple means, and directly reducible to the conſtruction of loci.

In theſe problems alſo, the ſynthetical demonſtration will be found extremely ſimple. In the inſtance of the ſolid of greateſt attraction, this holds remarkably. Thus it is obvious, that (*fig.* 136.) any particle of matter placed within the curve A C B H, will attract the particle at A in the direction A B, leſs than any of the particles in that curve, and that any particle of matter within the curve will attract the particle at A more than any particle in the curve, and more, *a fortiori*, than any particle without the curve. The ſame is true of the whole ſuperficies of the ſolid. Now if the figure of the ſolid be any how changed while its quantity of matter remains the ſame, as much matter muſt be expelled from within the ſurface, at ſome one place C, as is accumulated without the ſurface, at ſome other point H. But the action of any quantity of matter within the ſuperficies A C B H on A is greater than the action of the ſame without the ſuperficies A C B H. The ſolid A C B H therefore by any change of its figure muſt loſe more attraction than it gains. Thus is its attraction not diſtinguiſhed by every ſuch change, and therefore it is itſelf the ſolid of greateſt attraction.

Among a number of propoſitions which the limits of our work do not permit us to notice, it is propoſed, "to determine the oblate ſpheroid of a given ſolidity, which ſhall attract a particle at its pole with the greateſt force." And it appears that the gravitation at the pole of an oblate ſpheroid is not a maximum, until the excentricity of the generating ellipſe vaniſh, and the ſpheroid paſs into a ſphere. When a ſphere paſſes into an oblate ſpheroid its attraction varies at firſt exceeding ſlowly, and continues to do ſo till its oblateneſs, or excentricity, becomes very great.

The cone of greateſt attraction has the radius of its baſe nearly double that of its altitude, and the attraction of the cone, when a maximum, is about $\frac{4}{5}$ the attraction of a ſphere of equal ſolidity.

Of all the cylinders given in maſs or quantity of matter, that which attracts a particle at the extremity of its axis with the greateſt force is when the radius of the baſe of the cylinder is to the altitude as five to eight nearly, and it appears that the attraction of the cylinder, even when its form is the moſt advantageous, does not exceed that of a ſphere of the ſame ſolid content, by more than a hundred and eighty-third part.

A ſemi-cylinder given in magnitude, attracts a particle ſituated in the centre of its baſe, with the greateſt force poſſible, in the direction of a line biſecting the baſe, when the altitude of the ſemi-cylinder is to the radius of its baſe as 125 to 216.

Gravitation, *Centre of.* See Center.

Gravitation, *Line of.* See Line.

Gravitation, *Plane of.* See Plane.

GRAVITY, Terrestrial, is that force by which all bodies are continually urged towards the centre of the earth. It is in conſequence of this force that a body cannot remain at reſt on the ſurface of the earth, without exerciſing a preſſure either on ſome intermediate body, or on that portion of the ſurface of the earth which ſuſtains it; and the intenſity of this force is meaſured by the degree of preſſure, produced by a given maſs. The tenſion of a ſtring, by which a weight is ſuſpended, ariſes from the force of gravity. The ſpring ſteelyard, an inſtrument ſold at the ſhops for weighing, is extremely well adapted to illuſtrate the effect of the force of gravity; the ſuſpended ſubſtance draws out a ſcale by overcoming the reſiſtance of the ſpring. Theſe machines are not capable of great exactneſs, but if an inſtrument of this kind could be made with ſufficient accuracy, the alteration of the ſcale, (the weight remaining the ſame,) would ſhew any change in the force of gravity; and we might, by taking this apparatus to the ſummit of a high mountain, obſerve whether any change took place in the force of gravity by ſuch an operation. We meaſure likewiſe the force of gravity by the time which a body, ſuffered to deſcend freely from a ſtate of reſt, employs to fall through a given ſpace, or (as has been explained under Dynamics) by the velocity which a body, thus falling, acquires at the end of a given time. Thus a body, falling freely, during the interval of one ſecond, acquires a velocity of $32\frac{1}{6}$, that is, it would ſtrike an obſtacle with the ſame force as another body would of the ſame maſs, which was moving uniformly with the velocity of $32\frac{1}{6}$ per ſecond.

The denſity of the earth being about 2.5 that of water, we infer that the force of gravity of a ſphere, 8000 miles in diameter, and whoſe ſpecific gravity is twice and a half that of water, would attract a particle of matter placed juſt without its ſurface, in ſuch a manner as to cauſe it to move towards its centre, $16\frac{1}{12}$ feet in one ſecond.

It is, however, to be obſerved, that it is only at the pole that the *whole* force of the earth's gravity is actually exerted on a particle of matter: at every other part of the earth's ſurface, the force of gravity is diminiſhed by the motion of rotation, which producing a centrifugal force, oppoſite in its tendency to that of the force of gravity, diminiſhes the effect of the latter as we recede from the pole and approach the equator. But, beſides this, there is another cauſe which contributes in a very remarkable manner to modify the force of gravity at different points of the earth's ſurface, which is the elliptic figure of the earth.

The equatorial regions being more elevated than the polar, are more removed from the influence of the central attraction. Both theſe circumſtances, and their effects, muſt be attended to when we propoſe to make any very accurate computation of the force of terreſtrial gravity.

The diminution of gravity ariſing from the elliptic figure is nearly equal to the product of the $\frac{1}{289}$th part of the force of gravity, by the ſquare of the coſine of the latitude. The centrifugal force diminiſhes the force of gravity in the ſame proportion; thus by the combination of theſe two cauſes, the diminution of gravity from the pole to the equator is equal 0.00694 multiplied by the ſquare of the coſine of the latitude, the force of gravity at the equator being taken as unity.

The moſt exact inſtrument we poſſeſs, for meaſuring the intenſity of the force, is the pendulum, whoſe oſcillations are immediately accelerated or retarded by the ſlighteſt alteration in the force of gravity, and it is only by means of this inſtrument that we are enabled to infer with preciſion, the exact ſpace that a heavy body falls through in one ſecond of time.

GRAVITY, *The Nature of.*—Of the nature of gravitation, or the force of gravity, nothing more is known, than that it is apparently an eſſential property of matter, or, at leaſt, of all matter that hitherto has become the object of human inveſtigation; for Newton was not diſpoſed to believe but that matter might exiſt which was not endowed with this property, and ſuggeſts the ſuppoſition that it is cauſed by the agency of an elaſtic medium pervading all ſpace. This medium, he ſuppoſes, to be much rarer within the denſe bodies of the ſun, the ſtars, the planets, and the comets, than in the empty celeſtial ſpaces between them, and to grow more and more denſe at greater diſtances from them, ſo that all theſe bodies are naturally forced towards each other by the exceſs of preſſure. Upon this ſuppoſition, Dr. Young remarks, in his Lectures, that the effects of gravitation might be produced by a medium thus conſtituted, if its particles were repelled by all material ſubſtances with a force decreaſing like other repulſive forces, ſimply as the diſtances increaſe; its denſity would then be every where ſuch as to produce the appearance of an attraction, varying like that of gravitation. Such an ethereal medium would, therefore, have the advantage of ſimplicity, in the original law of its action, ſince the repulſive force, which is known to belong to all matter, would be ſufficient, when thus modified, to account for the principal phenomena of attraction.

It may be queſtioned whether a medium, capable of producing the effects of gravitation in this manner, would alſo be equally ſuſceptible of thoſe modifications which have been ſuppoſed neceſſary to the tranſmiſſion of light. In either caſe, it muſt be ſuppoſed to paſs through the apparent ſubſtance of all material bodies with the moſt perfect freedom, and there would, therefore, be no occaſion to apprehend any difficulty from a retardation of the celeſtial motion; the ultimate impenetrable particles of matter being, perhaps, ſcattered as thinly through its external form as ſtars are ſcattered in a nebula, which has ſtill the diſtant appearance of an uniform light; and there ſeems no reaſon to doubt the poſſibility of the propagation of an undulation through the Newtonian medium, with the actual velocity of light. It muſt be remembered, that the difference of its preſſure is not to be eſtimated from the actual bulk of the earth, or any other planet alone, but from the effect of the ſphere of repulſion of which that planet is the centre; and we may thus deduce the force of gravitation from a medium of no very enormous elaſticity.

Dr. Young obſerves, that a ſimilar combination of a ſimple preſſure with a variable repulſion is alſo obſervable in the force of coheſion, and ſuppoſes that if two particles of matter, floating in ſuch an elaſtic medium, capable of producing gravitation, were to approach each other, their mutual attraction would at once be changed from gravitation to coheſion, upon the excluſion of the portion of the medium intervening between them. The well known experiment of the two exhauſted hemiſpheres of Magdeburg affords an illuſtration of this hypotheſis, where we ſee apparent coheſion derived from atmoſpherical preſſure, and if we place between them a thick ring of elaſtic gum, we may repreſent the natural equilibrium between the forces of coheſion and repulſion, for the ring would reſiſt any ſmall additional preſſure with the ſame force as would be required for ſeparating the hemiſpheres ſo far as to allow it to expand in an equal degree; and at a certain point the ring would expand no more; the air would be admitted and the coheſion deſtroyed, as when a ſolid of any kind is torn aſunder. Theſe ſuppoſitions, however, are directly oppoſite to the hypotheſis which aſſigns to the elaſtic medium the power of paſſing freely through all the interſtices of the ultimate atoms of matter, ſince it could never paſs between two atoms cohering in this manner; we cannot, therefore, at preſent aſſert the identity of the forces gravitation and coheſion ſo ſtrongly as theory would allow us to do if eſtabliſhed. In ſhort, the whole of our enquiries reſpecting the intimate nature of forces muſt be conſidered as merely ſpeculative amuſements, which are of no farther utility than as they make our views more general, and aſſiſt our experimental inveſtigations.

La Place, after having ſhewn how the law of gravitation is deduced from the phenomena of the ſolar ſyſtem, concludes his reflections on this ſubject by enquiring whether the principle of gravitation is a primordial law of nature, or if it may not be the general effect of ſome unknown cauſe? Here, he obſerves, we are ſtopped by our ignorance of the nature of the intimate properties of matter, and deprived of every hope of anſwering this queſtion in a ſatisfactory manner. Inſtead, ſays this great author, of forming hypotheſes on this ſubject, let us content ourſelves with examining more particularly the manner in which this principle has been employed by philoſophers.

They have admitted the five following ſuppoſitions:

1. That gravitation takes place between the moſt minute particles of bodies.
2. That it is proportional to the maſſes.
3. That it varies inverſely as the ſquare of the diſtance.
4. That it is tranſmitted inſtantaneouſly from one body to another.
5. And that it equally acts on bodies in a ſtate of repoſe, and on thoſe which by their motion in the direction of its action ſhould ſeem likely to avoid a part of its influence.

The firſt of theſe propoſitions is, as we have ſeen, a neceſſary reſult of the equality which exiſts between action and re-action, every particle of the earth attracting it as the particle itſelf is attracted; this ſuppoſition is confirmed by the meaſures of the degrees of the meridian, and by experiments on pendulums; for amidſt all the irregularities of the meaſured degrees, we may perceive the traces of a regular figure, which is conformable to the theory. The great influence that the compreſſion of Jupiter has upon the nodes and perigees of the orbits of its ſatellites, proves to us that the attraction of this planet is compoſed of the attractions of all its particles. The proportionality of the attractive force to the maſſes is demonſtrated in the earth by experiments on pendulums, the oſcillations of which are of the ſame length of whatever ſubſtance they are compoſed. It is proved in the celeſtial regions by the conſtant relation which exiſts between the ſquares of the periodic times of bodies revolving about a common focus, to the cubes of the greater axes of their orbits.

We have ſeen with what preciſion the almoſt abſolute ſtate of repoſe of the perihelia of the planetary orbits indicate that the force of gravity varies according to the inverſe ſquare of the diſtance: and now that we know the cauſe of the motions of theſe perihelia, we may regard this law as rigorouſly exact. It is the ſame with all emanations which proceed from a centre, ſuch as light; it ſeems as if all forces whoſe action could be perceived at ſenſible diſtances obeyed this law. It has lately been obſerved, that the attractions and repulſions of electricity and magnetiſm decreaſe in proportion to the ſquares of the diſtances. A remarkable property of this law is, that if the dimenſions of all the bodies of the univerſe, their mutual diſtances and velocities were to be augmented or diminiſhed proportionally, they would deſcribe curves entirely ſimilar to thoſe deſcribed at preſent, and their appearances would be entirely the ſame. For the forces which animate them being entirely the reſult of attractions proportional to the maſſes divided by the ſquares of the diſtances, they would be augmented and diminiſhed proportionally to the dimenſions of this imaginary univerſe. It may be remarked at the ſame time that this property can only belong to the law of nature. Thus the apparent motions are independent of its abſolute dimenſions, as they are likewiſe of the motions it may have in ſpace, and we can only obſerve and recognize relative phenomena.

It is this law which gives to ſpheres the property of attracting each other mutually, as if their whole maſſes were united at their reſpective centres. It terminates alſo the orbits and the figures of the celeſtial bodies by lines and ſurfaces of the ſecond order, at leaſt if we neglect their perturbations and ſuppoſe them fluid.

We have no method of meaſuring the length of time in which gravity is propagated, becauſe the action of the ſun having once reached the planets, it continues to act on them as if the attractive force was communicated inſtantaneouſly to the extremities of the ſyſtem. We cannot, therefore, aſcertain in how long a time it is tranſmitted to the earth, no more than we could meaſure the velocity of light, were it not for the aberration, and the eclipſes of Jupiter's ſatellites. But it is not the ſame with the ſmall difference that may exiſt in the action of gravity upon bodies according to the direction of their velocity.

M. de la Place has found by analyſis, that an acceleration ſhould reſult in the mean motions of the planets round the ſun, and in the mean motions of the ſatellites about their planets.

M. de la Place had aſſumed this method of explaining the ſecular equation of the moon, when he believed, with other geometricians, that it was inexplicable on the principle of univerſal gravitation. He found that if it aroſe from this cauſe, a velocity muſt be ſuppoſed to exiſt in the centre of the moon, in order to releaſe it entirely from its gravity towards the earth, at leaſt ſix million times greater than that of light: the true cauſe of this equation being now known, we are certain that the action of gravity is much greater than this. This force, therefore, acts with a velocity which we may conſider as infinite; and we may conclude, that the action of the ſun is tranſmitted in an indiviſible inſtant to the extremities of the planetary ſyſtem.

Do any other forces act on the heavenly bodies beſides their mutual attractions?

We are unacquainted with any, and we may affirm that their effect is totally inſenſible. We may likewiſe be certain that theſe bodies experience no ſenſible reſiſtance from the fluids through which they paſs, as light, the tails of comets, or the zodiacal light.

The attractive force diſappears between bodies of an inconſiderable magnitude, and re-appears in their elements under a variety of forms. The ſolidity of bodies, their cryſtallization, the refraction of light, the elevation and depreſſion of fluids in capillary tubes, and all chemical combinations, generally are the reſults of attractive forces, the knowledge of which forms the principal object of natural philoſophy.

Are theſe forces the ſame as that of the gravity obſerved in the celeſtial regions, and modified on the earth by the figures of the integrant particles? To admit this hypotheſis we muſt ſuppoſe much more ſpace empty than full in all bodies, ſo that the denſity of their particles muſt be incomparably greater than the mean denſity of their whole volume. A ſpherical particle of one hundred thouſandth of a foot in diameter ſhould have a denſity at leaſt ten thouſand million of times greater than the mean denſity of the earth, to exert at its ſurface an attraction equal to the terreſtrial gravity. But the attractive forces of bodies greatly ſurpaſs this gravity, ſince they inflect light, whoſe direction is not changed by the attraction of the earth. The denſity of theſe particles ſhould, therefore, be to that of ſubſtances in a ratio which the imagination would fear to admit, if their affinities depended on the law of univerſal gravitation. The ratio of the intervals which ſeparate the particles of bodies to their reſpective dimenſions, would be of the ſame order as in ſtars which form a nebula, which in this point of view may be conſidered as a great luminous body. There is no reaſon, however, which abſolutely forbids us to conſider all bodies in this manner. Many phenomena are favourable to the ſuppoſition, particularly the extreme facility with which light penetrates diaphanous ſubſtances in all directions. The affinities would then depend on the integrant particles, and we might, by the variety of theſe forms, explain all the variety of attractive forces, and reduce to one general law all the phenomena of aſtronomy and natural philoſophy. But the impoſſibility of aſcertaining theſe figures, renders this inveſtigation uſeleſs to the advancement of ſcience.

Some geometricians, to account for theſe affinities, have added to the laws of attraction, inverſely as the ſquares of the diſtances, new terms which are inſenſible at ſmall diſtances; but theſe terms would be the expreſſions of as many different forces, and beſides being complicated with the different figures of the particles, they would only complicate the explanation of the phenomena.

Amidſt theſe uncertainties the wiſeſt plan ſeems to be, to endeavour to determine by numerous experiments the laws of affinities; and to effect this, the moſt ſimple method appears to be, by comparing theſe forces with the repulſive force of heat, which may be itſelf compared with that of gravity. Some experiments already made with this view, afford us reaſon to hope, that one day theſe laws will be perfectly known, and that then, by the application of analyſis, the philoſophy of terreſtrial bodies may be brought to the ſame degree of perfection, which the diſcovery of univerſal gravitation has procured for aſtronomy.

GRAVITY, in *Hydroſtatics*. The laws of bodies gravitating in fluids, make the buſineſs of hydroſtatics.

Gravity is here divided into *abſolute* and *ſpecific*.

GRAVITY, *abſolute or true*, is the whole force wherewith the body tends downward.

GRAVITY, *Specific*, called alſo *relative, comparative,* and *apparent* gravity, is the exceſs of gravity in any body, above that of an equal quantity or bulk of another; and denotes that gravity, or weight, peculiar to each ſpecies, or kind of natural body; and whereby it is diſtinguiſhed from all other kinds.

In this ſenſe, a body is ſaid to be *ſpecifically heavier* than another, when under the ſame bulk it contains a greater weight than that other; and that other is ſaid to be *ſpecifically lighter* than the firſt. Thus, if there be two equal ſpheres, each a foot in diameter; the one wood, the other lead, ſince the leaden one is found heavier than the wooden one, it is ſaid to be *ſpecifically*, or in *ſpecie*, *heavier*: and the wooden one *ſpecifically lighter*.

This kind of gravity ſome call *relative*; in oppoſition to *abſolute* gravity, which increaſes in proportion to the quantity or maſs of the body.

GRAVITY, *laws of the ſpecific, and levity of bodies.*—I. If two bodies be equal in bulk, their ſpecific gravities are to each other as their abſolute gravities. Thus a body is ſaid to be twice as heavy, *ſpecifically*, as another, if it have twice its gravity under the ſame bulk.

Hence, the ſpecific gravities of equal bodies are as their denſities.

II. If two bodies, compared together, be of the ſame ſpecific gravity, their abſolute weights will be as their magnitudes or bulks.

III. The ſpecific gravities of bodies of the ſame weight are in the reciprocal ratio of their bulks. Hence the maſſes of two bodies of the ſame weight are in a reciprocal ratio of their bulks.

IV. The ſpecific gravities of two bodies are in a ratio compounded of the direct ratio of the abſolute gravities, and the reciprocal one of their bulks. Hence, again, the ſpecific gravities are as the denſities.

V. The abſolute gravities of two bodies will be in a compound ratio of their ſpecific gravities and their bulks.

VI. The bulks of two bodies will be in a compound ratio of their abſolute gravities directly, and their ſpecific gravities inverſely.

VII. A body ſpecifically heavier than a fluid, loſes ſo much of its weight therein as is equal to the weight of a quantity of the fluid of the ſame bulk.

For, ſuppoſe a cubic inch of lead immerged in water; a cubic inch of water will, thereby, be expelled from its place: but the weight of this water was ſuſtained by the reſiſtance of the ambient water. Therefore, ſuch a part of the weight of the leaden cube muſt be ſuſtained by the reſiſtance of the ambient water, as is equal to the weight of the water expelled. The gravity of the body immerged, therefore, muſt be diminiſhed by ſo much.

Hence, 1. Since a fluid, ſpecifically heavier, has a greater weight, in the ſame bulk, than a lighter; the ſame body will loſe a greater part of its weight in a fluid, ſpecifically heavier, than in a lighter: and therefore it weighs more in a lighter than a heavier.

2. Equal homogeneous bodies weighing equally in air, loſe their equilibrium if one of them be immerged in a heavier fluid; the other in a lighter.

3. Since the ſpecific gravities are as the abſolute gravities under the ſame bulk; the ſpecific gravity of the fluid will be to the gravity of the body immerged, as part of the weight loſt by the ſolid, to the whole weight.

4. Two ſolids, equal in bulk, loſe the ſame weight in the ſame fluid: but the weight of the ſpecifically heavier body is greater than that of the ſpecifically lighter; therefore, the ſpecifically lighter loſes a greater part of its weight than the ſpecifically heavier.

5. Since the bulks of bodies, equal in weight, are reciprocally as the ſpecific gravities; the ſpecifically lighter loſes more weight in the ſame fluid than the heavier; wherefore, if they be in equilibrio in one fluid, they will not be ſo in another; but the ſpecifically heavier will preponderate, and that the more, as the fluid is denſer.

6. The ſpecific gravities of fluids are as the weights loſt by the ſame ſolid immerged in the ſame.

VIII. *To find the ſpecific gravity of a fluid.*—On one arm of a balance ſuſpend a leaden globe; and to the other, faſten a weight, which is in equilibrium therewith in the air. Immerge the globe ſucceſſively in the ſeveral fluids, whoſe ſpecific gravities are to be determined, and obſerve the weight which balances it in each. Theſe ſeveral weights, ſubtracted, ſeverally, from the firſt weight, the remainders are the parts of the weight loſt in each fluid. Whence the ratio of the ſpecific gravity of the fluids is ſeen.

Hence, as the denſities are as the ſpecific gravities, we find the ratio of the denſities of the fluids at the ſame time.

This problem is of the utmoſt uſe: as by it the degree of purity or goodneſs of fluids is eaſily found; a thing not only of ſervice in natural philoſophy, but alſo in common life, and in the practice of phyſic. See HYDROMETER.

That the ſpecific gravity may be found the more accurately, the weight of the thread not immerged in the fluid is to be ſubtracted from the weight of the ſolid in air; and the force neceſſary to make the thread ſubſide (if it be ſpecifically lighter) is to be added to the weight loſt. But if the thread that ſuſtains the ſolid be heavier than the fluid, the weight of the thread in the air is to be ſubtracted from the weight of the ſolid in air; and the weight the thread loſes from the weight loſt in the fluid. Indeed, this precaution may be ſpared, if, in examining the ſpecific gravity of ſeveral fluids, care be taken that the ſame thread be immerged to the ſame depth in each.

IX. To determine the ratio which the ſpecific gravity of a fluid has to the ſpecific gravity of a ſolid that is ſpecifically heavier than the fluid,

Weigh any maſs of the ſolid in a fluid, and note the juſt weight therein: the ſpecific gravity of the fluid will be to that of the ſolid, as the part of the weight loſt by the ſolid to its whole weight.

X. The ſpecific gravities of equally heavy bodies are reciprocally as the quantities of weight loſt in the ſame fluid. Hence we find the ratio of the ſpecific gravities of ſolids, by weighing maſſes thereof, that are equal in air, in the ſame fluid; and noting the weights loſt by each.

XI. A body, ſpecifically heavier, deſcends in a fluid ſpecifically lighter, with a force equal to the exceſs of its weight, above that of an equal quantity of the fluid.

Hence, 1. The force which ſuſtains a ſpecifically heavier body in a fluid, is equal to the exceſs of the abſolute gravity of the body, above that of the fluid, under the ſame bulk: *e. gr.* $47\frac{1}{3}$ pound of copper loſes $5\frac{1}{3}$ pounds of its weight in water; therefore a power of 42 pounds is able to ſuſtain it.

2. Since the exceſs of the weight of a ſolid over the weight of a fluid ſpecifically heavier, is leſs than that over the weight of a ſpecifically lighter fluid under the ſame bulk; it will deſcend with leſs force in a ſpecifically heavier fluid than in a lighter; and, conſequently, it will deſcend more ſlowly in the former than in the latter.

XII. A ſpecifically lighter body ſinks in a heavier fluid, till the weight of a quantity of the fluid, equal in bulk to the part immerſed, be equal to the weight of the whole body.

Hence, 1. Since the ſpecific gravities of bodies of the ſame weight are reciprocally as their bulks; and the bulks of fluids equal in weight, are as the parts of the ſame ſolid immerged therein; the ſpecific gravities of fluids are reciprocally as the parts of the ſame body immerged therein.

2. A ſolid, therefore, immerges deeper in a lighter fluid than in a heavier, and deeper, as the proportion of the ſpecific gravity of the ſolid to that of the fluid is greater.

3. If a body be of the ſame ſpecific gravity with a fluid,

the whole body will be immerged; and it will remain in any given place of the fluid.

4. If a ſpecifically lighter body be wholly immerged in a fluid, it will be urged, by the collateral columns of the fluid, to aſcend with a force equal to the exceſs of the weight of the fluid, bulk for bulk, over the weight of the ſolid.

5. A body, therefore, ſpecifically lighter, lying on the bottom of a veſſel, will not be raiſed up, unleſs the heavier fluid riſe above ſuch a part as is equal in bulk to a quantity of the fluid of the ſame weight with the whole ſolid.

XIII. The ſpecific gravity of a ſolid is to the ſpecific gravity of a lighter fluid, wherein it is immerged, as the bulk of the part immerged is to the whole bulk.

XIV. The ſpecific gravities of equal ſolids are as their parts immerged in the ſame fluid.

XV. The weight and bulk of a ſpecifically lighter body, and the weight of the ſpecifically heavier fluid, being given, to find the force required, to keep the ſolid wholly immerged under the fluid.

As this force is equal to the exceſs of the weight of the fluid beyond that of an equal bulk of the ſolid; from the given bulk of the ſolid, and the weight of a cubic foot of water, find, by the rule of three, the weight of a bulk of water equal to that of the body. From this ſubtract the weight of the ſolid; the remainder is the force required. *E. gr.* Suppoſe the force neceſſary to detain a ſolid eight feet in bulk, and 100 pounds in weight, under water, required: ſince a cubic foot of water is found to weigh 70 pound, the weight of water under the bulk of eight feet, is 560; whence, 100 pound, the weight of the ſolid, being ſubtracted; the remainder 460 pound is the force neceſſary to detain the ſolid under water.

Hence, ſince a ſpecifically lighter body aſcends in a heavier fluid, with the ſame force that would prevent its aſcent: by the preſent problem, we can likewiſe find the force wherewith a ſpecifically lighter body aſcends in a heavier.

XVI. The weight of a veſſel, to be made of a ſpecifically heavier matter; and that of a ſpecifically lighter fluid, being given: to determine the cavity the veſſel muſt have to ſwim on the fluid.

The weight of a cubic foot of the fluid being given, the bulk of the fluid equal to the weight of the veſſel is found by the rule of three. If, then, the cavity be made a little bigger than this, the veſſel will have leſs weight under the ſame bulk than the fluid, and will therefore be ſpecifically lighter than the ſame, and conſequently it will ſwim.

XVII. The force employed to retain a ſpecifically lighter ſolid, under a heavier fluid; and the weight loſt by a heavier ſolid in a lighter fluid, are each added to the weight of the fluid, and weigh together with it.

The ſeveral theorems here delivered, are not only all demonſtrable from the principles of mechanics, but are conformable to experiment. In effect, experience is here found to anſwer exactly to calculation, as is abundantly evident from the courſes of philoſophical experiments, now frequently exhibited; where the laws of ſpecific gravitation are well illuſtrated. See HYDROSTATICAL *balance*.

The ſpecific gravity of any ſubſtance is the relative weight of a given volume of it, compared with the ſame volume of ſome other ſubſtance taken as a ſtandard, and which is uſually diſtilled water at ſome given temperature. The abſolute gravity of a body is its entire weight, its ſpecific gravity is the weight of a given portion, as a cubic foot or cubic inch. As it would be very difficult, and in many caſes impoſſible, to meaſure the exact volume required to be weighed, a method of determining the ſpecific gravity of ſolids has been deviſed, founded on a principle of *Hydroſtatics*. It appears to have been known to Archimedes; that when a ſolid body, heavier than water, is plunged into that fluid, it loſes as much of its weight as is equal to the weight of the fluid it has diſplaced.

By the application of this principle we are enabled, in a very eaſy manner, to determine the ſpecific gravity of a body by firſt weighing it in air and afterwards in water. Then if the weight in air be divided by the weight loſt, or the difference of the weights in water and air, the quotient will expreſs the ſpecific gravity of that body, or the relative weight of an equal volume of that ſubſtance, and of the water in which the experiment was made.

The ſpecific gravity of two fluids may be determined by the ſame principle; for if we weigh a ſolid of any magnitude, as a ball of glaſs, firſt in water and then in any other fluid, the quantities of weight loſt in each experiment will be in the ſame proportion as the ſpecific gravity of the two fluids.

The ſpecific gravities of any ſubſtances, and in particular of ſuch as are lighter than water, may alſo be very conveniently determined by means of a common balance, employing a phial with a conical ground ſtopple filling it firſt with water and then either with a given fluid, or with a portion of the ſolid of which the weight has been aſcertained, together with as much water as is ſufficient to exclude the air.

It is neceſſary to attend to a great number of minute circumſtances when we wiſh to determine the ſpecific gravities of ſubſtances to a great degree of accuracy: theſe will be particularly noticed when deſcribing the particular inſtruments that have been invented for the purpoſe. See HYDROSTATIC *Balance*, HYDROMETER, &c.

One mode of aſcertaining the ſpecific gravities of fluids, differing but little from each other in denſity, is to have a ſeries of globules of glaſs ſo loaded, as to correſpond to the ſpecific gravities indicated by as many numbers, which are marked on them, and throwing ſeveral of them together into the fluid, and to obſerve which of them remains nearly ſtationary, without either riſing to the ſurface or ſinking. This method, though not expeditious, appears to be very ſecure from error, and is well adapted to determine the ſtrength of ſpirituous liquors. But in all theſe experiments it is neceſſary to be aware that a conſiderable change of the joint bulk of two ſubſtances is often produced by their mixture, and that in general their dimenſions are conſiderably contracted. Thus, 18 gallons of water and 18 gallons of alcohol, inſtead of 36 gallons, make only 35, conſequently the ſpecific gravity of the compound is one 35th greater than the mean of the ſpecific gravities of the ingredients. And in ſome caſes the whole dimenſion of a ſingle ſubſtance may even be contracted by the addition of another ſubſtance; thus iron, by the addition of one-eighth of its bulk of platina, becomes contracted one-fortieth of that bulk.

For meaſuring the ſpecific gravity of gaſſes, Mr. Leſlie has deviſed a new method, which conſiſts in obſerving the time employed in emptying a veſſel through a ſmall orifice, by means of the preſſure of an equal column of water.

A Table of Specific Gravities.

Principally from Davies and Lavoiſier. Davies's table is compiled with great diligence from many different authors; Lavoiſier's is chiefly extracted from Briſſon; it is carried to four places of decimals, but little dependence can be placed on the laſt.

Mineral Productions. Solids.

Platina, purified	19.5000
hammered	20.3366
Platina, wire	21.0417
laminated	22.0690
Pure gold, caſt	19.2581
hammered	19.3617
Gold 22 carats fine, of the ſtandards of London and of Paris, caſt	17.4863
hammered	17.5894
French gold coin 21 $\frac{11}{16}$ carats fine, caſt	17.4022
coined	17.6474
French trinket gold, 20 carats fine, caſt	15.7090
hammered	15.7746
Mercury	13.5681
Lead, caſt	11.3523
Litharge	6.30
Pure ſilver, caſt	10.4742
hammered	10.5107
Pariſian ſilver, 11 den. 10. gr. fine, caſt	10.1753
hammered	10.3765
French ſilver coin, 10 den. 21 gr. fine, caſt	10.0476
hammered	10.4077
Biſmuth, caſt	9.8227
Copper caſt	8.7880
wire	8.8785
Braſs, caſt	8.3958
Braſs wire	8.5441
Cobalt, caſt	7.8119
Nickel, caſt	7.8070
Iron, caſt	7.2070
Bar iron	7.7880
Steel, hard, not ſcrewed	7.8163
ſcrewed	7.8180
ſoft, not ſcrewed	7.8331
ſcrewed	7.8404
Loadſtone	4.80
Haematite	4.20
Tin, caſt	7.2914
ſcrewed	7.2994
Zinc, caſt	7.1908
Antimony, caſt	6.7021
Glaſs of antimony	4.9464
Crude antimony	4.0643
Tungſtein	6.0665
Arſenic, caſt	5.7633
Molybdena	4.7385
Ponderous ſpar	4.4300
Jargon of Ceylon	4.4161
Oriental ruby	4.2833
Spinelle ruby	3.7600
Ballas ruby	3.6458
Braſilian ruby	3.5311
Pſeudotopaz	4.27
Bohemian garnet	4.1881
Syrian garnet	4.0000
Sapphire of Puy	4.0760
Oriental ſapphire	3.9941
Sapphire of Braſil	3.1307
Oriental topaz	4.0106
Saxon topaz	3.5640
Braſilian topaz	3.5365
Emery	4.000
Hyacinth	3.6873
Beryl, or oriental aquamarine	3.5489
Occidental aquamarine	2.722
Diamond, roſe-coloured	3.5310
white	3.5212
lighteſt	3.501
Manganeſe crude	3.53
Black ſchorl, cryſtallized	3.3852
amorphous	2.9225
Flint glaſs	2933.3
White glaſs	2.8922
Bottle glaſs	2.7325
Green glaſs	2.6423
Glaſs of St. Gobin	2.4882
Fluor, red	3.1911
green	3.1817
violet	3.1757
blue	3.1688
white	3.1555
Black and white hone	3.1311
White hone	2.8763
Granitello	3.0626
Green ſerpentine of Dauphiné	2.9883
Green ſerpentine	2.8960
Ophite	2.9722
Green jade	2.9660
White jade	2.9502
Black mica	2.9004
Baſaltes, from the Giant's cauſeway	2.8642
Baſaltes from Auvergne	2.4153
White Parian marble	2.8376
Green marble	2.7417
Red marble	2.7242
White marble of Carrara	2.7168
Jaſponyx	2.8160
Chryſolith	2.7821
Chryſolith of Braſil	2.6923
Peruvian emerald	2.7755
Red porphyry	2.7651
Jaſper, grey	2.7640
violet	2.7111
yellow	2.7101
brown	2.6911
red	2.6612
White antique alabaſter	2.7302
Rhombic calcareous ſpar	2.7151
Pyramidal calcareous ſpar	2.7141
Slate	2.6718
Pitchſtone, red	2.6695
blackiſh	2.3191
yellow	2.0860
black	2.0499
Onyx pebble	2.6644
Tranſparent chalcedony	2.6640
Red Egyptian granite	2.6541
Pure rock cryſtal	2.6530
Amorphous quartz	2.6471
Agate onyx	2.6375
Carnelian	2.6137
Sardonyx	2.6021
Purbeck ſtone	2.601
White flint	2.5941
Blackiſh flint	2.5817
Oriental agate	2.5901
Praſe	2.5805
Portland ſtone	2.570
Whetſtone of Auvergne	2.5638
Red zeolithe	2.4868

Cryſtallized zeolithe	2.0833
Millſtone	2.4835
Paving ſtone	2.4158
Touchſtone	2.4153
Chineſe porcelain	2.3847
Porcelain of Limoges	2.3410
Porcelain of Seves	2.1457
Lapis obſidianus	2.3480
Selenite	2.322
Sulphate of potaſh	2.250
Sulphate of ſoda	2.200
Grindſtone	2.1429
Salt	2.130
Native ſulphur	2.0332
Melted ſulphur	1.9907
Tranſparent ſulphur	1.950
Nitre	2.000
Brick	2.000
Alabaſter	1.874
Plumbago	1.86
Sulphate of zinc	1.850
Alum	1.720
Borax	1.718
Sulphate of iron	1.700
Aſphaltum	1.400
Scotch coal	1.300
Newcaſtle coal	1.270
Staffordſhire coal	1.240
Jet	1.238
Ice, probably	.930
Pumice ſtone	.9145

Liquids.

Sulphuric acid	1.8409
Ph. Lond.	1.850
Nitrous acid, Ph. Lond.	1.550
Nitric acid	1.2175
Solution of ſalt	1.244
Water 27, ſalt 10	1.240
Water 3, ſalt 1	1.217
Water 12, ſalt 1	1.060
Water of the Dead ſea	1.2403
Sea water	1.0263
Solution of cauſtic ſoda	1.200
Muriatic acid	1.1940
Water of the Seine, filtered	1.0015
Naphtha	.708

Subſtances partly Mineral. Solids.

Acetite of lead	2.700
Tartrite of antimony	2.100
Muriate of ammonia	1.420

Liquids.

Sulphuric ether	.7394
Nitric ether	.9088
Muriatic ether	.7298

Elaſtic Fluids.

	Kirwan.	Lavoiſier. Barometer 30°. Thermom. 52°.
Sulphureous acid gas	2.265	
Carbonic acid gas	1.500	.00176
Nitrous gas	1.194	
Hepatic gas	1.106	
Oxygen gas	1.103	.00137
Atmoſpheric air	1.000	.00128
Nitrogen gas	.985	.00120
Ammoniacal gas	.600	
Hydrogen gas	.084	.000096

Vegetable Productions.

Cryſtals of tartar	1.850
Extract of liquorice	1.7228
Opopanax	1.6226
White ſugar	1.606
Solution of potaſh	1.570
Gum arabic	1.4523
Honey	1.450
Catechu	1.3980
Aloes, ſocotrine	1.3795
Aloes, hepatic	1.3586
Bdellium	1.3717
Myrrh	1.3600
Pomegranate tree	1.3540
Cocoa ſhell	1.345
Opium	1.3366
Lignum vitæ	1.3330
Box, Dutch	1.328
French	.912
Aſſafœtida	1.3275
Tragacanth	1.3161
Ivy gum	1.2948
Scammony, from Smyrna	1.2743
Aleppo	1.2354
Sarcocolla	1.2684
Myrrh	1.250
Guaiacum	1.2289
Gamboge	1.2201
Reſin of jalap	1.2185
Galbanum	1.2120
Gum ammoniac	1.2071
Dragon's blood	1.2045
Sagapenum	1.2008
Lignum nephriticum	1.200
Ebony	1.177
Olibanum	1.1732
Heart of oak, 60 years old	1.1700
Dry oak	.932
Pitch	1.150
Copal, opaque	1.1398
tranſparent	1.0452
Euphorbium	1.1244
Storax	1.1098
Oil of ſaſſafras	1.094
Benzoin	1.0924
Sandarac	1.0920
Yellow amber	1.0780
Maſtic	1.0742
Yellow reſin	1.0727
Frankincenſe	1.071
Mahogany	1.063
Acetic acid	1.0626
Oil of cinnamon	1.0439
Anime, occidental	1.0426
oriental	1.0284
Malmſey Madeira	1.0382
Oil of cloves	1.0363
Gall nuts	1.034
Elemi	1.0182
Cyder	1.0181
Diſtilled vinegar	1.0095
Water at 60°	1.0000

Extract from Mr. Gilpin's Table; Phil. Tranſ. 1794.

Water.	Alcohol.	at 30°.	40°.	50°.	60°.	70°.	80°.
10	0	1.00774	1.00094	1.00068	1.00000	·99894	·99759
10	1	·98804	·98795	·98745	·98654	·98527	·98367
10	2	·98108	·98033	·97920	·97771	·97596	·97385
10	3	·97635	·97472	·97284	·97074	·96836	·96568
10	4	·97200	·96967	·96708	·96437	·96143	·95826
10	5	·96719	·96434	·96126	·95804	·95469	·95111
10	6	·96209	·95879	·95534	·95181	·94813	·94431
10	7	·95681	·95328	·94958	·94579	·94193	·93785
10	8	·95173	·94802	·94414	·94018	·93616	·93201
10	9	·94675	·94295	·93897	·93493	·93076	·92646
10	10	·94222	·93827	·93419	·93002	·92580	·92142
9	10	·93741	·93341	·92919	·92499	·92069	·91622
8	10	·93191	·92783	·92358	·91933	·91493	·91046
7	10	·92563	·92151	·91723	·91287	·90847	·90385
6	10	·91847	·91428	·90997	·90549	·90104	.89639
5	10	·91023	·90596	·90160	.89707	.89252	.88781
4	10	·90054	.89617	.89174	.88720	.88254	.87776
3	10	.88921	.88481	.88030	.87569	.87105	.86622
2	10	.87585	.87134	.86676	.86208	.85736	.85248
1	10	.85957	.85507	.85042	.84568	.84092	.83603
0	10	.83896	.83445	.82977	.82500	.82023	.81530

Bourdeaux wine	·9939
Burgundy wine	·9915
Liquid turpentine	·9910
Camphor	·9887
Oil of mint	·975
Oil of nutmeg	·948
Medlar tree	·9440
Linſeed oil	·9403
Oil of caraway	·940
Oil of marjoram	·940
Oil of ſpike	·936
Oil of roſemary	·934
Elaſtic gum	·9335
Oil of poppy ſeed	·9288
Olive wood	·9270
Oil of beech maſt	·9177
Oil of almonds	·9106
Olive oil	·9153
Logwood	·913
Rape oil	·913
Balſam of Tolu	.896
Oil of lavender	.8938
Oil of oranges	.888
Eſſential oil of turpentine	.8697
Acetic ether	.8664
Beech	.8520
Aſh	.8450
Yew, Spaniſh	.8070
Dutch	.7880
Alder	.8000
Elm	.800 to .600
Apple tree	·7930
Plumb tree	·7550 to .663
Indigo	·7690
Maple	·7550
Cherry tree	·7150
Quince tree	·7050
Orange tree	·7050
Walnut	.6710
Pear tree	.6610
Fir, yellow	·657
white	·569
Male fir	·5500
Female fir	·4980
Cypreſs	.6440
Lime tree	.6040
Filbert wood	.6000
Arnotto	·5956
Willow	·5850
Cedar	·5608
Juniper wood	·556
White Spaniſh poplar	·5294
Poplar	·3830
Saſſafras wood	·482
Cork	·2400

Animal Subſtances.

Pearl	2.750
Coral	2.680
Sheep's bone, recent	2.222
Oyſter ſhell	2.092
Ivory	1.917
Stag's horn	1.875
Ox's horn	1.840
Blade bone of an ox	1.656
Lac	1.1390
Iſinglaſs	1.111
Egg of a hen	1.090
Human blood	1.053
Blood, buff coat	1.056
ſerum	1.056
red globules	1.028
Ewe's milk	1.0405
Aſſes' milk	1.0355
Mare's milk	1.0346
Goat's milk	1.0341
Cow's milk	1.0324
Woman's milk	1.0203
Whey of cow's milk	1.0193
Wax, white	.9686

Wax,

Wax, yellow	.9648
Lard	.9478
Spermaceti	.9433
Butter	.9423
Tallow	.9419
Fat of hogs	.9368
of veal	.9342
of mutton	.9235
of beef	.9232
Ambergreaſe	.9263
Lamp oil	.9233
Solution of pure ammonia	.8970

GRAVITY, in *Mechanics*, denotes the conatus or tendency of bodies towards the centre of the earth.

That part of mechanics which conſiders the motion of bodies ariſing from gravity, is peculiarly called *ſtatics*.

Gravity, in this view, is diſtinguiſhed into *abſolute*, and *relative*.

The former is that with which a body deſcends freely through an unreſiſting medium: the laws of which ſee under DESCENT *of bodies*, ACCELERATION, MOTION, *Inclined* PLANE, &c.

The latter is that with which a body deſcends after having ſpent part of its weight in overcoming ſome reſiſtance. Such is that with which a body deſcends along an inclined plane, where ſome part is employed in overcoming the reſiſtance, or friction of the plane. The laws of relative gravity, ſee under *inclined* PLANE, DESCENT, FLUID, RESISTANCE, &c.

GRAVITY, *Centre of.* See CENTER *of gravity*.

GRAVITY, *Diameter of.* See DIAMETER *of gravity*.

GRAVITY, *Paracentric ſolicitation of.* See PARACENTRIC.

GRAVITY, *Plane of.* See PLANE *of gravity*.

GRAVITY, *Retardation from.* See RETARDATION.

GRAVITY *of the air.* See WEIGHT *of the Air*, AIR and ATMOSPHERE.

GRAVITY, in *Muſic*, is an affection of ſound by which it becomes denominated *grave*, low, or flat.

Gravity ſtands in oppoſition to *acuteneſs*, which is that affection of ſound by which it is denominated *acute*, *ſharp*, or *high*.

The relation of gravity and acuteneſs, is the principal property on which muſic depends; and it is the diſtinct, fixed, and determinate quality of this relation which entitles ſound to the denomination of *melodious*, *harmonical*, or *muſical*.

Gravity is, therefore, that modification of ſound by which it is conſidered as *grave* or low, with reſpect to, or compared with, other ſounds, that are acute or high. See ACUTE.

The degrees of gravity, &c. depend on the nature of the ſonorous body itſelf, and the particular figure and quantity thereof: though, in ſome caſes, they likewiſe depend on the part of the body where it is ſtruck. Thus, *e. gr.* the ſounds of two bells of different metals, and the ſame ſhape and dimenſions, being ſtruck in the ſame place, will differ as to acuteneſs and gravity; and two bells of the ſame metal will differ in acuteneſs, if they differ in ſhape or magnitude, or be ſtruck in different parts.

So in chords, all other things being equal, if they differ either in matter, or dimenſion, or tenſion, they will alſo differ in gravity.

Thus again, the ſound of a piece of gold is much graver than that of a piece of ſilver of the ſame ſhape and dimenſions; and in this caſe the tones are, *cæteris paribus*, proportional to the ſpecific gravities: ſo a ſolid ſphere of braſs, two feet in diameter, will ſound graver than another of one foot diameter; and here the tones are proportional to the quantities of matter, or the abſolute weights.

But it muſt be obſerved, that acuteneſs and gravity, as alſo loudneſs and lowneſs, are but relative things. We commonly call a ſound *acute* and loud, in reſpect to another which is *grave*, or low with reſpect to the former; ſo that the ſame ſound may be both *grave* and *acute*, and alſo loud and low, in different compariſons.

The degrees of acuteneſs and gravity make the different tones or tunes, of voice, or ſound; ſo we ſay one ſound is in tune with another, when they are in the ſame degree of gravity.

The immediate cauſe or means of this diverſity of tones lies very deep. Mathematicians expreſs the proportion of ſound to ſound, by the ratio of numbers. The moderns fix it on the different velocity of the vibrations of the ſonorous body: in which ſenſe gravity may be defined, a relative property of ſound, which, with reſpect to ſome other, is the effect of a leſſer number of vibrations accompliſhed in the ſame time, or of vibrations of a longer duration. In which ſenſe alſo, acuteneſs is the effect of a greater number of vibrations, or vibrations of a ſhorter duration.

If the vibrations be iſochronous, the ſound is called muſical, and is ſaid to continue at the ſame pitch. See CHORD and STRING, in *Muſic*.

If two or more ſounds be compared in the relation of gravity, &c. they are either *equal*, or *unequal*, in the degree of tune. Such as are *equal*, or produced by iſochronous vibrations, are called *uniſons*.

The *unequal* including, as it were, a diſtance between each other, conſtitute that we call an interval in muſic; which is properly the difference, in point of gravity, between two ſounds.

Upon this inequality, or difference, does the whole effect depend; and in reſpect of this it is, that theſe intervals are divided into *concords* and *diſcords*. See HARMONICS and RATIO.

As the gravity of ſounds depends on the thickneſs, length, and tenſion, of the ſtrings, or on the length and diameter of the pipes, and, in general, on the volume or maſs of the ſonorous bodies; the increaſe of any of theſe qualities (except tenſion) augments the gravity of ſound. But there is no abſolute point of gravity in nature, and no ſound is *grave* or acute, but by compariſon.

GRAULKET, in *Geography*, a town of France, in the department of the Tarn, and chief place of a canton, in the diſtrict of Lavaur; nine miles N. E. of Lavaur. The place contains 3419, and the canton 7159 inhabitants, on a territory of 135 kilometres, in ſix communes.

GRAUN, CHARLES HENRY, in *Biography*, chapel-maſter to Frederic II. the late king of Pruſſia, was the favourite compoſer of that prince, from 1732 to the time of his deceaſe, in 1759. On the acceſſion of the prince of Pruſſia to the throne in 1740, his majeſty, having determined to have an Italian lyric theatre in his capital, ſent Graun to Italy to ſtudy the Italian language and taſte in muſic, and to engage vocal performers. Graun remained two years in Italy, during which time the king, his royal maſter, had conſtructed, in ſpite of the Sileſian war, one of the moſt magnificent, complete, and convenient theatres in Europe, for which Graun was the compoſer to the end of his life; and even after his deceaſe little muſic but of his compoſition was ever performed in it for a long time.

The works of this maſter are very numerous; before his arrival at Berlin, he ſet three or four operas in the German language at Brunſwick, but the words were bad, and it is not fair to judge of his genius by thoſe early productions.

He compoſed for the Berlin theatre, in the ſpace of fourteen years, from 1742 to 1756, twenty-ſeven Italian operas;

and for the church; a *Te Deum*, and a *Paſſione*, beſides miſcellaneous productions of leſs importance, as odes and cantatas, with the overture and recitatives of the paſtoral opera of Galatea, of which his majeſty, Quantz, and Nichelman, ſet the ſongs.

On the deceaſe of this excellent compoſer, innumerable poems and panegyrics were written to his memory. Among the "Critical Letters concerning Muſic," publiſhed by M. Marpurg, there is an addreſs to M. Fried. Wilhelm Zachariä, the celebrated poet and muſician of Brunſwick, recommending the death of Graun to his muſe. No great ſtreſs can be laid on panegyrics; however, there are few of Graun's admirers, who are not ready to burn with fire and faggot all thoſe who dare to doubt of this author's veracity.

" Graun, the brighteſt ornament of the German muſe, the noble maſter of ſweet melody, is now no more! creator of his own taſte, he ſpoke not, but to our hearts; tender, ſoft, compaſſionate, elevated, pompous, and terrible, by turns;—he could force tears of admiration from us, at his pleaſure; an artiſt, who made no other uſe of art, than to imitate nature, in the moſt pleaſing and expreſſive manner; each ſtroke of his pencil was equally perfect, full of invention, and of new ideas, his genius was inexhauſtible. The model of ſacred muſic, and in the theatre inimitable! a man who commanded our affections, not only by his talents, but by his virtues, of friendſhip, probity, and patriotiſm; no man was ever ſo univerſally lamented by the whole nation, from the king, to the loweſt of his ſubjects." Kritiſche Briefe uber die Tonkunſt. I. Band. Berlin 1760.

Now, to reverſe the medal; it is denied, by the other party, that Graun was the creator of his own taſte, which is the taſte of Vinci; they deny, that he is ever pompous or terrible, but ſay, that an even tenor runs through all his works, which never reach the ſublime, though the tender and graceful are frequently found in them; they are equally unwilling to ſubſcribe to his great invention, or the originality of his ideas; and think that ſtill more perfect models of ſacred muſic may be found in the choruſſes of Handel, and the airs and duos of Pergoleſi and Jomelli: nor can they well comprehend, how that compoſer can be called *inimitable*, who is himſelf an *imitator*.

We have recently examined the ſcores of Graun's operas, and ſee no reaſon for changing the opinion which we formed 30 years ago. He was certainly a great maſter, elegant in his melodies, and correct and regular in his harmony; but if any one of his operas were now to be revived, it would be thought in want of variety and fire.

During the life of his great and illuſtrious patron, he was revered as much at Berlin as Handel in England; both great men, moſt aſſuredly; but much diſcrimination is neceſſary in drawing a paralĺel between them. Handel formed his ſtyle on the beſt models of the old ſchool, at the time of its greateſt perfection; ſuch as Cariſſimi, Colonna, Aleſſ. Scarlatti, Steffani and Corelli; Graun on that of the inventor of the new ſtyle, Vinci; who, though extremely and juſtly admired for the grace and elegance of his melodies, the ſimplicity of his accompaniment, and the facility and clearneſs of his ſtyle in general, has been far ſurpaſſed by Pergoleſi, Jomelli, Piccini, Sacchini, and Paeſiello. Germany is perhaps more obliged to Graun for ſmoothing, ſimplifying, and poliſhing the rough, laboured, and inelegant ſtyle of their old maſters, than to any Italians that have been employed at the imperial court or at Dreſden, to ſet the dramas of Apoſtolo Zeno and Metaſtaſio. Handel had more ſpirit and invention, and Graun more poliſh and refinement. Handel was wholly unrivalled in the country where he ſpent the greateſt part of his life; but Graun had a rival in the Roman Catholic courts, in the celebrated Haſſe, his countryman, whoſe compoſitions were as much in circulation and favour all over Europe, as thoſe of Vinci and Pergoleſi. Thoſe of Graun ſeem wholly confined to Germany, and almoſt to the court of Berlin; nor do we ever remember to have heard Mara ſing one of his airs in England, though during many years ſhe performed the principal female parts in his operas at Berlin. His *Te Deum* was firſt appointed to be performed at the concert of ancient muſic in 1786, by the late duke of Leeds, then marquis of Caermarthen, and it has continued a ſtock piece ever ſince. Many of his duets, and his Tod Jeſu are admirable compoſitions, and he certainly deſerves to be ranked very high among the great maſters of the laſt century.

GRAUN, JOHN GOTTLIB, brother of the above compoſer, and concert-maſter to his late Pruſſian majeſty, Frederick II. his admirers at Berlin, ſay that " he was one of the greateſt performers on the violin of his time, and moſt aſſuredly, a compoſer of the firſt rank; his overtures and ſymphonies are majeſtic, and his concertos are maſter-pieces, particularly thoſe for two violins, in which he has united the moſt agreeable melody with all the learning that the art of counterpoint can boaſt; he has likewiſe frequently ſet the *Salve Regina*, and compoſed maſſes, which are rendered grand and noble by ſimplicity and good melody, even in the moſt laboured parts."

But leſs quarter is granted to this maſter, by the admirers of more modern muſic, than to his brother; they often find his overtures and ſymphonies too like thoſe of Lulli, and too full of notes to produce any other effect, when played at Berlin, than that of ſtunning the hearers: and in his concertos and church muſic, when that is not the caſe, the length of each movement is more immoderate, than Chriſtian patience can endure.

Perhaps the truth may lie between theſe two opinions; and with reſpect to the chapel-maſter Graun, it ſhould be remembered, that he was ſeldom allowed to follow the bent of his own genius.

GRAUNT, JOHN, born April 24, 1620, was brought up to the trade of a haberdaſher, but by his good ſenſe and integrity in buſineſs he acquired the eſteem of his fellow citizens, ſo as to be elected into the common council of the city of London. The bills of mortality, which were annually laid before this body, led Mr. Graunt to turn his attention to the ſcience of political arithmetic. From very ſmall beginnings he collected a large body of materials, from which he compoſed a work entitled " Natural and Political Obſervations made upon the Bills of Mortality." This work was well received by the public, and paſſed through ſeveral editions: it obtained likewiſe for the author an admiſſion into the Royal Society, upon the particular recommendation of the king, who gave it in particular charge to thoſe concerned, that if they found any more ſuch tradeſmen, they ſhould be ſure to admit them all. It is generally ſuppoſed that Mr. Graunt received valuable aſſiſtance from ſir W. Petty; but the ſtyle is ſuch as might be expected from a plain citizen, and the tabular form, preſenting at one view the general reſults of a number of important facts, was a thought eſſentially leading to all the concluſions which have ſince been eſtabliſhed relative to theſe ſubjects. After he retired from buſineſs, he was admitted a truſtee for ſir William Backhouſe, into the management of the New River Company, which, with the unlucky circumſtance of his being a convert to popery, gave occaſion to the groundleſs calumny of his having had a hand in the great fire of London.

The ſtory, though given by Burnet, is abundantly refuted by the writers of the Biographia Britannica. Mr. Graunt continued his application to his ſtudies, and made large additions to his "Obſervations" but two years before his death, which happened on the 18th of April, 1674. He was buried at St. Dunſtan's Weſt, and many of the moſt eminent and ingenious perſons of that time, among whom was ſir William Petty, paid their laſt reſpects to his memory. He left behind him a diſcourſe upon the advance of the exciſe, and ſome papers on religious topics, which have not been publiſhed. It muſt be mentioned to his honour, that immediately after the publication of his book, Lewis XIV. or his miniſters, enacted a law to enforce the moſt exact regiſter of births and burials that was to be found any where in Europe. Biog. Brit.

GRAUPEN, a term uſed by the German miners to expreſs the reſiduum of any ore after the regulus, or metalline part, is run from it. Thus the ores of biſmuth leave behind them, after the regulus is melted off, an earthy ſubſtance, called biſmuth graupen, with which, mixed with flints and an alkali, they make a kind of ſmalt, not diſtinguiſhable from the true ſmalt made from cobalt. Phil. Tranſ. N° 390.

GRAUSTONE. See GREYSTONE.

GRAUWACKE. See *Tranſition* ROCKS.

GRAY, THOMAS, in *Biography*, a diſtinguiſhed Engliſh poet, deſcended from very reſpectable citizens of London, was born in Cornhill, December the 26th, 1716. His grandfather was a conſiderable merchant; but his father, Mr. Philip Gray, was of an indolent and reſerved temper; and therefore diminiſhed rather than increaſed his paternal fortune. He had many children, of whom Thomas, the ſubject of theſe memoirs, was the fifth: all of them except himſelf died in their infancy, and he is ſaid to have narrowly eſcaped ſuffocation, owing to a too great fullneſs of blood, which deſtroyed the reſt, and he would certainly have been cut off as early, had not his mother, with a courage remarkable for one of her ſex, ventured to open a vein with her own hand, which inſtantly removed the paroxyſm. He was probably deſtined for a profeſſion, and accordingly ſent to Eton ſchool to acquire the fundamental ſtock of claſſical literature. Here he was placed under the immediate care of Mr. Antrobus, his mother's brother, at that time one of the aſſiſtant maſters, and likewiſe a fellow of St Peter's college, Cambridge, to which place Mr. Gray removed, and was admitted a penſioner in the year 1734. Of his reſidence at Cambridge few memorials are recorded; he ſeems rather to have cultivated a literary taſte in ſilence, than to have had any aim at public diſtinction. He nevertheleſs appeared as a poet among the univerſity congratulators of the prince of Wales's marriage, and his verſes were admitted to be the beſt of the academical collection. His letters, during this period, to Mr. Weſt, which are printed by Mr. Maſon, ſhew that he had little reverence for the graver ſtudies, or for the dignified perſonages of the place, and that he had acquired that claſſic faſtidiouſneſs which was the permanent feature in his character. He quitted college in 1738, and occupied a ſet of chambers in the Inner Temple, with the avowed intention of ſtudying the law. A Latin ode, addreſſed upon this occaſion to Mr. Weſt, who had the ſame purpoſe in view, exhibits in a ſtriking manner the aſcendancy which the poet poſſeſſed in his mind over the ideal lawyer; and on the invitation which Mr. Walpole gave him to be the companion of his travels, he laid aſide this intention, and never after reſumed it. They ſet out in the ſpring, and his letters from the different ſtages of his progreſs, are a proof of the intelligent curioſity with which he viewed all the ſtriking objects of art and nature, and the manners and habits of mankind. Thus, in his letter from Amiens, he deſcribes every thing that he ſaw on the road, paints in vivid colours what was remarkable in the ſeveral towns through which he paſſed; and he adds, that "on every hillock is a windmill, a crucifix, or a Virgin Mary dreſſed in flowers, and a ſarſenet robe; one ſees not many people or carriages on the road; now and then a ſtrolling friar, a countryman with a great muff, or a woman riding aſtride on a little aſs, with ſhort petticoats, and a great head-dreſs of blue wool." They travelled through France, croſſed the Alps, viſited the principal towns of Italy as far as Naples, returned to Florence, and in the ſpring of 1741 proceeded for Venice. Upon their way thither the two companions fell into a diſagreement, which occaſioned their ſeparation Of this unfortunate incident the biographer ſays, "Mr. Walpole enjoins me to charge himſelf with the chief blame in their quarrel; confeſſing that more attention and complaiſance, more deference to a warm friendſhip, ſuperior judgment and prudence, might have prevented a rupture that gave much uneaſineſs to them both, and a laſting concern to the ſurvivor; though, in the year 1744, a reconciliation was effected between them." Mr. Gray, with his own very moderate reſources, finiſhed the reſt of the tour, and arrived in England in September 1741, two months previouſly to the death of his father. He now returned to academic retirement at Cambridge. In the following year he had the misfortune to loſe his friend Mr. Weſt, the confident of his ſentiments and partner of his ſtudies. The death of this hopeful young man left a vacancy in Mr. Gray's heart, which was never after ſupplied. He had an ambition to excel in Latin poetry, but was convinced that laſting fame could only be acquired by works accordant to the general taſte of his countrymen. He made many noble beginnings of poems, which, if he had poſſeſſed perſeverance enough to have completed them, would have redounded to his immortal honour. In the year 1742, he took the degree of bachelor of civil law, a circumſtance which gave him every neceſſary privilege for improving an univerſity reſidence, and he ſat down to a courſe of reading, which he purſued with the diligence of an exact critic. For ſeveral years his exquiſite learning and high poetic talents were known to but a very few of his moſt intimate friends. In 1747 he publiſhed his "Ode on the diſtant Proſpect of Eton College;" and in 1751 his "Elegy written in a Country Church-yard," was ſent into the world without the author's name. Few poems were ever ſo popular; it has paſſed through an almoſt indefinite number of editions, and is at this moment one of the moſt favourite productions of the Britiſh muſe. It has been tranſlated into Latin and Greek verſe. In 1753 Gray buried his mother, to whom he had always behaved with true filial duty and affection, and on her tomb he wrote, "the tender mother of many children, one of whom alone had the misfortune to ſurvive her." At college he was, on account of ſome peculiarity in his manners, ſubject to the boiſterous tricks of a few riotous young men of fortune, who took a pleaſure in diſturbing and alarming him; he made remonſtrances on the ſubject to the heads of the houſe, which not producing the effect which he anticipated, he removed his reſidence to Pembroke Hall in 1756, and in the ſucceeding year he was, on the death of Cibber, offered the poſt of poet laureat, which he declined. His motive for refuſing this office could not have been through any doubt of his being adequate to its duties, for in the ſame year he ſhewed what he was capable of doing as a lyric poet by the publication of his two principal odes, entitled "On the Progreſs of Poeſy;" and "The Bard." It would indeed have been moſt lamentable that a man of his genius and independent mind ſhould have been fettered by the obligation of producing periodical oblations of court incenſe. The odes juſt mentioned were much leſs popular than the elegy: many could not underſtand them, ſome ridiculed them, and in general they were more the objects of aſtoniſhment than of rapturous feeling; nevertheleſs, among perſons of real literary taſte, they raiſed the author's poetical character to a level with that of the firſt poets of his country. In the year 1759, Mr. Gray varied the uniformity of his life by a reſidence, which continued three years, in lodgings near the Britiſh Muſeum, chiefly for the purpoſe of conſulting curious books and manuſcripts in that great national repoſitory. In 1765 he took a journey into Scotland for his health, was introduced to the moſt eminent literati in that country, and fed his imagination with thoſe ſcenes of natural ſublimity and beauty which no man was better qualified to taſte, and to improve. He had, previouſly to this, ſought for the profeſſorſhip of modern hiſtory at Cambridge, but either his application was too late, or the patron, lord Bute, had other intereſts to ſerve; it was given to another candidate. A ſecond vacancy occurred in 1768, when it was conferred upon him, unſolicited and unexpected, in the moſt handſome way poſſible, by the duke of Grafton, who, notwithſtanding ſome defects in the former part of his life, has always been capable of doing noble things in a noble manner. The place was worth 400*l. per ann.* and Gray made a voluntary return for the favour by an "Ode to Muſic," for the inſtallation of that nobleman, as chancellor of the univerſity in 1769. His new office laid him under an obligation to ſome exertions: he might indeed have ſheltered himſelf by the example of his predeceſſors, and received the emoluments without paying any regard to its duties, but the idea of retaining a perfect ſinecure did not accord with his temper; he immediately ſet about preparing for active ſervice, he ſketched an admirable plan for his inauguration ſpeech, in which, after enumerating the preparatory and auxiliary ſtudies requiſite, as ancient hiſtory, geography, chronology, &c. he deſcended to the authentic ſources of the ſcience, ſuch as public treaties; ſtate records, private correſpondence of ambaſſadors, &c. He alſo drew up and laid before the duke of Grafton, three different ſchemes for regulating the method of chooſing pupils privately to be inſtructed by him, which were highly approved, and if he had been accuſtomed, by general habits, to thoſe exerciſes which he felt would have been beneficial to the improvement of his pupils, much might have been expected from his lectures, but with a mind replete with the ſtores of knowledge, ancient and modern, he was totally unable, through the baneful effects of habitual literary indolence, to bring his vaſt acquiſitions to uſe on demand; and after many uneaſy ſtruggles, he proceeded no farther than to ſketch out a plan. His health was indeed rapidly on the decline; low ſpirits, "the indolent ſcholar's familiar malady," ſeized him; an irregular hereditary gout made more frequent attacks than uſual on his feeble conſtitution: at length a ſudden nauſea, with which he was affected while dining in the College Hall, announced that the diſeaſe had left the extremities and attached itſelf in the ſtomach. He died July 30th 1771, in the fifty-fifth year of his age. He was ſenſible to the laſt, and aware, through the whole of the diſeaſe, of his great danger, but expreſſed no viſible concern at the thoughts of his approaching diſſolution. With a warm imagination, Mr. Gray had cool affections, and a calm ſedate diſpoſition. He was attentive from economy, yet wholly void of avarice: he was generous, even when his circumſtances were the moſt narrow. He was careful of himſelf, and ſo timorous, that it is aſſerted, ſome of the fineſt views in a tour to the Lakes eſcaped him, becauſe he did not chooſe to venture to thoſe ſpots whence they were to be ſeen. This want of perſonal courage is a ſingular contraſt with the manly and martial ſtrains of his poetry. In morals he was temperate, upright, and a conſtant friend to virtue. His religious opinions were not known, but he always abhorred the diſſemination of ſcepticiſm and infidelity. Few men of his reputation have had leſs vanity, and he bore with good-humour and eaſy negligence all the criticiſms upon his compoſitions. The learning of our poet was general and deep: it comprifed almoſt every topic of human enquiry, excepting what belonged to the ſciences properly ſo called. As a poet his name muſt deſcend to the lateſt poſterity, at leaſt, as long as there is taſte enough left to feel and enjoy elegant writing. No one appears to have poſſeſſed more of that faculty of poetical perception which diſtinguiſhes among all the objects of art and nature what are fitteſt for the poet's uſe, together with the power of diſplaying them in their richeſt colours. According to a critic, Mr. Gray "did not excel in pure invention, neither is he highly pathetic or ſublime, but he is ſplendid, lofty, and energetic; generally correct, and richly harmonious. Though lyric poetry is that in which he has chiefly exerciſed himſelf, he was capable of varying his manner to ſuit any ſpecies of compoſition. Perhaps he was beſt of all qualified for the moral and didactic, if we may judge from his noble fragment of "An Eſſay on the Alliance of Education and Government." As a writer of Latin verſe he is perhaps ſurpaſſed by few in claſſic propriety. His letters are entertaining and inſtructive; free from all parade; they poſſeſs a fund of pleaſantry, which will ever render them popular among thoſe of his countrymen, who are at all imbued with the principles of literary taſte. By a friend who has deſcribed his character it is ſaid that "perhaps he was the moſt learned man in Europe; he was equally acquainted with the elegant and profound parts of ſcience, and that not ſuperficially but thoroughly. He knew every branch of hiſtory both natural and civil, and had read all the original hiſtorians of England, France, and Italy; and was a great antiquarian. Criticiſm, metaphyſics, morals, and politics, made a principal part of his plan of ſtudy; voyages and travels of all ſorts were his favourite amuſement, and he had a fine taſte in painting, prints, architecture, and gardening: with ſuch a fund of knowledge, his converſation muſt have been equally inſtructive and entertaining; but he was alſo a good man, a well bred man, a man of virtue and humanity. There is no character without ſome ſpeck, ſome imperfection; and I think the greateſt defect in his, was an affectation in delicacy, or rather effeminacy, and a viſible faſtidiouſneſs or contempt and diſdain of his inferiors in ſcience. He alſo had in ſome degree that weakneſs which diſguſted Voltaire ſo much in Mr. Congreve: though he ſeemed to value others chiefly according to the progreſs they had made in knowledge, yet he could not bear to be conſidered himſelf merely as a man of letters; and though without birth, or fortune, or ſtation, his deſire was to be looked upon as a private independent gentleman." Maſon's Life and Letters of Gray, four vols. 8vo. 1778.

Gray, or *Grey*, a mixed colour, partaking of the two extremes, black and white. In dyeing, many of the varieties of grey, iron-grey, ſlate colour, &c. are given by proceſſes, in general, ſimilar to thoſe for black, but with ſmaller quantities of the ingredients, and eſpecially a ſhorter time of immerſion. They are often finiſhed with a weak bath of weld, cochineal, Brazil-wood, and other livelier colours to give ſome particular tints.

In the *Manege* they make ſeveral ſorts of grays: as the *branded* or *blackened* gray, which has ſpots quite black, diſperſed here and there. The *dappled* gray, which has ſpots of a darker colour than the reſt of the body. The *light* or *ſilver* gray, wherein there is but a ſmall mixture of black hairs. The *ſad* or *iron* gray, which has but a ſmall mixture of white. And the *browniſh* or *ſandy-coloured* gray, where there are bay-coloured hairs mixed with the black.

GRAY, in *Zoology*, a name given in ſome counties of England to the badger.

GRAY is alſo uſed in ſome places for a ſpecies of wild-duck, more commonly known by the name of the *gadwall*. See DUCK.

GRAY, in *Geography*, a town of France, and principal place of a diſtrict, in the department of the Upper Saône, ſeated on the Saône, which is navigable by boats to Lyons, whither the inhabitants ſend grain and iron, the chief articles of their commerce. The place contains 5009, and the canton 13,825 inhabitants, on a territory of 215 kiliometres, in 26 communes. N. lat. 47° 27′. E. long. 53° 40′.

GRAY, a poſt-town of America, in Cumberland county and ſtate of Maine; 15 miles N.W. from Portland. The townſhip was incorporated in 1778, and contains 987 inhabitants.

GRAY's *Bay*, a bay on the N. ſide of the river Columbia, in New Georgia. N. lat. 46° 19′. W. long. 236 22′.

GRAY's *Creek*, a river of Virginia, which runs into James river. N. lat. 37° 8′. W. long. 76° 56′.

GRAY's *Harbour*, a port or bay on the W. coaſt of North America, examined and deſcribed by Mr. Whitbey. The ſurrounding ſhores are low and apparently ſwampy, with ſalt-marſhes; the ſoil is a thin mixture of red and white ſand over a bed of ſtones and pebbles. At a ſmall diſtance from the water ſide, the country is covered with wood, chiefly pines of an inferior ſtunted growth. The number of Indians inhabiting this place were eſtimated at about 100; they ſpoke the Nootka language, though it did not ſeem to be their native tongue, and they appeared to vary in little or no reſpect from thoſe people occaſionally ſeen. N. lat. 47°. E. long. 236° 7′.

GRAYLING, or UMBER, the Engliſh name for the fiſh called by authors *thymallus*, and *thymus*, and by Artedi made a ſpecies of corregonus, and the SALMO *thymallus* of Linnæus, which ſee.

It is caught in the freſh rivers and clear rapid ſtreams, chiefly in the mountainous counties of England, and in the like ſituations in Germany, and other kingdoms, and is one of the fineſt taſted of all the freſh-water fiſh. It is common in Lapland, where the guts of it are uſed inſtead of rennet to make cheeſe, which they get from the milk of the rein-deer. It is a voracious fiſh, riſes freely to the fly, and will very eagerly take a bait. It feeds on worms, and ſpawns in May.

GRAYSON, in *Geography*, a county of Virginia in the upper waters of the Great Kanhawa. It contains 3742 free inhabitants, and 170 ſlaves. Its form is triangular; the longeſt line being about 50 miles, and its greateſt breadth 15 miles. It is mountainous, abounding with timber and iron ore; and two ſets of iron-works are erected in it: about a fifth part is arable. The court houſe is in N. lat. 36° 35′, 250 miles S.W. of Richmond.

GRAZALEMA, a town of Spain, about 1½ mile from the borders of the province of Granada, built partly on the ſide, and partly on the top of a mountain. Moſt of the inhabitants are employed in the manufacture of woollen and coarſe cloths, and alſo of crucibles. Their number is about 5000.

GRAZIANI, ANTON-MARIA, in *Biography*, a biſhop and elegant writer, was born of a diſtinguiſhed family at Borgo-ſan-Sepolcro, in Tuſcany, about the year 1537. Having obtained a good knowledge of grammatical learning at Friuli under the celebrated Abſtemio, he was ſent to Padua to ſtudy the law. In 1560 he viſited Rome, and was kindly patronized by Commendone, afterwards cardinal. He accompanied this friend, between whom and himſelf there was an unalterable attachment, in all his journeys into Germany and Poland, and refuſed to quit him, though ſolicited with great promiſes by Henry of Valois, at that time king of the latter country. After the death of Commendone in 1584, he was made ſecretary to pope Sixtus V., and took a conſiderable ſhare in the election of Clement VIII. who, in 1592, in gratitude for his ſervices, created him biſhop of Amelia, and ſent him as his nuncio to the Italian princes and ſtates, in order to unite them in a league againſt the Turks. When at Venice, he prevented that republic from declaring in favour of Cæſar d'Eſte after the demiſe of Alphonſo II. duke of Ferrara. In 1598 he retired to his ſee, where he remained, till his death in 1611, moſt aſſiduouſly employed in the duties of his high office. As an author Graziani is known by the following works, "De Bello Cyprio," lib. v. 4to. 1624; "A Hiſtory of the War of Cyprus:" "De Vita Commendoni, Cardinalis," which was intended as a tribute of gratitude and affection to his deceaſed friend and patron: "De Caſibus adverſis Virorum illuſtrium," and a collection of ſynodal ordinances. In 1745 the public were preſented with a curious poſthumous work of this author, entitled "De Scriptis Invita Minerva, ad Aloyſium Fratrem," lib. xx. in which he not only gives an account of his own life and writings, but that of his native town and family; of his brother's travels, and of the public affairs in which he was engaged. Moreri.

GRAZIANI, D. BONIFACIO DA MARINO, maeſtro di capella of the Jeſuits' chapel and ſeminary at Rome, was a very voluminous compoſer of ſacred muſic and cantatas, who flouriſhed from the year 1650 to 1678. Padre Martini has given the following liſt of his eccleſiaſtical publications; three books of pſalms for five voices, *a due cori*, or for two choirs; publiſhed at Rome 1652 and 1670. Maſſes *à* 5 Rome, 1671. Six books of motets, for 1, 2, 3, 4, 5 and 6 voices; Rome, from 1651 to 1671; antiphons, for the bleſſed virgin Mary, for 4, 5 and 6 voices, Rome, 1665. *Reſponſ. della Settim. ſanta*, Rome, 1663. *Litanie* for 3, 4, 5, and 8 voices, Rome 1675. Sacred and moral compoſitions, for 1, 2, 3 and 4 voices, 1678. Of his cantatas, though none are mentioned in this liſt, yet the number of them, that have been preſerved in MS. collections of old muſic, is equal to thoſe of Cariſſimi, Ceſti, and Luigi Roſſi, particularly in the Britiſh Muſeum; Dr. Aldridge's collection of muſic in the library of Chriſt-church, Oxford; Dr. Burney's Collect. &c.

GRAZIER, in *Agriculture*, a term commonly applied to ſuch farmers as are engaged in the art and buſineſs of fattening various ſorts of live ſtock on paſture and other graſs-lands. That this ſort of buſineſs may be managed to the beſt poſſible advantage, the grazier ſhould have a perfect knowledge of the nature, properties, and value of all ſorts of cattle and ſheep ſtock, as well as of the quality of the ground on which they are to be fed, and of the moſt proper methods of ſuiting them to each other. And he ſhould alſo be well informed concerning the nature and ſtates of markets in general. It is obvious that upon theſe being well underſtood and properly regarded, much of the ſucceſs of this ſort of farming buſineſs muſt depend, as thereby proper advantage may be taken, not only of fairs and markets, but a variety of other neceſſary circumſtances.

The markets for the ſale of fat ſtock, eſpecially thoſe of the neat cattle and ſheep kinds, are generally as high about the end of April as at any other period of the year, in conſequence of the ſupply, at that ſeaſon of the year, being only had from cake or corn-fed animals, not one farmer in a thouſand having then any ſort of winter green food remaining. On this account ſuch beaſts or ſheep as are really fat at that time are ſure to fetch a good price in the markets, and particularly at Smithfield. With the latter animals, however, the caſe is, in ſome inſtances, rather different as to thoſe farmers who are good providers: ſpring food is now beginning to be ready, though ſeldom in ſuch plenty, from the number of bad managers, as to reduce the markets in any great degree.

The inexperienced grazier ſhould conſequently fully weigh and conſider the different modes in which he may be able to diſpoſe of his fat ſtock to the greateſt advantage. The firſt and principal place to which his attention will be directed, will probably be Smithfield market, eſpecially for the more ſouthern graziers. If he be ſituated in a diſtrict that is divided into ſmall or middling ſized farms, and in which the farmers are commonly in the regular practice of employing diſtrict drovers, in whom proper confidence can be placed, he will of neceſſity be as ſafe as his neighbours, and may not have reaſon for any particular caution. This mode is very common in the eaſtern part of the county of Norfolk. Where he occupies a very large farm, whatever the nature of it may be, whether an arable grazing one, as is cuſtomary in Weſt Norfolk, or a graſs grazing one, as in the county of Lincoln, on a ſcale that enables him to ſend many droves in a pretty regular manner to his ſaleſman, he may ſafely truſt to him; as the uſual confidence and integrity of trade moſtly take place in ſuch caſes. But it muſt be obſerved, that it is ſeldom the caſe that the grazier who ſends occaſionally or accidentally a lot of fat beaſts or ſheep to Smithfield market, gets as fair a price for them as his great neighbour, who is in conſtant dealing, gets the ſame day, or his little one, whoſe ſtock took the ſame chance through the means of a confidential drover. The perſon who thus drops in a lot, out of the regular courſe of his buſineſs, is ſcarcely ever ſatisfied with the treatment he meets. And there is, without doubt, much truth in the remark, in conſequence of the frequency of its being made by perſons from different places.

On this account the inexperienced grazier ſhould conſider the circumſtance well, and try the country butchers, in order to feel his way through the difficulty as well as he can, provided his farm be of ſuch a ſize, and in ſuch a ſituation, as to lay him open to its influence and effects.

In the buſineſs of grazing, great advantage may be derived, by thoſe who have not had much experience, from the frequent weighing of the animals while alive; as by a compariſon of the living with the dead weight, in ſuch caſes, as when they are killed in their own neighbourhoods, they may ſoon become able to judge, with a tolerable degree of correctneſs, of the dead weight of any common ſized beaſt, of which they have aſcertained the weight while in the living ſtate. And where the living weight has been taken from tables of admeaſurement, ſuch as thoſe compoſed by Bantor, they may compare the reſult in a pretty exact way.

The work of aſcertaining the living weight in ſheep, calves, hogs, and other ſimilar kinds of animals, may be effected in a ſimple and eaſy manner, merely by the contrivance of a ſort of cage or large covered baſket, with a door at each end for their reception and diſcharges, to which is attached a pair of large ſteelyards, ſo as to ſhew the weight.

The frequent weighing of the fattening ſtock ſhews the grazier the different degrees of progreſs which the animals have made in different periods and ſituations, as well as what the effects of different ſorts of food are upon them; what changes may be neceſſary in it, and when it may be the moſt proper to ſell, provided the markets ſhould be ſuitable. In ſhort, a ſort of confidence is in this way gained by the grazier, that could not be readily acquired in any other manner.

But aſſiſtance of this nature is not by any means neceſſary for ſuch graziers as have been long accuſtomed to the handling and judging of the weights of animals, as they can in general form tolerably correct opinions by the eye and the feel, in conſequence of ſuch long experience; though it not unfrequently happens that they are deceived, the beaſts turning much better and heavier than they had imagined. It has, indeed, been remarked that, let the grazier be as experienced as he may in buying and ſelling, as well as in judging by the hand and the eye, the butcher will beat him, from having been able to bring the live to the teſt of the dead weight, in ſuch a variety of different inſtances, as muſt render his judgment perfect. The grazier, though he cannot therefore equal him, may, in a great meaſure, approximate to him by means of frequent careful weighing of the living animals.

It muſt of courſe appear evident that it is a matter of great conſequence for the ſtock farmer, to make himſelf, as ſoon as poſſible, perfectly converſant with this part of his buſineſs, as without it he muſt be liable to be greatly deceived in his dealings.

GRAZING, the practice of feeding and paſturing down graſs-lands with different ſorts of live ſtock, with the intention of improving and rendering them fit for the market. It is a ſort of management that cannot be carried on to much advantage, except in thoſe diſtricts where the quantity of paſture land is conſiderable, and of a ſuitable quality for the purpoſe, or where the value of the produce of ſuch ſward land is but ſmall in compariſon with the ſtock which is fed upon it.

There are particular diſtricts in different parts of the kingdom that are much more in this ſyſtem of farming than others, as is exemplified by thoſe of the counties of Lincoln and Leiceſter, in the middle part of the iſland, Somerſet, Glouceſter, &c. in the weſt, and Romney marſh, &c. in the ſouth.

But there are tracts of grazing ground of more or leſs extent in moſt of the counties of the kingdom.

It is well remarked that there are certain ſituations as well as deſcriptions of paſture ground on which this method of farming may be had recourſe to with better profits, and more ſucceſs than that of any branch of the dairying ſyſtem. This muſt be the caſe in all thoſe diſtricts where the proportion of land in the ſtate of tillage is very ſmall in compariſon to that of the paſture kind, conſequently the price of produce of the graſs ſort trifling in compariſon to that of the fat ſtock. In all ſuch diſtricts of the kingdom where the graſs-lands are of ſo fine and rich a quality, as to be capable of fattening large bullocks or other cattle, this ſyſtem may be had recourſe to with much ſucceſs and profit, and is perhaps the beſt application to which the lands can be applied, as is fully ſhewn by ſuch diſtricts being moſtly under ſome management or other of this nature.

It may be obſerved that the art of grazing to advantage depends upon a variety of circumſtances, ſuch as thoſe of the nature and quality of the grounds, the propriety of the management of them in reſpect to feeding down, changing, and ſhutting them up; the properly adapting the ſtock to them in quantity, ſize, and quality; the judgment of the grazier not only in ſelecting ſuch as are moſt ſuitable for the purpoſe and moſt diſpoſed to fatten, but in obtaining them, where they are to be purchaſed, at ſuch prices as that they may pay well for keeping; and diſpoſing of them, when fattened, at their full value and advantage.

It has been ſtated, by Mr. Kent, that the ſtocking of land with proper cattle is one of the niceſt parts of the ſcience of farming. Where nature is left to herſelf, ſhe always produces animals ſuitable to her vegetation, from the ſmalleſt ſheep on the Welſh mountains to the largeſt ſort in the Lincolnſhire marſhes; from the little hardy bullock in the northern highlands to the noble ox in the richeſt paſtures in Somerſetſhire. But good huſbandry admits of our increaſing the value of the one in proportion to that of the other. Land improved enables us to keep a better ſort of ſtock, which ſhews the double return the earth makes for any judicious attention or labour we beſtow upon it. The true wiſdom of the occupier is beſt ſhewn in preſerving a due equilibrium between this improvement of his land and ſtock. They go hand in hand, and if he neglect the one, he cannot avail himſelf of the other. It ſhould, therefore, be firſt conſidered what kind of cattle, or other ſorts of ſtock, will anſwer the purpoſe beſt, on the particular deſcription of land upon which they are to be grazed; and next, what ſorts may pay the moſt in the conſumption of the produce.

“ In general, it will probably be found, that upon ſtrong florid paſtures of the drieſt kinds, the large ſorts of cattle, with ſome of the larger breeds of ſheep, will be the moſt ſuitable ſtock; but that where the graſs-lands are neither ſo luxuriant nor ſo dry, and upon turnip-lands, the ſmall Engliſh, Welſh, or Scotch cattle, with ſome of the ſmall breeds of ſheep, will be moſt profitable. Thus, as different ſorts of graſs-land and different kinds of produce ſeem in point of profit to require different deſcriptions of animals to feed upon and conſume their produce, it is of much importance to be at ſome pains to make the beſt and moſt ſuitable application.” And in caſes where the grazier breeds his own ſtock, he will have little difficulty in ſelecting ſuch of the different kinds as are the moſt adapted to his views; but where the animals are to be purchaſed in, which muſt moſt frequently be the caſe, more care and circumſpection will be neceſſary. It will be proper, though a difficult taſk, to make a choice of ſuch as have been well kept and are in a thriving condition; as when they have been ſtinted in their food, and have the contrary appearance, they ſeldom do ſo well for the uſes of the grazier. It will likewiſe be of advantage to have them from ſituations in which the lands are inferior in point of richneſs. It is noticed by ſome, that many farmers have found great advantage in buying ſheep from the pooreſt ſpots, as they generally thrive moſt when they come into a richer paſture, like trees which endure tranſplanting the better for coming from a poor nurſery. They likewiſe think that they endure folding and penning better than ſheep which are bred on a more luxuriant ſoil. And they are certainly right, in theſe obſervations. But, with reſpect to the notion which farmers are apt to entertain, that all kinds of ſheep will not endure penning, they labour under an error. It is believed that all lean or ſtore-ſheep are the better for being folded. They are generally more healthy; and, above all other advantages, this one is certainly obtained by it; when ſuch ſheep are put to fatten they thrive much better and faſter, as oxen do that have been moderately worked. But where the grazing-lands are very moiſt, ſheep are not by any means a ſort of ſtock to be depended upon, as they are extremely liable to become diſeaſed.

In addition to theſe points, it is neceſſary to have conſiderable regard to the qualities or properties of the kinds of animals, whatever they may be, in the intention of grazing them with profit; thoſe kinds, whether of cattle or ſheep, which have the property of keeping themſelves fat, or in tolerably full condition, by the leaſt conſumption or expenditure of food, being conſtantly preferred, whatever the ſize or breed may be, as that is evidently a quality of much greater importance to the grazier than that of mere ſize, conſidered in an abſtract manner. It is ſtated, that where there are fine and rich paſtures, the grazier may “ chooſe his beaſts as large as he can find them, provided they are of the right breed and ſhape; but let him always prefer ſhape to ſize; for it will aſſuredly pay him better;” and, that “ thoſe who are upon indifferent graſs muſt take care to proportion the ſize of their beaſts to the goodneſs of their paſtures: their cattle had much better be too ſmall than too large; as there are vaſt tracts of land that will anſwer in grazing, which are not good enough to ſupport large breeds.” And it is not improbable, but that the ſame thing may hold good in a great degree in regard to ſheep. But in all ſuch caſes, as where the ſtock is reared upon the land of the farm, which is often a good practice, there can be little difficulty, as has been ſeen, in fixing upon ſuch animals as are the moſt proper in theſe different intentions; but as it muſt often be neceſſary for the grazing farmer to purchaſe his live-ſtock at fairs and markets, and in other circumſtances, much care and attention, as well as knowledge, will be required for him to accompliſh it in the moſt advantageous manner.

In a ſyſtem of Practical Agriculture, lately publiſhed, it is noticed to be “ of great importance in this buſineſs to provide ſuch as have been kept in a proper manner, and are in a healthy, improving ſtate; as, where the contrary is the caſe, they are difficult, and require a much greater length of time to be brought into the ſtate proper for ſale than would otherwiſe have been neceſſary. It is, perhaps, experience alone that can qualify the grazier to form a correct judgment in theſe reſpects; in general, however, he is led to the choice of ſtock by no fixed or ſcientific principles, but by the impreſſion the appearances of the animals have upon him.” And, it is ſtated on the authority of Mr. Marſhall, “ that the experienced grazier, who has been accuſtomed to attend fairs and markets, knows at ſight, or by the aſſiſtance of the ſlighteſt touch, whether the animals he is about to purchaſe will ſuit him. Their general form and looks pleaſe him. They are every where clean; have little offal about them; their eyes are full and vivid; their countenances briſk; their ſkins alive, and their fleſh mellow. On the whole, they have the reſemblance of thoſe which have been grazed before with ſucceſs. Others are rejected, from the grazier not having found any ſuch as they reſemble to have done well, but many to have turned out in an unprofitable manner.” And the writer of the above work conceives, that there are certain “ principles in this branch of the farmer's buſineſs which may be attended to with great advantage, as the animals have certain points or parts, the proper or improper forms of which denote them to be valuable, or the contrary, for this purpoſe. Theſe are, that the legs ſhould be ſhort in proportion to the ſize of the animal; the back very ſtraight, broad, and flat; the loins wide; the carcaſe deep round, or rather barrel-ſhaped below; the fore-quarters round, full, and ſpreading; the bones ſmall; the fleſh affording an elaſtic feel; the ſkin thin, and a diſpoſition to fatten well, and on the beſt parts. Where theſe marks are predominant, the ſtock is moſtly ſuitable for the purpoſes of the graziers.” And, “ that where the hair of the hide, in fattening cattle, is inclined to curl inſtead of being ſtraight, they are moſt diſpoſed to thrive. This has been found to be the caſe in practice in different parts of the kingdom," as has been ſhewn in various publications on agriculture.

"In lean beaſts alſo, when the hair of the hides is curled, they commonly keep themſelves in better condition than where the contrary is the caſe. In all caſes a diſpoſition in the animals, of whatever ſort they may be, to wildneſs, and not remaining quietly in their paſtures, forms an inſurmountable objection in this ſyſtem of management; as no animal ever fattens well that has a tendency to ramble: it is quietneſs, feeding quickly, and lying much, that has the greateſt tendency to make them become fat in a ſhort time;" a fact which is fully confirmed by what happens in the new Leiceſter or Diſhley breed of ſheep, which are ſo tame and quiet as ſcarcely to move over a common gutter in the paſture. And, "from the reſult of actual experiment with four different beaſts, in which the leaſt poſſible difference could not be diſcovered on the moſt minute examination, it has been ſhewn that too much attention cannot be beſtowed in the choice of the breed of fattening ſtock, as, though they were in every reſpect the ſame in appearance, two, from their ſuperior diſpoſition to fatten, were found to afford a profit in the proportion of fifteen ſhillings the week, while the other two did not yield more than about five ſhillings and ten-pence." This fact is recorded in the Annals of Agriculture, and clearly ſhews that too much attention cannot be paid by the grazing farmer to the diſcovery of this propenſity in the ſtocking of his paſture, or other graſs-lands.

Notwithſtanding it muſt often happen that the grazier cannot fully avail himſelf of this, from the impoſſibility or vaſt difficulty of procuring ſuch animals, and is conſequently under the neceſſity of buying in ſuch as are more at hand, and ready for his uſe.

It is the uſual cuſtom in Leiceſterſhire, and the neighbouring diſtricts, to have commonly recourſe to the improved long-horned breed of cattle, from the animals being found to fatten in a ready manner, and to afford good beef. And, in the adjoining county of Lincolnſhire, a mixture of the large ſorts, of both the long and ſhort-horned breed, are had recourſe to as grazing ſtock, beſides thoſe bred in the county, and ſuch as are brought into it by the Sotch drovers.

On the contrary, in Somerſetſhire, the dark-red ſort, or Devonſhire breed, has been long much in eſteem by the graziers, and have lately ſpread themſelves much into the midland diſtricts, as Leiceſterſhire, Oxfordſhire, and Warwickſhire, from the grazing farmers in theſe diſtricts finding them to anſwer upon their paſtures more perfectly. And in Suſſex, the ſame breed is alſo held in conſiderable eſtimation by the farmers, as well as their own variety of it, as they are both found to fatten kindly, and with conſiderable expedition, upon their lands, and to have a ready ſale in their markets and fairs.

However, in the more arable or tillage diſtricts of Norfolk and Suffolk, where turnips and artificial graſſes are more in uſe, the Kiloe, Galloway, and other ſmall Scotch breeds, as well as thoſe of the Welſh runt kind, are in preferable demand, from their anſwering better on theſe ſorts of food, their more kindly diſpoſition to fatten, and the excellent quality of their fleſh, which never fails to have a ready ſale in the London market, where the greateſt part of their fat ſtock is ſold. But the grazing farmers in the northern counties have moſtly recourſe to their own long-horned breed, raiſed on the farms, with the different Scotch breeds brought into the diſtricts, their home ſort being in their experience the leaſt diſpoſed to take on fat and become ſaleable. And the large Hereford ſort, as well as that kind of Welſh cattle termed the Glamorgan, are alſo very advantageous grazing ſtock in ſituations where the paſtures are good, and they can be finiſhed with other ſorts of food. Great numbers of the former of theſe ſorts are purchaſed by the graziers round the metropolis for being fattened or brought conſiderably forward on the rich graſs lands, which have been mown for hay, and finiſhed with other ſorts of food. Yet the ſmall breeds of the Scotch, Welſh, or other ſimilar kinds, may, in many caſes of the inferior ſorts of grazing lands, often be the moſt beneficial in affording profit to the farmer, as he can ſuit them more to the nature and ſtate of ſuch lands, and they have more chance of becoming fat upon them. Indeed it has been ſtated in the tenth volume of the Bath Papers, on the experience of fifteen years, that the ſmall animal has *generally* "a more natural diſpoſition to fatten, and requires (proportionably to the large animal) leſs food to make it fat; conſequently the greater quantity of meat for conſumption can be made per acre." If this point was ſatisfactorily proved, there could be no doubt of ſmall animals being preferable both on this deſcription of grazing land, and that of a better quality; but, as an able and accurate obſerver has upon much experience been induced to think differently on this ſubject, the grazier ſhould be cautious how he has recourſe to ſmall breeds upon lands that are capable of fattening large ones, until the queſtion has been fully decided.

In reſpect to what relates to the ſort of cattle that may be employed to the greateſt advantage under this ſyſtem, oxen, and ſuch heifers as have been ſpayed, are in general conſidered, by the beſt informed graziers, as the beſt ſort of ſtock; as beſides being more quiet, the latter have not only the property of fattening in a more expeditious manner, but with a leſs conſumption of food. They are not, however, ſo readily provided by the grazier. The ox is of courſe the moſt commonly, as well as moſt extenſively, employed for the purpoſe of the grazier, as having the advantage of being capable of being fattened, and of affording good beef, after he has been beneficially wrought in the team of the farmer. Cows, under different circumſtances, are likewiſe often bought in by the grazing farmer for the purpoſe of being made fat, ſuch as thoſe that have become dry, have ſlipped the calf at an early period, or are becoming aged; but much caution is neceſſary in the purchaſe of this ſort of grazing ſtock, as they frequently turn out leſs favourably than bullocks or heifers, though in ſome caſes they leave a good profit. When old, they rarely thrive well or get fat with any degree of expedition. Indeed it is, perhaps, the beſt way, in all caſes, for the grazier to have ſuch ſtock as is not too far advanced in age, as young animals are invariably more diſpoſed to get fleſh, and become fat, than ſuch as are old. In the grazing of both heifers and cows, they ſhould be ſuffered to take the bull as ſoon as they have an inclination, and be ready for being ſold off fat ſeveral months before the time they would have calved. Such cow or heifer ſtock as are in calf, may ſometimes be purchaſed in at a cheap rate in the fairs in the autumnal ſeaſon, and be fattened off in the early ſpring with a good profit. There is likewiſe another deſcription of this ſort of ſtock ſometimes grazed, which is what are termed *free martins*, or cows that are barren; but they are ſaid to ſeldom anſwer in this intention in any very advantageous manner.

In relation to the moſt proper ſheep ſtock for the grazier, when the paſtures are rich, and afford full keep, the improved, large long-woolled breeds, as the new Leiceſters, may yield the beſt profit; but where the lands are leſs rich, and the feed of courſe leſs plentiful, the ſmall, improved, ſhort-woolled breeds, as the South Downs, may leave a more ample profit to the farmer. Where wethers of the former kind can be procured, they moſtly turn out well for the purpoſe. And in the contrary circumſtances, perhaps the South Downs cannot be excelled by any of the ſhort, or middle-woolled breeds. But in particular ſituations and circumſtances of graſs-lands, many other breeds may, however, be more profitable to the grazing farmer. It is ſtated, in the Agricultural Survey of Somerſetſhire, that the Dorſets, formerly ſo prevalent in that diſtrict, have lately given way to the polled, native breed of the lower part of the county; from the circumſtances of their giving a larger proportion of wool, and their fattening more expeditiouſly, and at the ſame time more fully, eſpecially on the internal parts. However, in the rich marſhes in the ſouthern parts of the iſland, the grazing farmers, who are moſtly in extenſive buſineſs, have conſtantly recourſe to the polled, white-faced breed, and that of the South Down, which they find the moſt profitable ſorts on their lands that can be employed.

In the northern parts of the kingdom, the graziers have principally recourſe to the native breeds, the heath and Cheviot ſorts, and find the former the quickeſt in getting fat, and the moſt hardy in their nature. The Cheviot ſort ſeems, however, lately to have gained ground in the more elevated and hilly ſituations.

Whatever the breeds of the animals may be that are made uſe of as grazing ſtock, it has been found, from long experience, that it is a matter of much importance to procure them from diſtricts, where the quality of the land is inferior to that on which they are to be fattened, as by ſuch means they not only get fat in a more expeditious manner, but without ſuffering any check upon being firſt turned upon the paſtures.

It is a matter of much conſequence in ſheep grazing that they have a fine cloſe paſture; and that they be prevented from going upon ſuch graſs-lands as have been covered by water, and become ſandy. as under ſuch circumſtances, they are liable to become diſeaſed. And, beſides this, it may be beneficial in many caſes for the farmer to be careful that horſes are not turned upon the paſtures along with them, as it has been found that the tufts of long, rank graſs that riſe about the dung-heaps, are apt to render them in a ſtate of diſeaſe, except where froſt has taken place, when the danger is for the moſt part removed; and it is ſuppoſed, that it is alſo dangerous to ſuffer ſheep to browſe upon the grain, eſpecially that of barley, which ſhoots up among the ſtubble, after the harveſt is completed; and fallows that are wet and unſound are equally detrimental, whether the ſoil be *light* or *ſtrong*. In the former ſituations, they frequently pull up the herbs by the roots, which they eat with the dirt adhering to them, which will inevitably give them the rot; and, if the fallows be ſtrong land, and ſhould not afford a ſufficient ſupply of food, they are liable to the hunger-rot, from being compelled to eat the rank, unwholeſome vegetables produced on ſuch grounds, eſpecially the leſſer ſpear-wort, and the marſh-penny-wort, both of which plants flouriſh in wet ſituations, and ought carefully to be eradicated wherever they are found. It is further adviſed, that in turning ſheep into paſtures, particularly water-meadows, and alſo into thoſe places that are ſubject to rot, to purſue the ſame precaution as with neat-cattle; which is previouſly to ſatisfy the craving of appetite, by giving them hay or cut ſtraw, and after the dew has been evaporated by the rays of the ſun, to drive them gently round the field for two or three hours before they are ſuffered to eat. But, whenever any ſort of dry food is given, they ought to be ſupplied with *pure water*, particularly during the intenſe heat that uſually prevails in the ſummer months, and which often renders the graſs as dry as a ſtubble. "For this purpoſe, clear, light-running water is always to be preferred, where it can be obtained; though, in general, whatever preſents itſelf is made uſe of. But where this neceſſary of life is found only in a tainted ſtate, or overcharged with the juice of dung, it will be adviſable to give them well-water in troughs or ſhallow tubs. This muſt be particularly attended to in the folds, ſo long as the ſheep are confined there by the ſeverity of the weather." It has been noticed, that "the watering of ſheep is, on the Continent, regarded as a circumſtance of the greateſt moment, and accordingly receives that attention which it requires. Thus, in Sweden, and at the national farm at Rambouillet in France, they are daily watered with running-water, or with that obtained from lakes or ſprings, *ſtagnant* water being moſt properly and rigorouſly prohibited. In ſome of the Saxon ſheep-farms, the ſheep are watered in the cots or folds during the winter, inſtead of taking them to watering-places. Spring or well-water is conducted by means of pipes into troughs, out of which the ſheep drink at pleaſure; they in conſequence drink oftener, and each time take leſs water, which is favourable to their health. The ordinary mode of watering ſheep in that, and we may add in many parts of our own country, is attended with many inconveniences. The animals refuſe to drink water in the winter, if it be too cold; they hurry while drinking, and do not take enough when the weather is very windy, or hail, rain or ſnow falls.

"Beſides which, they often diſturb the water with their feet; this diſguſts them, and at length one part of the flock completely prevents the other from approaching the watering-place." And it has been adviſed to fold them before the dew falls in ſummer and winter, and not remove them till it exhales, letting them have hay or other dry food of ſome ſort.

It is ſtated, that all grazing-land of rich quality ought to be ſtocked with ſheep, cattle, and horſes, ſo that the graſs may be eaten clean off; for, unleſs it is regularly depaſtured, much damage enſues. Each of the above three kinds of animals prefers, as moſt palatable food, ſome graſſes which the others reject; and none of them will bite near their own dung, though they may near that of others; and thus they conjointly contribute to keep the paſture level without much expence. Paſtures or grazing-lands ſhould be kept as level as a bowling-green, both for ornament and uſe; for, by one part being left higher than another, the long graſs keeps increaſing in patches; and land where it grows may be conſidered as taken away from the paſture, as the cattle will almoſt ſooner ſtarve than eat it. By leaving the ſort of graſſes the animals refuſe from year to year, the land increaſes in uſeleſs plants, and diminiſhes in uſeful ones; as the ſeed of ſuch plants continually drops, and the uſeful ones are prevented ſeeding by the cattle eating them. If ſuch paſtures were mown in thoſe places, it would give the uſeful plants room to grow. There are in this kingdom an infinite number of acres of rich and excellent land, which, from bad management, and from want of judgment in ſtocking, become of no more value than a barren ſoil. But ſuch grazing land as is intended for the purpoſe of feeding cattle, a few ſheep are conceived abſolutely neceſſary to eat up the weeds. If any part of the paſture be getting into bents, or higher graſs than it ought to be, and the animals begin to neglect it, you muſt mow it immediately, and as near the ground as poſſible; for the cloſer you cut down ſuch coarſe parts, the ſweeter and the quicker will the graſs ſpring up in the place. Could animals, by hunger, be driven to eat the long graſs, they would not fatten upon it; for, as the nearer the bone the ſweeter the fleſh, ſo the nearer the ground the ſweeter the graſs; it is not, he ſuppoſes, ſo much the quantity as the quality of the food that muſt be attended to.' And in further proof of the advantage of hard ſtocking, it is ſtated, that it is a common complaint, that the land is good in ſpring, but it goes off. Is this to be wondered at, when one-third, or perhaps one-half of the field is become ſo rank, that no one animal in the paſture will bite a mouthful of it? Suffer the very beſt piece of graſs-land, entirely free from weeds, to lie without either eating off the graſs, or mowing it, and in a few years it will be over-run with weeds, have very little uſeful graſs in it, and in fact be little better than rubbiſh. Conſequently, there can be little doubt of the beneficial conſequences of hard or cloſe ſtocking on the older ſorts of grazing-land; but on the new leys it ſhould probably be ſeldom attempted, as injury may be done to ſuch lands without the ſtock being thereby adequately improved.

But in grazing farms, there are ſeveral different ſyſtems of management purſued, in reſpect to cattle as well as ſheep. The practice with ſome graziers is, "to purchaſe their cattle in the fairs in the autumn-ſeaſon, about October, or in the following month, ſupporting them through the winter, principally with ſtraw, or ſometimes, which is a much better practice, with a little hay mixed with it, till towards the beginning of March, continuing their fattening through that and the ſucceeding month with ſome ſort of ſucculent food, ſuch as turnips, potatoes, or other ſimilar kinds, until the graſs be in a ſtate fit to be turned upon in May, on which they may be carried forward and completed, according to circumſtances, about Auguſt, or in the following month."

And another practice "is to purchaſe their beaſts lean, as ſoon as the graſs-lands are in a ſtate fit to be turned upon in May, wholly completing their fattening on the graſs about the latter end of October, or later in the autumn, according to their quickneſs in feeding. In this ſyſtem of management, the ſmaller kinds of cattle ſtock may be found in general the moſt advantageous, eſpecially where the lands are of the leſs fertile and luxuriant deſcriptions."

Another practice, ſometimes had recourſe to by grazing farmers, but which is, in general, perhaps leſs profitable than either of the above modes, is that of buying in ſtock at ſuch periods, according to the difference in their ſizes, as that they may be ready to be ſold off about April, or in the ſucceeding month, a period at which they uſually fetch high prices in the markets. It has been obſerved, that "in this ſyſtem, with large oxen or other ſorts of beaſts, it is ſometimes the practice to keep them through two winters, giving them only one ſummer's graſs; being in the firſt winter not fully fed, but kept in good graſs in the ſummer-ſeaſon, and forced on with the beſt feeding in the ſecond; but with the ſmaller ſorts of ſtock, one ſummer's graſs and a winter's ſtalling is the uſual mode; the cattle being bought in as ſoon in the ſpring as the graſs is riſen to a good bite." It is in very few inſtances that the animals can pay for this length of keeping. And, "in ſome diſtricts, heifers are preferred to oxen; in which caſe, they buy them in about March or April, and, after keeping them through the ſummer, ſell in October and November. This method is thought, by ſome, a profitable ſyſtem of management." By the author of the Modern Syſtem of Practical Agriculture, on theſe different ſyſtems, it is noticed that they may all "probably be practiſed with advantage under different circumſtances; but it is obvious that the firſt can only be had recourſe to with propriety, where green winter food is raiſed in ſufficient abundance, and the grazier has a ſtore of litter for being converted into manure. Under other circumſtances, the ſecond mode of management will be much more profitable. The two laſt methods are the leaſt convenient, and, probably, on the whole, except in very favourable circumſtances, the leaſt profitable, eſpecially the former of them, as, from the great length of time which they are kept, much management and attention to food becomes neceſſary to render them advantageous; which, with common ſervants, is ſeldom ſufficiently regarded."

But in addition to theſe ſeveral modes or plans of fattening neat-cattle, there is a practice followed in ſome rich hay-diſtricts near large towns, and particularly by the hay-farmers in Middleſex, which is, that "of buying in ſmall cattle in tolerable condition in the autumn, as ſoon as the after-graſs is ready, in order to their being fattened out on the rouens, and diſpoſed of towards the latter end of October, or beginning of the following month."

And, regarding ſheep ſtock, the ſame difference of ſyſtem takes place; as, in ſome caſes, where the lands are in a ſtate of incloſure, it is the "practice to buy ewes in lamb in the latter end of ſummer or beginning of autumn, keeping them on the inferior ſorts of graſs-lands, ſtubbles, or fallows, till the beginning of January; and then, by giving them turnips or cabbages, to keep them in good condition through the period of their lambing, and afterwards in the beſt manner that can be contrived, in order that the lambs may become fit for the butcher ſufficiently early to admit of the ewes being afterwards fattened, and diſpoſed of in the beginning of the autumn." This, in many caſes, is found a profitable ſyſtem of management, but which requires much care and attention in directing it.

Another practice in this buſineſs is, to purchaſe wether ſtock about the beginning of May, at the age of two or three years, keeping them ſparingly till ſome weeks after the grounds have been cleared from hay; then bringing them to good keep in the rouen, afterwards fattening them by means of turnips or cabbages, ſo as not to have them ready ſooner than the beginning of March, which is commonly the ſeaſon in which they fetch the higheſt prices. In this ſyſtem of grazing management, a good profit is moſtly afforded by farmers who purſue it in a judicious and ſteady manner.

And a further practice in fattening ſheep is purſued in ſome caſes with great profit and ſucceſs, which is that of buying in lambs of the wether, or other kinds, about the beginning of September, which are kept in different methods by different graziers, being by ſome brought forward with the greateſt poſſible expedition by the beſt keep, ſo as to be ready to be ſold off as ſoon as poſſible. But others have recourſe to the contrary method, keeping them only in a middling way during the winter, till about the beginning of April, and then forcing them forward by good keep, ſo as to have them ready for the butcher in Auguſt, or continuing them in the following month; and then clearing the whole of the ſtock from the land. In this practice, large profits are often made by judicious graziers, eſpecially when ſituated near large towns where the population is great.

Another ſyſtem of fattening, which can only be purſued to advantage in ſituations near large populous towns, is that of providing graſs-lambs for the markets as early as poſſible in the ſpring months, which pays the grazier well in many caſes. With this view, it is the practice to procure the more forward ewes, ſuch as thoſe of the Dorſet breed, which drop their lambs in the beginning of January, if not before. In Middleſex, where this management is much attended to, in conſequence of the great demand, it is the cuſtom to purchaſe this ſort of ewes at Kingſton, Weyhill, and other fairs in the neighbourhood. The ewes, in order that they may have a plentiful ſupply of milk, are extremely well kept on turnips, brewers' grains, and fine green ſweet rouen hay, and the lambs thereby forced forward in ſuch a rapid manner, as to be ready for the markets in the beginning of March or April. And the ewes, from their becoming dry ſo early, are capable of being fattened and diſpoſed of towards Michaelmas, uſually fetching the prices at which they were purchaſed in at: as the whole of the ſtock is in this ſyſtem cleared within the year, the farmer has the opportunity of fully aſcertaining its advantage or diſadvantage. The ſtatement of which is thus given in the able Survey of the Agriculture of the County of Middleſex:

Statement.	£.	*s.*	*d.*
Lamb, ſold at	1	10	0
Ewe, do. do.	1	10	0
Wool, 2*s.* 6*d.* or	0	2	0
Together	3	2	0
Deduct prime coſt	1	12	0
Remains the increaſe of an ewe in one year	1	10	0

It is hinted, that "in this management very much depends upon keeping the ewes perfectly well fed, and in dry warm incloſed paſtures, as without ſuch attention the ewes are apt to become thin and lean, in conſequence of the greatneſs of the evacuation, and afterward to require a much longer time in being made fat," by which much loſs muſt be ſuſtained. In the Economy of the Midland Counties, a practice in reſpect to fattening graſs-lambs, is ſuggeſted, which in particular caſes may be beneficial; which is that of removing the lambs from the ewes when they decline much in milk, before they are perfectly fattened, in order to complete them on young clover, or other ſorts of "prime keep." The chief object in this caſe is, that of the ewes becoming ſooner ready for the butcher. Some, alſo, conceive, that after the firſt fluſh of milk is gone, and it begins to be ſcanty, the lambs thrive better "on graſs alone, away from the ewes," than when kept along with them, as the hankering after the little milk that is afforded prevents their feeding freely on the graſs. Hence it is ſuppoſed, that "where this method is followed, which can probably be with advantage only where the milk of the ewes is greatly deficient in ſupporting and bringing the lambs forward, much attention muſt be paid to having the keep early and in abundance. In this view, rye-graſs and white clover for early uſe, and broad clover at a later period, may be the moſt proper and uſeful crops. In this management the ewes ſhould be carefully examined occaſionally; and, where much deficiency in the milk is found, the lambs be immediately removed to the paſtures."

In reſpect to the ſtocking of graſs-lands in the moſt advantageous manner for the grazier, it muſt depend materially on the richneſs of the lands, and the nature of the ſtock in reſpect to ſize, and other circumſtances. But, according to Mr. Billingſley, the Somerſetſhire graziers, in ſtocking the rich and middling ſorts of graſs-land, allow, to an ox, from one acre to an acre and a half; and ſome add one ſheep to each ox. But, in Lincolnſhire, they ſtock in much larger proportions; as is ſhewn in the Agricultural Survey of that diſtrict, where they are brought into a tabular form as below, for the more rich paſture land.

Table of Stocking rich Paſtures.

Names of places.	Sheep in ſummer per acre.	Acres per bullock in ſummer, with the ſheep.	Sheep in winter per acre.	Rent.
Long Sutton	5½	2½		
Mr. Scroop	11	No bullocks.		
Boſton, &c.	4	1½	2	
Skirbeck	5	1¼	2	
Bolton	5	1	3½	
Deeping Fen, Mr. Graves	5	2	1½	40
Alderchurch, Mr. Berridge	7½	2	3	
Swineſhead	2½	1	2	
Ewerby	3	2½	2	30
Horbling, &c.	3	2	2	
Howel	3	3	2	
Immingham	1	1½	2	
Grainthorp, &c.	3	3	1½	
Stallenborough	2	2	2	
Skidbrook	1½	1¼	½	
Ditto, &c.	2	2	—	35
Addlethorpe	5	1¼	2	40
Goſberton	6	1	2	
Burgh, &c.	5	2	2	40
Wrangle	2	2	—	36
Hundred of Skirbeck	2	1¼	2	45
Wibberton	5	2	2½	
Marſh Chapel	3	2	—	35
Ditto	3	1	—	45
Grimſby	2¼	1	2¾	
Average	3¾	1¾	2	

Upon this it is obſerved, that "conſidering the ſize of the ſheep, which cannot be eſtimated at leſs than 24lb. a quarter, on an average; and that the bullocks riſe from 50 to 100 ſtone (14lb.), this rate of ſtocking is very great indeed. There are, on every acre, 360lb. of mutton, and reckoning the bullocks at 42 ſtone, dead weight, there is alſo 336lb. of beef; in all, 696lb. of meat per acre in ſummer, beſides the winter produce, which is immenſe."

But, in the rich grazing counties in the more ſouthern parts of the iſland, a large proportion of both ſheep and cattle ſtock is admitted per acre: the exact proportion, however, differs with different graziers very greatly.

But the great and leading principle in this buſineſs is, however, never to ſtock in ſuch a manner as to reſtrict the animals in the leaſt; as it is by their being enabled to fill themſelves quickly, and to lie down much, that the greateſt progreſs and advancement in fattening are made, whether in ſtock of the cattle, ſheep, or any other ſort, when at graſs. But, on the inferior or weaker graſs-lands, a much ſmaller proportion of ſtock than on thoſe of the rich and fertile kind only can be employed. It can frequently not be more than an ox and a ſheep or two, to two acres, or two acres and a half. However, in ſtocking with neat-cattle, for the purpoſe of fattening, it ſhould conſtantly be ſuch as that the animals may have a full bite; but with ſheep, ſuch as to keep the paſture in a rather cloſe ſtate of feeding. Another circumſtance is neceſſary to be attended to, in order to bring the grazing-ſtock properly forward in paſtures, which is that of changing them more frequently than has generally been the caſe with grazing farmers. And it is, perhaps, on this principle, as well as thoſe of their affording greater degrees of warmth and ſhelter, and thereby promoting the growth of the herbage more abundantly, that ſmall incloſures are more advantageous in this practice than thoſe of a ſize larger. See Pasture.

But the practice of different diſtricts, where the grazing ſyſtem is much in uſe, will, however, afford a more clear idea of this ſort of management. In the Agricultural Survey of Lincolnſhire, it is ſtated, that in the low-land in Barton on the Humber, there was a horſe-paſture and a ſheep one contiguous, and upon the incloſure it was remarkable to obſerve the great difference between them; that which had been under ſheep ſo greatly ſuperior. And in the tract of marſh-land on the ſea-coaſt they obſerve, that, where moſt graſs is left in autumn, there the herbage is the coarſeſt and worſt next year. The remark was, it is obſerved, made in anſwer to recommending eddiſh for ſpring-feeding ſheep, which they thought would not do on rich marſh, though it might on uplands. This likewiſe ſhews that the Romney Marſh ſyſtem of cloſe feeding is right, and would anſwer as well in Lincolnſhire. And in the hundred of Skirbeck, they like, it is added, to have a tolerable head of graſs in the ſpring, before turning in; and afterwards ſo to ſtock as to prevent its getting coarſe by *running away*, ſo as to prevent the neceſſity of *hobbing*, which, however, muſt be done in a wet growing ſeaſon. Mr. Parkinſon obſerves, that the leſs ſheep are changed the better. This remark, which he takes to be very juſt, demands, he ſays, attention; it bears on the queſtion of folding. Beaſts are changed while *hobbing* is done; and the ſooner it is hobbed the better, as, if cut while young, cattle will eat it. But in Somerſetſhire, according to Mr. Billingſley, in ſummer feeding, attentive farmers have the dung which falls from the animal ſcraped up and wheeled into heaps, and the thiſtles and rough ſpots frequently mown. Beſides they make a point of excluding horſes and ſheep from their cow-paſtures. And when their mown ground is fit to be ſtocked, they hayn their ſummer leaze, ſo as to have a good ſupply of rough graſs or rouen in the winter. They alſo mow and feed alternately, by which means the beſt ſorts of graſſes are preſerved and encouraged; and in the Synopſis of Huſbandry, it is ſtated, that, "when the ſummer turns out moiſt and growing, the herbage often ſhoots faſter than the ſtock can eat it down. In this caſe it is common in Kent, to bruſh over the marſhes at the mowing ſeaſon, though they had not been originally laid in for that purpoſe; by which economy the farmer becomes poſſeſſed of a much larger portion of hay than he had before formed an expectation of, and which, in countries where this commodity fetches a good price, is an advantage whereof he is right to avail himſelf; for theſe caſual bruſhings may probably furniſh him with a quantity of winter provender ſufficient to his own uſe; whilſt thoſe marſhes which were primarily intended to be mown, and having been deſignedly laid in with that view, will produce a commodity of a better quality and more ſaleable; that may be diſpoſed of at market. On the removal of this old graſs, the ground is left at liberty to ſend forth a more vigorous ſhoot in the autumn, ſo that theſe rouens do at that time produce a ſweet and wholeſome paſturage, which would otherwiſe have been choked up with the rotten tore of the laſt year; yet there are caſes where it may be neceſſary to ſuffer this old graſs to remain on the ground, as where a portion of food is required for the cows or other horned beaſts in the winter. Then this old tore, having been ſweetened by the froſts, will be found exceedingly uſeful, and the cattle will at that time greedily devour what in the ſummer months they turned from with diſguſt."

The ſame writer alſo adds, that "the manner of ſtocking a grazing farm in the marſhes differs according to the nature of the land. In Romney Marſh, the views of the grazier are chiefly directed to the breeding and management of ſheep: and in the Iſle of Sheepey, both bullocks and ſheep claim his attention, whilſt in ſome parts the marſh land is wholly appropriated to the breeding of horned cattle and colts. Thoſe grazing farms are moſt eligible, which admit of breeding and fattening on the ſame paſture. This is the caſe with Romney Marſh, a tract of land ſo eminently diſtinguiſhed for a valuable breed of polled ſheep, that it furniſhes the graziers of Sheepey, and other places in this county, with an annual ſupply of lean-ſtock over and above what is reſerved for feeding; ſo that it is evident the grazier here enjoys a double profit from his farm, though it is believed, ſince the increaſed value of lean-ſheep, that the graziers in the Iſle of Sheepey have many of them adopted the method of breeding their own ſtock." This is probably the moſt beneficial practice.

In the county of Weſtmoreland, the cattle bought in in September are wintered on the coarſe paſtures and in the ſtraw-yard. In May following the young ones are ſent to the commons; and thoſe of an older deſcription turned upon the beſt paſtures as ſoon as poſſible, according to the earlineſs of the ſituation. But in the Agricultural Report of the North Riding of Yorkſhire, it is ſaid that "there the uſual time of breaking the paſtures is the 12th May, from which time they continue regularly ſtocked until about October, when, if the ſtock conſiſts of milch-cows, or feeding cattle and ſheep, they are removed to fog (after-graſs); the paſtures, with the addition of the ſtubbles, remain ſtocked during the winter with ſtore ſheep or lean cattle; but the latter are, by many farmers, taken into the ſtraw-yard for the night. The herbage of the paſtures is, however, it is thought, thus completely deſtroyed before winter, and the land thus left naked is ſtarved, and the growth of moſs greatly encouraged, to the almoſt certain ruin of the graſs-land. An inſtance has not occurred in the courſe of the ſurvey, of the practice of preſerving a conſiderable part of the ſummer growth of graſs upon the land, for ſpring feed, a practice well worthy of attention. This winter clothing, it is ſuppoſed, enriches the ſwards, deſtroys the moſs, and, by keeping the roots of the graſs warm, cauſes an early vegetation in ſpring, when the ſcarcity of the herbage ſo much enhances the value of it. On farms, the ſoil of which is not adapted to turnips, this practice would, it is ſaid, be peculiarly beneficial."

"In March, the land intended to be paſtured the enſuing ſummer, is, or ought to be freed, and the ſtock put into the land intended to be mown, where they remain, until thoſe paſtures are broken up in the beginning of May.

"In the dales of the Moorlands, the lower lands only are adapted to meadow; conſequently, the land cannot be changed alternately from meadow to paſture, as may be practiſed in many other parts of the Riding; though there, as before noticed, the practice is not ſufficiently attended to. There are many inſtances of cow-paſture, which have been invariably ſummer-fed during ſeveral generations." See Pasture-*Lands*.

"The beſt farmers uſually paſture their new laid ground the firſt two years, and that chiefly with ſheep, as ſheep improve graſs more than any other kind of ſtock, both by their treading more lightly and uniformly, and by the dung and urine being more regularly diſperſed over the land. But the practice of eating them very bare during the firſt autumn and winter after ſowing, and alſo mowing them the firſt ſummer, is too prevalent; ſuch practices are, it is obſerved,

ſerved, the ruin of ſeeds Some, however, think that paſturing new laid-ground is moſt excellent management; the ſeveral graſſes, by being frequently cropped, become not only firmer in nature, but much more numerous. Stock, when paſturing new lands, ought to be often changed; if ever you over-eat, they will require ſome time to recover their uſual vigour. New laid-grounds ſometimes give ſheep the rot, particularly three or four years laid, on indifferent ſoil."

And the practice of ſhifting the ſtock from one paſture to another, of mixing different kinds of ſtock together in a due proportion in the ſame paſture, and under ſtocking with ſheep, paſtures deſtined for feeding larger cattle, ſhould always be particularly attended to.

It is ſtated in the Survey of Lincolnſhire, that "the rich grazing lands are the glory of that county, and demand a ſingular attention. The ſoil is a rich loamy clay, ſome very ſtiff, but of uncommon fertility, as may be ſeen by various inſtances. Some of the grazing lands in Long Sutton that were common, will carry five or ſix ſheep an acre, and four bullocks to ten acres. Mr. Scrope has there four acres, which carry 45 ſheep in ſummer, and muſt be *hobbed* often to keep it down. And on the graſs-lands in Deeping Fen, improved by paring and burning, Mr. Graves keeps five ſheep an acre from Lady-day to Michaelmas, and one and a half in winter, and a bullock of 60 ſtone to two acres beſides in ſummer."

And from ſome trials which were made by T. Fydell, eſq. in the grazing of neat cattle on the beſt ſort of ground in Lincolnſhire, and which are given below, Mr. Young is led to conclude, that 3*l.* an acre is the higheſt rent he has heard of in that county, and much higher than common, even for the beſt lands. This ſeems to confirm the idea he has entertained, that the rich grazing lands of this diſtrict are lower rented than ſuch or nearly ſuch lands in other parts of the kingdom. And further, that "the average weight of the beaſts was 70 ſtone, being of the York or Lincoln breed; the ſheep all Lincolns. The former bought in April or May, and all gone by the 11th of December; the ſheep are bought in May; they are clipped twice, and ſold fat in April or in May following; that there is little difference in ſeaſons, except that, after a bad winter, the ſheep are not ready for market ſo ſoon by a month as they are after good winters. The loſs in weight in driving to Smithfield is very little; the expence, beaſts 15*s.* 9*d.* ſheep 1*s.* 9½*d.* each. Mr. Fydell held for ſeveral years a piece of land in Skirbeck pariſh, which meaſured 21 acres, and kept, *communibus annis*, from Lady-day to Michaelmas, 19 heavy beaſts, and a 100 ſheep, and wintered fifty ſheep. And he now holds a paſture adjoining his garden, at Boſton, of eight acres, which keeps in ſummer ten oxen and forty ſheep, and winters thirty ſheep. But the fineſt grazing lands are at Boſton, Alderchurch, Foſdyke, Sutherton, Kirton, Frampton, Wibberton, and Skirbeck: theſe will carry, in ſummer, a bullock to an acre and a half, beſides four ſheep an acre; and two ſheep an acre in the winter ſeaſon."

It is ſtated that "the Rev. Mr. Berridge, of Alderchurch, has near his houſe forty acres of the rich graſs, upon which the ſtock is upon an average 300 ſheep, ſixteen fattening bullocks, three cows, four horſes, and carries through the winter three ſheep an acre. This land is valued at 40*s.* an acre. It is a vaſt ſtock. He favoured him with theſe particulars in the preſence of a dozen neighbours, and called in his manager to confirm it; it wanted, therefore, no after-corrections." And "in the grazing lands at Swineſhead, a beaſt an acre of 40 to 70 ſtone, and two or three ſheep; alſo two ſheep an acre in winter. Mr. Tindal, at Ewerby, which is on high-land, compared with Holland Fen, ſtocks a bullock to two and a half acres, and three ſheep per acre in ſummer, and two ſheep an acre in winter. And in the lordſhips of Horbling, Billingborough, Berthorp, Sempringham, Pointon, Dowſby, Dunſby, and Hackonby, there are extenſive tracts of rich grazing land applied to fattening bullocks and ſheep, carrying a bullock to two acres, and three ſheep per acre in ſummer; and two ſheep an acre in winter, which lands are generally rented at 30*s.* per acre. Mr. Elkington, of Howel, keeps one bullock and nine ſheep to three acres, and in the winter two ſheep an acre." But "Hanworth, north of Lincoln, is chiefly graſs which is fed by cows, calves, and young cattle. On the Lawn at Norton Place, which is heath-land, two couples per acre in ſummer; but the ſoil not adapted to permanent graſs without great exertion." And "there is a tract of paſture-land, which is of conſiderable extent north and ſouth, but very narrow eaſt and weſt, which lies in the vale between the heath and the Wolds. He viewed it from Norton Place in going to Owerſby, which is in it; the quality is good, but of the ſecond rate." And further, that "the graſs-land cloſe to Gainſborough lets at 4*l.* and 5*l.* an acre. The marſh graſs on the Trent and Knaith, &c. 20*s.* to 30*s.* and produces one and a half or two tons of hay an acre. The marſhes on the river are ſtocked from the 12th of April to the 12th of May; this of late has, however, been omitted, as they found the graſs hurt by it. Clear the hay by Lammas, one to one and a half ton an acre. Then turn in milch-cows, and afterwards other ſtock, till November. Rent 20*s.* but meaſure ſhort. And at Garthorpe, in marſh-lands, ſome rich grazing lands, which will carry a good bullock an acre, but no ſheep fed. This land is now let to break up at 3*l.* 15*s.* an acre for 14 years." But that "Mr. Heſſelden, at Barton, has four acres near the town; levelled and manured it after the allotment, and this year it feeds four cows: three of them joiſted at 3*s.* a week, a produce of 12 guineas. At Immingham and Stallenborough, there are ſome marſh-lands that will carry nine bullocks of 80 ſtone upon 12 acres, and 12 ſheep, and two ſheep per acre in winter; ſome has only one. But the ſame lordſhips have, it is remarked, clay paſtures that will not do any thing like this. And, at Thornton college, Mr. Uppleby has a few cloſes of extraordinary fine grazing-land, which will carry the largeſt bullocks, and it is worth, he thinks, 50*s.* an acre rent.

"The marſh on the coaſt of Grainthorpe, Saltfleetby, and Theddlethorpe, &c. is very good: it will keep three ſheep an acre, and an ox to three acres; and one ſheep and an half to an acre in winter. The hilly wold good paſtures on marl and chalk at Gayton, near Louth, will carry three ewes and three lambs *per* acre, and a ſprinkling of young cattle, &c. beſides; ſome only two ewes and lambs, beſides cattle, ſuch land as is worth 15*s.* to 20*s.* an acre. In the marſhes that are in the vicinity of Saltfleet and Sutton, there is ſome diſtinction, which it will be proper to note by pariſhes. In Northcots, the quality rather inferior, being chiefly for breeding. Mars Chapel, better, but ſtill weak; and for breeding alſo. In Grainthorpe, a great deal very good grazing land. Coniſholm, low, ſwampy, and but little good. Skidbrook, a great deal, and very good. South Somercots, the ſame; but 1000 acres of *ings*, or common meadow. The three Saltfleetby's 5000 acres, and a great deal very ſtrong and good for feeding beaſts. Some of the late Mr. Chaplin's marſhes here ſold ſo high as 77*l.* the ſtatute acre. In general, the meaſure ſhort from Saltfleet to Sutton, there ſtatute. In the Theddlethorpes, much very good; but ſome low, and not well drained. Marblethorpe, very good. Sutton, remarkable good and ſtrong feeding land.

"In theſe marſh pariſhes, the rich grazing ground of the firſt quality lets at about 40*s.* an acre, and the reſt about 30*s.* Such as will not feed, but only breed, at 20*s.* to 25*s.*; and this diſtinction of feeding and breeding is here alſo expreſſed by ſaying, that one ſort of marſh will feed ſheep; but the other, keep them in holding order, will make them hold the fleſh they have got, but not fatten profitably. If the beſt of theſe lands are compared with the grazing diſtricts of Boſton and its vicinity, it was remarked to him, that theſe are more naturally good, and much better watered: they have at all times plenty of freſh water here, which is a great object; but for artificial fertility, locality to fairs and markets, &c. the Boſton lands are much ſuperior. The meaſure at Boſton, &c. is here ſaid to be more than an acre; here leſs, not more than three roods, and the *ing* land ſtill leſs. On ten acres, at Skidbrook, eight beaſts and ſixteen ſheep have been ſummered, and the ſheep wintered alſo. And, in general, the marſh that lets from 30*s.* to 40*s.* will carry a beaſt to two acres, and two ſheep an acre; but, perhaps, he ſays, more generally one and a half ſheep."

With reſpect to the profit of grazing the beſt land, it is ſtated in this manner:

Statement.

	£.	s.	d.
A beaſt bought at 20*l.* to two acres, at the profits of 5*l.* - - - - - -	2	10	0
Two ſheep *per* acre, bought in at 45*s.* and ſold at 55*s.* - - - - -	1	0	0
Four fleeces at 9½*lb.* 38*lb.* at 8*d.* - -	1	5	4
	4	15	4

Expences.

	£.	s.	d.
Rent - - - - -	2	0	0
Tithe - - - - -	0	1	0
Rates - - - - -	0	3	6
Dyke-reeve - - - -	0	0	9
	2	5	3
Shepherding - - - -	0	1	0
Waſhing and clipping - - -	0	0	6
Incidents - - - - -	0	0	6

Capital employed.

	£.	s.	d.	£.	s.	d.	£.	s.	d.
Beaſts -	£.20	0	0						
Sheep -	4	10	6	1	6	6			
	24	10	6						
A year's rent	2	0	0						
	26	10	6				3	13	9
At 5*l. per cent.*						Profit -	1	1	7

Here the total intereſt made is about 9*l. per cent.* on the capital of 26*l.*, and this ſeems to be rather inadequate, for there is nothing for loſſes, which, in a courſe of time, muſt be ſomething conſiderable. The intereſt made ought to be, at leaſt, 10*l. per cent.* after a proper deduction for loſſes. Either, therefore, the land carries more ſtock, or it is too highly rented. Grazing is accounted a profitable profeſſion; but when it is conſidered that this 26*l.* capital would ſtock five acres of good arable land, and that they could not be reckoned to pay a leſs profit than from 12*s.* to 15*s.* an acre, from 3*l.* to 4*l.* 5*s.* it will appear that the plough is much more beneficial than ſuch grazing calculated in this way.

Mr. Kerſhaw, of Driby, and Mr. Bourne, of Haugh, agree in the following marſh account for land there at 35*s.* the acre.

Produce.

	£.	s.	d.
Two ſheep at 10*s.* the ſummer - - -	1	0	0
Two ditto in winter - - -	1	0	0
Half the profit on an ox - - -	1	13	4
	3	13	4

Expences.

	£.	s.	d.
Rent - - - - -	1	15	0
Tithe - - - - -	0	3	0
Rates and dyke-reeve - - -	0	8	0
Shepherding - - - -	0	1	0
Cutting thiſtles and dreſſing - -	0	2	0
Ditches, folds, &c. - - -	0	0	6

Intereſt of Capital.

	£.	s.	d.	£.	s.	d.
Bullock, half	£.6	0	0			
Two ſheep	3	0	0			
Rent -	2	0	0	0	11	0
	11	0	0			
Going to look at ſtock				£.0	0	6
				3	1	0

	£.	s.	d.
Produce - -	£.3	13	4
Expences - -	3	1	0
Profit	0	12	4

The groſs intereſt rather better than 10*l. per cent.*

Mr. Parkinſon, of Reeveſby, obſerved, that the rich marſhes were better managed, and in better order, twenty years ago, than they are at preſent; the wold farmers had not then got ſuch poſſeſſion of them, and they were in the hands of reſident graziers, who attend much more to *hobbing*, which kept them fine; for nothing hurts marſh land ſo much as letting it run coarſe, from permitting the graſs to get a head. And he calculates an acre of rich marſh in Wrangle, &c. thus,

Expences.

	£.	s.	d.
Rent - - - - -	£.1	16	0
Tithe - - - - -	0	0	0
Rates - - - - -	0	6	0
Shepherding - - - -	0	1	0
	2	3	0
Dyke-reeve - - -	0	0	8
Ditches, folds, and gates - - -	0	0	6

Intereſt of Capital.

	£.	s.	d.	£.	s.	d.
2 Shearlings	£.5	0	0			
Bullock to two acres 20*l.*	10	0	0	£.0	17	0
Year's rent	2	0	0			
	17	0	0			
				3	1	2

Produce.

	£.	s.	d.	£.	s.	d.
Improvement of 2 ſheep, 4 fleeces, 3 to a tod, 1^{1} tod				1	6	8
Difference in price 10*s.*				1	0	0
				2	6	8
Loſſes 5*l. per cent.*				0	2	4
				2	4	4
Bullock, profit about 4*l.*	£.2	0	0			
Loſſes one-fortieth	0	1	0			
				1	19	0
				4	3	4
Expences				3	1	2
Profit *per* acre				1	2	2

Or total intereſt 11*l.* 5*s.* 6*d. per cent.*

In the hundred of Skirbeck, the paſture conſiſts of three ſorts in point of rent, &c. the higheſt at about 45*s.* being from 32*s.* to 50*s.* The ſecond from 26*s.* to 32*s.* average 28*s.* The third, average 1*l.* 1*s.* Beſides this a ſmall quantity of open meadow, called *ings*, average about 18*s.* The beſt kind of paſture is chiefly ſtocked with ſhearling wethers, bought at the ſpring market at Boſton, which, having yielded two fleeces of wool, are ſold off eaſily in the next year; and by beaſts in the ſummer, ſold in autumn; ſome kept on farther in eddiſh, but all gone in the winter. The ſecond beſt is chiefly fed by young beaſts and hogs, kept on to ſhearlings: theſe are well kept, as their value materially depends on it; there are alſo ſome few breeding ſheep on this diviſion of the paſture. The third claſs is chiefly mown. But it is to be noted that all theſe particulars relate to an acre larger than ſtatute meaſure, about 4¾ roods."

"The firſt diviſion is ſtocked at the rate of three ſheep per acre, winter and ſummer, with the overplus of ſome bought in the ſpring, and not cleared from the land till ſome months later than the time at which they are bought. The beaſts are in proportion, on an average of ſeven to ten acres, from 54 to 100 ſtone. The ſecond claſs winters about five ſheep to two acres, with not leſs than four per acre in ſummer, with a few cows and young beaſts; and on both theſe there will be ſome few horſes, too uncertain to average. On the beſt land, they are chiefly horſes making up for ſale; and, on the ſecond quality, horſes employed in work, or young ones; it is not uſual to keep any horſes in ſummer except on the paſtures. The produce of hay on the third may be about 35*s.* an acre; the eddiſh eaten by cattle from the other grounds; or by lambs or hogs, before they go to their winter keeping.

Grazing Account of ten Acres of the firſt Quality.

Expences.

	£.	s.	d.	£.	s.	d.
"Rent				22	10	0
Tithe, 3*s.*				1	10	0
Town charges.						
Poor and conſtable, &c.	0	2	7			
Church	0	0	3			
Highways	0	0	5			
In the pound	0	3	3			
				3	12	9
				27	12	9
Dyke-reeve, 5*d.*				0	4	2
Shepherding. 2*s.* 6*d.* an acre				1	5	0
Fences, 1*s.*				0	10	0
				29	11	11
Intereſt of capital						
Seven oxen, at 14*l.*	98	0	0			
Thirty ſheep, 45*s.*	67	10	0			
Enters at Lady-day, but a year's charges	27	0	0			
Surplus neceſſary, becauſe of ſheep unſold at time of purchaſe	18	0	0			
	210	10	0			
Intereſt at 5*l.*				10	10	6
Loſſes on ſtock very little indeed, 1*l.* per cent. will probably cover it				2	2	0
Cutting thiſtles, hobbing equal to it, ſtock as above				165	10	0
				207	13	11
Incidents				5	0	0
				212	13	11
Profit				15	16	1
				228	10	0

Produce.

	£.	s.	d.
Seven beaſts, at 2*l.* 10*s.*	121	10	0
Thirty ſheep, at 54*s.*	81	0	0
Sixty fleeces, at 8*s.*	24	0	0
A horſe, twelve weeks	2	0	0
	228	10	0

Per acre 1*l.* 11*s.* 6*d.* profit.
Produce 6*l.* 6*s.* 0*d.* per acre."

The writer hints that the profit upon this firſt claſs of land is greater than upon the reſt; and that the third ſort yields very little profit by grazing, and would pay much better in tillage. There are many graziers there, who have no other land than what is upon theſe flats, and ſome who are ſuppoſed to have made by their buſineſs enough to have realized a comfortable ſubſiſtence. The grazing accounts of certain fields in the occupation of Mr. Loft, of Maſh Chapel, are ſtated in this way :

Expences.

“ Rent	£1	15	0
Tithe	0	2	0
Rates	0	3	0
Shepherding	0	1	0
Intereſt of capital	0	12	0
	2	13	0

“ It carries a bullock to two acres, and three ſheep per acre.

Produce.

“ Half a bullock	£1	10	0
A ſheep and half	1	10	0
	3	0	0
Expences	2	13	0
Profit	0	7	0

Of better land.

Rent	£2	5	0
Sundries	0	7	0
Intereſt of capital	1	4	0
	3	16	0

It carries a bullock and three ſheep an acre.

A bullock	3	0	0
Three ſheep	3	0	0
	6	0	0
Expences	3	16	0
Profit	2	4	0

It is however ſtated, that very few fields will yield any thing like this: he has but one cloſe; and there are ſome expences omitted. And “ Mr. Tenniſon, of Lincoln, has 13 acres of marſh at Grimſby, that ſummer-feeds 14 bullocks; and carries 35 ſheep the year through.” But that “ in the tract of marſh-land on the ſea-coaſt, they obſerve, that where moſt graſs is left in autumn, there the herbage is the coarſeſt and worſt next year; the remark was made in anſwer to recommending eddiſh for ſpring-feeding ſheep, which would not do on rich marſh, though it might on uplands.” It alſo ſhews, that the ſyſtem of cloſe feeding is proper, and would anſwer well in many diſtricts where it is not the practice.” And “ in the hundred of Skirbeck, they like to have a tolerable head of graſs in the ſpring, before turning in; and afterwards ſo to ſtock as to prevent its getting coarſe by running away, ſo as to prevent the neceſſity of hobbing, which, however, muſt be done in a wet growing ſeaſon.”

But after the ſtock has been brought into a proper ſtate for the market, there is in many ſituations much difficulty in diſpoſing of it to the beſt advantage. Mr. Marſhall has remarked, that though it be attended with leſs difficulty than that of buying in the ſtock, it requires much knowledge, as well as experience, to execute it in the beſt manner, or with the leaſt poſſible loſs. A due conſideration of the progreſs of the ſtock while feeding, and of the length of time they have been upon the land, may afford ſome ſort of guide in the buſineſs; but the moſt correct judgment may be formed by the young grazier, by the practice of frequent weighing, and the accurate compariſon of the living with the dead weight of ſuch ſtock as are killed in his neighbourhood, as it is a much more certain method than the uſe of the eye and hand, as has been ſhewn under the head GRAZIER. Having recourſe to frequent weighing has alſo the advantage of ſhewing the progreſs that is made by animals under different ſorts of keep or food. But beſides this, the grazing farmer muſt be regulated in the ſale of his ſtock by the nature of his ſituation. In moſt of the midland and ſouthern parts of the kingdom, Smithfield is the place where the fat ſtock of the farmers are diſpoſed of: while in other parts, they are frequently ſold in the neighbourhood, or to the large towns which are at no great diſtance. In the former caſes, eſpecially on the leſs extenſive farms, the fat ſtock are brought up by perſons, who make it a buſineſs, being employed by various graziers in the ſame vicinity, who have an entire confidence in them. With the more extenſive graziers, who ſend up frequent lots, the buſineſs is done by a ſaleſman, in whom they have confidence. With little grazing farms, the cuſtom is often to ſell them to the butchers in the neighbourhood, which is frequently the beſt method. And the advantages of theſe different modes muſt depend greatly upon circumſtances. Some, however, ſuppoſe that the London market is the beſt calculated only for thoſe who give a weekly attendance, on account of the uncertainty of the ſupplies. The expences being materially different, as with the ſaleſman's commiſſion, they frequently amount to twelve ſhillings a head there, while in the country they are not more than from three to five. Conſequently, that fat ſtock may in many caſes, where only a few, or what are termed ſmall lots, are to be diſpoſed of, be ſold at home with leſs expence than having them ſent to diſtant markets; but that with large lots, the latter mode muſt be had recourſe to, as more certain, expeditious, and convenient. Upon the whole, the facts which have been ſtated fully ſhew that the advantages of the grazing ſyſtem muſt be materially different under different circumſtances, and be greatly influenced by thoſe of a local kind. It has indeed been remarked by a Kentiſh grazier, that the profits of no two grazing farmers are exactly “ alike on the ſame given quantity of land,” nor even on the ſame land, as years, prices, as well as the exertions and talents of each individual, are different. In all caſes, the ſuperiority of the ſucceſs muſt in a great meaſure depend upon the knowledge, exertion, and excellence of the method which is adopted by the particular farmer. Statements can of courſe only ſhew what are the general profits of the ſyſtem. With neat-cattle, in the weſtern and midland diſtricts, they are given by Mr. Billingſley, and Mr. Young, in the Surveys under the direction of the Board of Agriculture. In this way, the former ſays, that a grazing farmer who has 200 acres of land, may fatten annually one hundred head of cattle, as oxen, with ſeventy ſheep and ten colts, which together may afford a comfortable but not exorbitant profit to him.

Statement.

Dr.	£.	s.	d.
To rent of 200 acres, average value 40*s.* an acre - - - -	400	0	0
To tithe and taxes, ſay - -	50	0	0
Feb. To fifty oxen, at 11*l.* - -	550	0	0
July. To fifty oxen, at 7*l.* - -	350	0	0
To mowing and making fifty acres of hay, at 10*s.* - - - - - -	25	0	0
To ſkimming and making fifty acres of ſummer-leaze, at 3*s.* - - -	7	10	0
To wages throughout the year, beſides the farmer's labour - - -	50	0	0
To accidents - - - -	20	0	0
	1452	10	0
To profit (intereſt of capital and accidents included) - - -	277	10	0
	1730	0	0

Cr.	£.	s.	d.
Oct. By fifty oxen, at 18*l.* - -	900	0	0
May. By fifty oxen, at 13*l.* - -	650	0	0
By profit on ſeventy ſheep, ſummer kept -	40	0	0
By profit on ten colts - - -	40	0	0
By profit on two hundred ſheep winter fatted, and ſold in April unſhorn - -	100	0	0
	1730	0	0

And on the rich grazing lands in Lincolnſhire, according to the latter writer, the practice ſeems to afford a much greater advantage to the farmer; as the account, given by T. Fydell, eſq. M. P. for twenty acres, in 1796, ſtands thus:

Statement.

Dr.	£.	s.	d.
To 18 beaſts, at 12*l.* each - -	216	0	0
To 80 ſheep, at 46*s.* - - -	184	0	0
	400	0	0

Expences, viz.	£.	s.	d.	£.	s.	d.
Tithe - - -	1	10	0			
Dyke-reeve - -	3	0	0			
Rates - - -	10	0	0			
Shepherding - -	3	0	0			
Expences - -	5	0	0			
				22	10	0
Loſs, ſuppoſed one ſheep - -				2	6	0
				424	16	0
Intereſt one year - - -				21	4	0
One year's rent - - -				60	0	0
				506	0	0
Hire of a cloſe for the winter, for 35 ſheep - - - -				17	10	0
				523	10	0
Profit - - - - -				87	4	0
				610	14	0

Cr.	£.	s.	d
By 18 beaſts, at 19*l.* 5*s.* - -	346	10	0
By 80 ſheep, at 55*s.* - - -	220	0	0
By 52 tod of wool, at 17*s.* - -	44	4	0
	610	14	0

And that "the difference between the buying and ſelling price, loſs deducted, 208*l.* 8*s.*, is the produce of the land, or 10*l.* 8*s.* per acre, which is very great indeed, and ſhews that this land would let at 5*l.* 4*s.* an acre, ſuppoſing this year to be an average one.

"This difference of rent would deduct 44*l.* from the profit of 87*l.* and leave 43*l.* which, with 21*l.* charged, make 64*l*; intereſt on the year's advance of 546, or 11½ per cent."

But in the ſyſtem of grazing purſued in ſome of the ſouthern rich marſhy diſtricts with ſheep, as ſtated ſome time ago, the amount ſtands as below, according to Mr. Price; but at preſent the profit muſt be much higher, from the improved management of the Romney Marſh graziers in general.

Account of Stock bought in for Fifty Acres of Paſture Land, for the Year 1778.

	£.	s.	d
310 barren ewes, at 1*l.* 1*s.* each - -	325	10	0
90 South Down wethers, at do. -	94	10	0
10 ſteer runts - - - -	98	15	0
10 Suſſex oxen - - -	115	0	0
8 Steer runts - - -	49	10	0
Rent, at 30*s.* per acre - -	75	0	0
Expences, at 5*s.* per acre - -	12	10	0
	770	15	0

Stock ſold off Fifty Acres of Paſture Land, in the Year 1788–89.

	£.	s.	d.
310 barren ewes, at 31*s.* each -	480	10	0
90 South Down wethers, at do. -	139	10	0
10 ſteer runts, at 13*l.* each - -	130	0	0
10 Suſſex oxen, at 15*l.* each -	150	0	0
10 ditto, to keep 18 weeks, at 2*s.* per week each - - -	18	0	0
8 ſteer runts, ſold at 9*l.* each -	72	0	0
2 ditto, to keep 12 weeks, at 1*s.* 6*d.* per week each - - -	1	16	0
8 packs 3 draughts of long wool at 8*l.* 10*s.* - - - -	74	7	6
1½ ditto of fine wool, at 12*l.* -	18	0	0
Total - -	1084	3	6
Deduct - -	770	15	0
Clear profit -	313	8	6

Profits on Fatting Land, allowing 10s. for each Sheep.

One acre.	£.	s.	d.
Winter, 2 barren ewes, off in May -	1	0	0
Summer, 5 wethers, off at Michaelmas -	2	10	0
Wool of 7 ſheep, at 12*l.* per pack	2	2	0
One bullock to fat - -	3	0	0
	8	12	0

	£.	s.	d..	£.	s.	d.
Brought over -				8	12	0
Rent - -	1	10	0			
Expences -	0	5	0			
Aſſeſſes and taxes	0	5	0			
				2	0	0
Clear profit - -				6	12	0

One acre.

	£.	s.	d.
Three wethers, on at Michaelmas	1	10	0
Two ditto, in May -	1	0	0
Wool - - -	1	10	0
One bullock to fat - -	3	0	0
	7	0	0
Rent, &c. as before - -	2	0	0
Clear profit - - -	5	0	0

Profits on Breeding Land.

One acre.

	£.	s.	d.	£.	s.	d.
Winter; 2½ ewes and 3 lambs, at 14*s.* - -				2	2	0
Wool of 2½ ewes - -				0	13	0
Wool of 3 lambs - -				0	4	6
Wool of one teg - -				0	4	0
The ſummer improvement of do. -				0	5	0
Joiſt bullock keep - -				0	10	0
				3	18	6
Rent - - -	1	0	0			
Expences - -	0	5	0			
One in twenty loſs by deaths	0	7	0			
				1	12	0
Clear profit - - -				2	6	6

It is remarked, "on the firſt of theſe ſtatements, that the year was favourable for vegetation; and that ſuch profits could not probably be made ſeven years together, which is the moſt accurate method of calculating profits on land. There being no aſſeſſes on the land, alſo, makes it more profitable." And further, that two modes in reſpect "to the profits on fattening land are ſtated; the firſt uſed by the beſt graziers; the other, the moſt common: ſome take bullocks in to keep, others buy runts; the profits of which muſt depend on their judgment; but 3*l.* is the medium profit between the whole: 10*s.* each ſheep is generally allowed as the gained profit by fattening." It is added that "it cannot be ſuppoſed that this profit will always amount to ſo much as the years differ; therefore dry ſeaſons will abate it, and a large tract of land cannot have the ſupply of ſtock to make it ſo great. There are loſſes to be taken out; but, upon the whole, it is very profitable, as the expences are ſo moderate, that one ſervant-man can manage a thouſand acres of paſture-land. The value or rent of land is put too low, except for long leaſes unexpired, or where a large quantity of land is taken. The average price of rent is from 40*s.* to 3*l.* for fattening land, unleſs four or five hundred acres of breeding and fattening, perhaps about 30*s.*; and ſome old leaſes 1*l.* breeding land."

It is ſtated that where ſheep, in order to fatten them in a more expeditious manner, or to finiſh them in caſes where the graſs is inſufficient for the purpoſe, have the addition of turnips or other ſorts of luxuriant green food, great care ſhould be taken, by the grazier, that a due proportion of ſome ſort of dry material be had recourſe to at the ſame time; as without ſuch precaution, not only loſs may be ſuſtained by the death of ſome of the ſheep in particular inſtances, but by their making leſs progreſs in becoming fat than would otherwiſe be the caſe. Hay, cut chaff, bran, or a few oats, anſwer the purpoſe very well. See SOILING.

It is neceſſary, in order that the conſumption of theſe ſorts of food may be conducted in the moſt economical manner, that proper troughs, racks, cribs, or baſkets, ſhould be provided, and fixed in ſuch a way, as that they cannot be overturned. The graziers, in ſome parts of Lincolnſhire, have a large ſort of crib or wicker-work baſket, being eight or ten feet in circumference, and wattled to the height of one foot or a foot and a half, in a cloſe manner, and then left open for about a foot and a half; after which it is cloſely wattled again for nearly a foot, being drawn in, in a narrowing manner at the top, ſo as to have only proper room for introducing the food. The ſtuds or ſtaves are placed about eight or ten inches apart, which admit of the ſheep feeding in a diſtinct manner. It is deſcribed in the fourth volume of the firſt ſeries of the Repertory of Arts, &c. and denominated a *tumbril.* It may be ſeen at *fig.* 8. in the *Plate on Granaries.* This contrivance affords much advantage, both in the ſaving of food from being waſted, and in affording the leſs ſtrong ſheep an opportunity of feeding without being diſturbed or driven away by the ſtrong ones, and conſequently much injured.

In the Rural Economy of the Midland Counties, it is noticed in reſpect to the practice of grazing in ſuch ſeaſons as are very wet, that an incident of this ſort that occurred to the writer in the very wet autumn of 1789 is intereſting. "The general complaint is, that grazing ſtock, though they have this year rolled in graſs, have not done well; Mr. Henton, of Hoby in Leiceſterſhire, being ſingular in ſaying, that his feeders had done tolerably. Indeed his ſtock corrobates his aſſertion. He had a lot of cows at Loughborough, the 12th of Auguſt, the fatteſt in the ſhow.

"But his management is more remarkable than his ſucceſs." He "foddered them with hay all the wet weather; that is, he mowed the broken graſs for them, beginning under the hedges, and continuing to mow the coarſeſt patches throughout the piece.

"The firſt day (the day it was mown), the cattle ſeldom touched it; but the ſecond or third day they fell to it freely, eating it "between whiles," in preference to graſs. In the morning, it was always the firſt thing they filled their bellies with.

"The cattle having eaten up the more palatable parts of the herbage, the thiſtles, and other offal, were raked up, and carried off the ground: moſt excellent management!

"This ſtock conſiſted of about ſixty head. At firſt one man only was employed in mowing, &c. But, before the rainy weather ceaſed, he ſet on another man.

"What an admirable thought! that which other men ſuffered to ſtand waſte in itſelf, an encumbrance to the ground, and a nurſery of weeds, was converted to food, more nutritious, in a wet ſeaſon, than the beſt of the ſtanding herbage."

Mr. Parkinſon, of Lincolnſhire, had made a practical obſervation, which is, that "the leſs ſheep are changed, the better." It demands the farmer's attention, as ſhewing the injury of folding in many caſes. And it is noticed, that the grazing cattle are changed while the buſineſs of *hobbing* the fields is performed, and that the ſooner this is executed the better; as when the graſs tufts are cut while young, the cattle will eat the produce well.

Upon the ſubject of ſtocking grazing land, Mr. Marſhall remarks, that "the fairs at Birmingham are among the worſt in the country for fat ſtock, the butchers giving the graziers no encouragement to drive their ſtock to them, preferring the toil of riding twenty, thirty, or perhaps forty, miles from home to pick up their "fat!" ſpending a principal part of their time and their profits in an employment truly ridiculous. How convenient it would be to the grazier, as well as to the butcher, to have a weekly market, a Smithfield at or near Birmingham! to the grazier, in thereby having a conſtant and certain market whenever he wanted either keep or money; and, to the butcher, in ſaving time and travelling expences. Yet the few animals which are taken there at preſent, are frequently drove out unſold. But Thurſday, which is the ordinary market-day, is improper. Monday or Tueſday would be a more ſuitable day; and Sutton, perhaps, the moſt ſuitable place. In performing the buſineſs of purchaſing in ſtock, the neareſt fairs are always to be preferred, if it can be done there with propriety; as much injury and loſs is frequently ſuſtained by driving from a conſiderable diſtance.

And the buſineſs of grazing other ſorts of animals may, in ſome caſes, be a profitable concern, but muſt always be regulated by the nature of the land and circumſtances of the farmer. Where he has a conſiderable extent of the more coarſe ſort of paſture-land, he may often find it advantageous to graze young horſes, eſpecially where he has the convenience of breeding them likewiſe. But though it is a practice ſometimes followed by grazing farmers, to admit horſes in the ſame paſtures with the other ſtock, it ſhould conſtantly be avoided as much as poſſible, as they are very injurious by teazing and driving the fattening cattle about, and preventing their reſting ſo much as is otherwiſe the caſe. It is a better method to let them follow this ſort of ſtock. When horſes are admitted upon the grazing lands in Somerſetſhire, it is ſeldom done in a larger proportion than that of one to twenty acres. But there is another animal which it has long been a practice in particular ſituations to graze. This is the hog, which, where the farmer has a piece of rich graſs, either of the artificial or natural kind, he may turn upon it with much advantage. With clover, and ſome other artificial graſſes, the animals are found to ſucceed perfectly well in this ſort of management; but it is objectionable as loſing a vaſt ſource of manure of an excellent kind. When the field is ſo ſituated as that the hogs can return in the evenings to the well littered ſties, it may, however, be a highly beneficial ſyſtem of practice. There can be no doubt but that this ſort of management might be much more extenſively employed with this animal, and that thereby much of the food of ſtore pigs might be ſaved. See Hog.

GRAZIOSO, *Ital.* *Gracieuſement*, *Fr.* graceful, are terms in *Muſic*, addreſſed to the performer; but if the compoſition is devoid of *grace*, the term can convey no inſtruction to the performer. It is in vain for the compoſer to ſit down with a reſolution to compoſe a *graceful* movement; it muſt come unſought, and inſenſibly.

Marmontel has defined grace in poetry, grace in attitudes, grace in motion, grace in the arrangement of words in proſe, of figures in painting, as a poliſh, a lacquer, a varniſh, a gilding to every human action; without which we may be ſurpriſed and entertained, but never perfectly pleaſed.

No poet, perhaps, abounds in grace and facility ſo much as Metaſtaſio; for examples, ſee his cantatas.

Among muſical compoſers, perhaps, none have been more gifted with this charm than Pergoleſi, Sacchini, and Cimaroſa.

The time of a gracioſo movement is nearly the ſame as *andante*; ſmooth, gentle, and inclined to piano; no coarſe ſtrokes of the bow on the violin, or dry *coups de langue* on the G flute, except, to vary the expreſſion and effect, the compoſer indicates the contrary.

GRAZZANO, in *Geography*, a town of Italy; 13 miles S.S.W. of Verona.

GRAZZINI, Gio. Paolo, of Ferrara, in *Biography*, left the profeſſion of goldſmith to become a painter at an advanced period of his life; his chief inſtructions he owed to the friendſhip of Carlo Bonone. The firſt ſpecimen of his capacity was a picture of St. Eligio placed in the goldſmith's hall of Ferrara. Eight years which he had employed to finiſh the work were amply redeemed by the diſplay of a maſter-hand, and a tone of colour that placed him near in rank to Pordenone, and aſtoniſhed all Ferrara, who had known Grazzini for half a century. He continued to produce works of leſs compaſs, but of equal taſte, which are met with in private collections. He died in 1632. Fuſeli's Pilkington.

Grazzini, Anthony-Francis, ſurnamed *Il Laſca*, an Italian writer, was born at Florence in 1503, and is known to poſterity as a conſiderable writer in proſe and verſe. He is particularly remembered for his light and jocoſe poems, among which are many of the Canti Carnaſcialeſchi, or Carnival Songs. Theſe, it is ſaid, were firſt invented by Lorenzo de Medici, and a collection of them was publiſhed by Grazzini at Florence in 1559. His other works are as follow: "La Guerra de Moſtri, poema giocoſo," 1584. "Stanze," &c. "Comedie VII.;" "Il Laſca, Dialogolo," &c.; "Lettere," "Orazione," "Rime," Novelle XI. The laſt was an extremely popular work, and as a noveliſt Grazzini was thought to be a worthy rival of Boccace in the elegance of his narration and purity of his ſtyle. He was one of the founders of the academy Della Cruſca. Moreri.

GREASE, among *Farriers*, &c. an inflammation and ſwelling of the heels about the fetlocks, and ſometimes of the legs of a horſe, as high as the knee or hock, with the ſecretion of an oily matter, to which the diſeaſe owes its name. The matter diſcharged from the heels has a peculiar offenſive ſmell, and the heels themſelves are ſometimes ulcerated. Heavy horſes, with round fleſhy legs, are the moſt ſubject to this diſorder, and the white legs more than the reſt. It is almoſt always found in the poſterior extremities. Greaſe is occaſioned by ſudden changes from a cold to a hot temperature, ſuch as the removing of horſes from graſs into hot ſtables; from the too ſudden change of a generous to an impoveriſhing diet; from neglect on the part of grooms in leaving the heels wet and full of ſand; and from conſtitutional debility. On the approach of this diſeaſe, and for ſeveral days before any very conſiderable appearances of ſwelling and inflammation, the animal ſeems to feel much pain in the affected heel, which is indicated by his raiſing it frequently from the ground, and his not being able to reſt upon it without uneaſineſs. At this early period, the diſorder may in general be removed by a poultice of boiled bran and linſeed powder conſtantly applied to the part, and kept moiſt with warm water; giving every night, or every ſecond night, a mild diuretic. When the inflammation and ſwelling are conſiderable, the fore-mentioned poultice may be uſed, and a ſtrong diuretic, or a purgative may be adminiſtered as long as the caſe ſeems to require it. When the ſwelling and inflammation have abated, which will commonly happen in three or four days, the poultice may be diſcontinued, and the following aſtringent lotion may be applied five or ſix times a day. Forms of aſtringent lotion, *viz.* No. 1. Alum powdered, 1 oz., vitriolic acid, 1 dr. and water, 1 pint. No. 2. Alum powdered, 4 oz., vitriolated copper, $\frac{1}{2}$ oz., and water, $1\frac{1}{2}$ pint. No. 3. Sugar of lead, 4 oz., vinegar, 6 oz., water, 1 quart. In each of theſe recipes mix the ingredients. Some alteration may be neceſſary, according to circumſtances, in the ſtrength of theſe lotions. Where the inflammation and irritability of the part are conſiderable, they muſt be diluted with an equal quantity of water; but if the inflammation be ſubdued, and a ſwelling and ulceration remain, the alum ſolution cannot be made too ſtrong. If the heels be ulcerated, and eſpecially if they appear foul and have an offenſive ſmell, one or other of the following aſtringent ointments ſhould be applied to the ulcers, *viz.* No. 1. Hog's lard, 4 oz., oil of turpentine, 2 dr., and water of acetated litharge, $\frac{1}{2}$ oz. No. 2. Venice turpentine, 1 oz., hog's lard 4 oz., and alum finely powdered, 1 oz. Mix the reſpective ingredients. If the ulcers be deep, and do not readily heal, they ſhould be waſhed with the detergent lotion previouſly to each dreſſing. Regular exerciſe on clean and dry ground is of the higheſt importance. In ſlight caſes of greaſe, the aſtringent lotion and a few diuretic balls will generally effect a cure; but if the diſeaſe is of long ſtanding, and more eſpecially if the horſe has had it before, it will be more difficult to remove it. In ſuch caſes an alterative powder, compoſed of powdered reſin and nitre of each 4 ounces, mixed and divided into 8 doſes, ſhould be given in the corn every day, until it produces a conſiderable diuretic effect. In very obſtinate caſes, rowels in the thigh have been found uſeful. Digitalis, or fox-glove, has been recommended in thoſe ſwellings of the legs which are the conſequences of greaſe; but as this is a violent medicine, and apt to injure the ſtomach, it ſhould be cautiouſly adminiſtered; the doſe is from half a dram to one dram. When a horſe has ſuffered much from this diſeaſe, and appears to be weak and out of condition, a liberal allowance of corn will tend to recover him, eſpecially if it be aſſiſted by the aſtringent lotion, and careful grooming. In caſes of this kind exerciſe is indiſpenſible. When the diſeaſe depends upon debility it is obvious that a doſe of phyſic would be improper; but conſiderable benefit has ſometimes attended the exhibition every morning, till the bowels are moderately opened, of the following alterative; *viz.* ſoccotrine aloes, 1 oz., caſtile ſoap, $1\frac{1}{2}$ oz. powdered ginger and myrrh, of each $\frac{1}{2}$ oz. Form theſe into a maſs with ſyrup, and divide it into ſix balls. This medicine, though of an opening quality, will improve the horſe's ſtrength, and at the ſame time promote abſorption. Or the following preparation may be adminiſtered: *viz.* antimony, finely powdered, and flowers of ſulphur, of each 6 oz.; linſeed powder, 2 oz.; and honey ſufficient to form a maſs for 12 balls; one of which may be given once or twice a-day.

Nothing tends ſo much to prevent greaſe and ſwelling of the legs as frequent hand-rubbing, and cleaning the heels carefully, as ſoon as a horſe comes in from exerciſe. In inveterate caſes of greaſe, where the diſeaſe appears to be in ſome degree habitual, a run at graſs is the only remedy. If a dry paddock can be procured where the horſe may be ſheltered in bad weather, it will be found very convenient; for thus circumſtanced the horſe may perform his uſual labour, and be kept free from the complaint. In the earlier ſtages of the diſeaſe, the practice of turning the horſe into a ſalt-marſh is ſerviceable: and a few months' run on a ſalt-marſh has frequently eradicated the diſorder, when other remedies have failed. Obſtinate caſes of greaſe may very frequently be cured by withholding the horſe's allowance of water for two days, or even a longer time, and then riding him into the ſea or ſalt water, when his thirſt will induce him to drink freely; and the ſalt water will act as an uſeful laxative and alterative. This proceſs muſt be frequently repeated, whenever it does not appear to be injurious in any material reſpect. In a few obſtinate caſes, Mr. White ſays, (Treatiſe on Veterinary Medicine,) that he has ſeen the mercurial alterative of ſervice, giving one ball every morning, until the bowels are opened: it is formed of calomel, $\frac{1}{2}$ dr., aloes, 1 dr., Caſtile ſoap, 2 dr., and oil of Juniper, 30 drops, made into a ball with ſyrup for one doſe. In the treatment of thoſe ulcers, or "cracks," as they are often termed, which particularly occur in the back part of the paſtern, and which are of difficult cure, cleanlineſs is of great importance; and when they appear inflamed and painful, it will be uſeful to apply a ſoft poultice, in which a little Goulard has been mixed, for two or three days. The following ointment, *viz.* freſh hog's lard, 4 oz. and white lead finely powdered, 1 oz. mixed, may then be applied, ſpread on tow, and ſecured with a light thin bandage. If cracks or ulcers appear in the heels, without that general ſwelling of the legs and diſcharge of matter, which conſtitute the diſeaſe named greaſe, they may be ſoon cured by applying the aſtringent ointment, and giving a few doſes of diuretic alterative: but when theſe are accompanied by the greaſe, laxatives or purgatives are proper, according to the condition of the animal. The aſtringent ointment is made of hog's lard, 4 oz. palm oil, 2 oz. and fine olive oil, 1 oz. melted by placing the pot which contains it in boiling water, and, when melted, ſtirring in $1\frac{1}{2}$ oz. of the water of acetated litharge, and continuing to ſtir it till the mixture is nearly cold. If the ulcers are deep, the horſe ſhould be kept in the ſtable till they are nearly healed, with a cooling opening diet; and his legs ſhould be frequently and briſkly rubbed with the hand; and a few of the diuretic alterative powders ſhould be given. When proud fleſh, as it is called, appears in the ulcers, it muſt be deſtroyed by cauſtics, ſuch as blue vitriol powdered, or diſſolved in warm water, or lunar cauſtic. When this is neglected, they ſometimes increaſe to a large ſize, and become almoſt of a horny conſiſtence, in which ſtate they are commonly named "grapes."

In recent caſes of greaſe, in which the heels are inflamed and ſwollen, and diſcharge a whitiſh-coloured matter, much benefit has reſulted from fomenting them for a conſiderable time with warm water, in which a ſmall quantity of Goulard has been mixed, and immediately applying the Goulard poultice. In obſtinate caſes of greaſe, where the matter diſcharged is very ſolid, the fermenting poultice is uſeful, that is, a poultice of linſeed meal, warm water, and yeaſt, which ſoon removes the offenſive ſmell, and cauſes a leſs acrid matter to be formed. Powdered charcoal has alſo been recommended for the ſame purpoſe. In recent caſes the Goulard poultice and mild purgatives will ſoon reduce the inflammation conſiderably; and then the cure is eaſily accompliſhed by aſtringent lotions. For preventing a return of the complaint, exerciſe and good grooming are indiſpenſably neceſſary; frequent hand rubbing of the legs, and a diuretic powder occaſionally, are alſo uſeful. Horſes with white hinder legs, or ſuch as are much diſpoſed to ſwelling of the legs, ſhould be bandaged for ſome time, particularly after hard work, keeping the bandage conſtantly moiſt with a ſolution of alum and water. In ſome caſes of greaſe the inflammation ſeems to extend to the cellular membrane under the ſkin, the conſequence of which is a more ſevere pain and lameneſs than when it is ſuperficial. The inflammation generally terminates in an abſceſs of the heel, which burſts and leaves a deep ill-looking ulcer. Although the general ſwelling of the legs ſubſides, the ulcer is extremely irritable, and healed with difficulty, particularly if the horſe be exerciſed. By applying poultices and warm digeſtive ointment, and by keeping the horſe at reſt, the ulcer gradually heals. When ulcers of the heel do not appear diſpoſed to heal, the aſtringent ointment above-mentioned ſhould be changed for the following, which is more ſtimulant, and previouſly to its application, the ſore ſhould be waſhed with a ſolution of blue vitriol. The ſtimulating ointment is prepared by mixing ointment of yellow reſin, 4 oz. olive oil ½ oz. and red nitrated quickſilver in fine powder ½ oz. See White's Treatiſe of Veterinary Medicine, vol. i.

If the greaſe be an attendant of ſome other diſeaſe, it will be in vain to attempt the cure before the diſeaſe be removed, that is the original cauſe of it; and therefore, if it be a hectic, the yellows, or the farcin, &c. the directions given for thoſe diſeaſes are to be followed, and in the mean time proper applications are to be uſed outwardly for the greaſe.

GREASE, *Molten*, a diſeaſe of the inteſtines, incident to horſes, and generally dependent on ſome conſtitutional affection. Horſes that have been well fed, without much exerciſe, are peculiarly ſubject to this complaint: although they appear ſleek and fat, they are not fit for violent or long-continued exertion, unleſs they have been brought to it gradually: and therefore when they are put to work in this ſtate, and violently exerciſed, a fever often enſues; and this fever commonly depends upon general inflammation or increaſed action of the whole arterial ſyſtem. In this diſeaſe, nature makes an effort to remove it by a violent purging; and the mucus, formed on the inner ſurface of the bowels for the purpoſe of lubricating and protecting them from the action of any acrimonious matter that may happen to be paſſing through them, being now more abundant, appears ſomewhat like fat mixed with the dung. When blood is drawn from a horſe in this ſtate, a large quantity of inflammatory cruſt, coagulable lymph, or buff-coloured jelly, appears on its ſurface. Such is the account which Mr. White gives of this diſeaſe, and he explodes the account of thoſe veterinary writers who repreſent molten greaſe as conſiſting in a colliquation or general melting of the fat of the body, great part of which is abſorbed, and thrown upon the blood and upon the inteſtines, whence it is voided with the excrement. Nor does he approve of the deſcription of this diſeaſe, given by Mr. Blaine, in his Treatiſe on Veterinary Medicine, who conſiders it to be the ſame with the human dyſentery. In the courſe of a ten years' extenſive practice, he ſays that he has never met with a ſingle caſe that reſembled the dyſentery deſcribed by medical authors. "I have often obſerved," ſays this writer, "during the progreſs of ſymptomatic fever, internal inflammation, mucus mixed with the dung, which had ſometimes the appearance of part of one of thoſe long white worms ſo often found in the horſe's bowels; at others it reſembled a membrane. I have obſerved the ſame thing in horſes apparently healthy, or after the operation of very ſtrong phyſic. I have alſo ſeen many caſes where there was teneſmus or conſiderable irritation in the rectum; the horſe frequently voiding a ſmall quantity of dung, and appearing in pain. But this was always a ſymptom of ſome more important complaint, and eaſily removed, or the effect of phyſic, and very unlike dyſentery." Molten greaſe, according to Mr. White, is not to be conſidered as a diſtinct diſeaſe, but merely as a ſymptom, ſometimes appearing in general inflammation, but more frequently in fevers. In either of theſe caſes ſome of the internal organs are more affected than others. When a difficulty of breathing occurs, indicated by an unuſually quick motion of the flanks and expanſion of the noſtrils, it is a ſign of an affection of the lungs. When molten greaſe appears, it ſhews that the mucous membrane of the bowels is more particularly affected; ſometimes both theſe parts are affected at the ſame time. The principal remedy in this diſeaſe is copious bleeding, according to age, ſtrength, and other circumſtances of the caſe. It is often neceſſary to repeat the operation of bleeding; and if the diſeaſe appears to be principally ſeated in the lungs, only laxatives ſhould be adminiſtered and rowels inſerted in the cheſt and belly; the ſides alſo may be bliſtered, or the muſtard embrocation rubbed on the ſides and belly. In molten greaſe, or when the bowels are affected, if a copious purging occurs, it ſhould not be ſuppreſſed, but encouraged, by giving frequent decoctions of linſeed, gum arabic diſſolved in water, ſtarch, or the powder of arrow root, and boiled in water. When the dung is voided ſparingly, but frequently, and particularly when any knobs are mixed with it, let a pint of caſtor oil be given, which may be repeated, if neceſſary, about two days. In this caſe it will be proper to rub the muſtard embrocation on the belly. If the diſeaſe continue, and eſpecially if there be conſiderable irritation about the anus; the horſe frequently ejecting a ſmall quantity of excrement, and appearing to be in great pain, the following opiate clyſter may be given, *viz.* opium 1½ dram, warm water 8 oz. mixed, to which add about a quart of ſtarch water, *i. e.* ſtarch boiled in water, of a proper conſiſtence for a clyſter. If the exhibition of a clyſter ſeems rather to increaſe than alleviate the pain and irritation, the doſe of caſtor oil muſt be repeated, and a clyſter thrown up only of water, gruel or a little oil. As the gut in this caſe is very tender and irritable, the clyſter pipe ſhould not be rough, and it ſhould be introduced with caution; it ſhould therefore be perfectly ſmooth, covered with oil or lard, and not protruded with violence. It is probable, ſays Mr. White, that a ſmall, ſhort tube of bone, about three times the bulk and length of the pipe uſed in human ſubjects, would be preferable on this occaſion to that which is commonly employed. White's Treatiſe of Veterinary Medicine, vol. i.

GREASE, among *Hunters*, denotes the fat of a bear or hare.

GREASY, in *Agriculture*, a term provincially made uſe of to imply any thing foul, whether in animals or land. It is frequently uſed to ſignify ſuch tillage lands as are much over-run with graſs when in the ſtate of fallow.

GREASY-*Blaes*, or *Creechy-blaes*, in *Mining*, are terms by which kind ſhale or ſlate clay, or that which has a greaſy appearance, and works or digs eaſily, is diſtinguiſhed. See SHALE.

GREAT, a term of compariſon, denoting a thing to have more extenſion than ſome other to which it is referred. Thus we ſay, a great ſpace; a great diſtance; a great figure, a great body, &c. See COMPARISON.

GREAT is likewiſe uſed figuratively, in matters of morality, &c. to ſignify ample, noble, elevated, extraordinary, important, &c. Thus we ſay, Shakſpeare was a great genius; queen Elizabeth had a great ſoul; Cromwell was a man of great deſigns; Da Vinci, a great painter; Galileo, a great philoſopher; Boſſu, a great critic, &c.

GREAT is alſo a title or quality appropriated to certain princes, and other illuſtrious perſonages. Thus we ſay the great Turk; the great Mogul; the great khan of Tartary; the great duke of Florence, &c.

GREAT is alſo a ſurname beſtowed on ſeveral kings and emperors. Thus we ſay, Alexander the great, Cyrus the great; Charles the great, or Charlemagne; Henry the great of France, &c. So the Engliſh frequently ſay, Edward the great, or the great Edward; William the great, meaning king William III. or the great William. The French ſay Louis the great, *le grand*, ſpeaking of Louis XIV. Giles of Paris ſays, Charlemagne firſt got the ſurname great from the tallneſs and eminence of his ſtature. Helgaud adds, that Hugh the great of France was thus denominated on account of his great piety, goodneſs, &c.

GREAT is alſo applied to ſeveral officers who have preeminence over others. Thus we ſay, the lord great chamberlain; the great marſhal of Poland, &c.

GREAT *Circles of the ſphere*. See *Great* CIRCLE.

GREAT *Circle ſailing*. See SAILING.

GREAT *Apparatus*. See APPARATUS.

GREAT *Artery*. See ARTERY.

GREAT *Bairam*. See BAIRAM.

GREAT *Bank of Newfoundland*, in *Geography*. See BANK. It lies between 41° and 50° 24′ N. lat., and between 49° 45′, and 54° 45′ W. long.

GREAT *Barrington*. See BARRINGTON. The number of inhabitants by a late eſtimate is 1754.

GREAT *Bay*, a bay of North America, at the mouth of the Piſcataqua river, between Portſmouth and Exeter, in the ſtate of New Hampſhire.

GREAT *Bear lake*. See BEAR *lake*.

GREAT *Bear*. See URSA *major*.

GREAT *Cape*, in *Geography*, a Cape of Upper Canada, where lake Superior deſcends into the narrows of the fall St. Mary.

GREAT *Diachylon*. See DIACHYLON.

GREAT *Egg harbour*, &c. in *Geography*. See EGG *harbour river*.

GREAT *Famine*, a river of America, in New York, which riſes in the mountains near the ſource of the river Oneida, and runs N. W. by W. to lake Ontario.

GREAT *Gun*. See CANNON and GUN.

GREAT *Intervals*, in *Muſic*, ſignify the ſame, with Holden and ſome other writers, as greater and major do with the generality of muſicians, and is applied to the intervals marked with Roman capitals, as II, III, V, VI, VII, &c. See GREATER.

GREAT *Iſland*, in *Geography*, a ſmall iſland in the Eaſt Indian ſea, near the N. coaſt of the iſland of Flores. S. lat. 7° 59′. E. long. 120° 54′.—Alſo, an iſland in the river Niagara, between lake Erie and lake Ontario. N. lat. 53°. W. long. 78° 59′.—Alſo, an iſland of Ireland, in the county of Cork, being the largeſt of the iſlands formed by the river Lee in Cork harbour; on it is the flouriſhing town of Cove.—Alſo, an iſland in Piſcataqua harbour, New Hampſhire, in the United States.

GREAT *Kanhaway*. See KANHAWAY.

GREAT *Letters*. See CAPITALS.

GREAT *Maſs*. See MASS.

GREAT *Mecatina*. See MECATINA.

GREAT *Octave*, in *Muſic*, is applied by the Germans, according to their tablature, or notation of muſical notes, to the octave, or rather ſeptave, beginning with C on the ſecond leger line below the baſs ſtave, and ending with B on the ſecond line, or *mi* of Guido, and to which they excluſively apply the Roman capitals C, D, E, F, G, A, B. See Dr. Callcott's Muſical Grammar, art. 34. See alſo SMALL OCTAVE, ONCE-MARKED *Octave*, and TWICE-MARKED *Octave*.

The object of this tablature is, to enable muſical notes to be written or printed without clefs or lines and ſpaces in a ſtave.

GREAT *Officers*. See OFFICER.

GREAT *Pelican Iſland*. See PELICAN.

GREAT *Repeat*. See REPEAT.

GREAT *Ridge*, in *Geography*, one of the ridges of the Alleghany mountains, which ſeparates the waters of the Savannah and Alatamaha. At the S.E. promontory of this ridge is that extraordinary place called Buffaloe lick, diſtant about 80 miles from Auguſta. It occupies ſeveral acres of ground. A large cane ſwamp and meadows, forming an immenſe plain, lie S.E. of it, and in this ſwamp Mr. Bartram apprehends that the branches of the great Ogechee take their riſe. The lick is nearly level, and lies between the head of the cane ſwamp and the aſcent of the ridge.

GREAT *River*, a river of Virginia, which runs into the Staunton river. N. lat. 36° 46′. W. long. 79° 12′.—Alſo, a river of Canada, which runs into the river St. Lawrence, 20 miles below Quebec.

GREAT *River*. See RIO *Grande*.

GREAT *Scale*, in *Muſic*. The late ſir Marmaduke Overend, after a life almoſt ſpent in reſearches into the nature and proportion of muſical intervals, ſucceeded, to the ſatisfaction of Dr. Boyce, his intimate friend, to whom his labours were ſubmitted, in unravelling the myſteries of the Greek ſcales of muſic, as he ſays, in a paper on the great ſcale, in his quarto manuſcripts, vol. ii. page 113 to 133, now in the library of the Royal Inſtitution, which is thus entitled, *viz.* "All the Greek ſcales of muſic combined, with the diatonic intenſe, extended in the acumen and gravitas, with their remiſſions and intenſions to double flats and double ſharps in each; firſt reſtored, elucidated, and calculated, by Marmaduke Overend, Iſleworth 1779." In pages 143 to 149 of the ſame volume of MS. we find alſo the ſeveral ratios of this ſcale in their leaſt terms, and the indices of the component primes, of one octave of the acumen and the gravitas with the ſynemmenons, the remiſſions, &c. This ſcale, which contains 86 notes within the octave, is a great muſical curioſity, which we are ſorry that our limits will not admit of inſerting: by the notice here taken of it, the curious may reſort to the manuſcripts themſelves for further ſatisfaction. See *Greek* SCALE.

GREAT *Seal*. See SEAL.

GREAT *Sixth, Redundant*, in *Muſic*, or redundant great ſixth, according to Holden, is the inverſion of the deficient leſs third of his ſcales ($\frac{6}{7}$), and has a ratio of $\frac{7}{12}$, $= 475.94709\,\Sigma + 9f + 41\,m$ in Farey's notation, its common logarithm being .7659167.9396, its Euler's log. or decimal of the octave = .7776075, and it contains 43.38868 major commas. This interval does not belong to the received or diatonic ſyſtem, having the number 7 in its ratio.

GREAT *Sodus*. See SODUS.

GREAT *Third*, in *Muſic*, probable, according to Holden's new and fanciful ſyſtem, is the ratio which the mind "probably" conceives (page 371 of his "Eſſay") as pertaining to the major third in the common chord minor, and to which he aſſigns the numbers $\frac{19}{24}$, $= 206.270982\,\Sigma + 4f + 18\,m$ in the new notation: its common logarithm is .8985423 5924 and that of Euler, .3570350, it alſo contains 18.80576 major commas; it is far removed from the received or diatonic ſyſtem of intervals, as involving the prime number 19, and yet it is one of thoſe which reſult from earl Stanhope's directions for tuning; it is the leſſer equal-beating biequal third of his lordſhip, ſee EQUAL BEATING. Mr. Holden, at page 384 of his eſſay, relates an experiment in which this third proved an "intolerable diſcord," which is more than might be expected, from the temperament of rather more than $\frac{9}{11}$ths of a comma, which it has.

GREAT *Tithes*. See TITHES.

GREAT *Wardrobe*. See WARDROBE.

GREAT *Wheel*, in *Clock* or *Watch-work*, is that wheel which the weight, ſpring, or fuſee, firſt moves.

GREAT *Work*, in *Chemiſtry*, is the alchemical proceſs whereby gold is made, or pretended to be made.

GREAT *Year*. See PLATONIC *year*.

GREATER *Barons*. See BARON.

GREATER *Enharmonical dieſis*. See DIESIS.

GREATER *Excommunication*. See EXCOMMUNICATION.

GREATER *Faſti*. See FASTI.

GREATER *Hexachord*. See HEXACHORD.

GREATER, in *Muſic*, is applied to diſtinguiſh ſeveral intervals, whereof there are two of the ſame name, as greater ſecond, leſſer ſecond; greater third, leſſer third; &c. Major interval is as often applied to theſe, and by ſome few writers they are called great intervals. The ſemitone or difference between the *greater* and the *leſſer* intervals of the ſame names, are not all equal, but of two different magnitudes, *viz.* the ſemitone minor ($\frac{24}{25} = 36\,\Sigma + f + 3\,m$), which occurs between the thirds and the ſixths major and minor, and the ſemitone medius ($\frac{128}{135} = 47\,\Sigma + f + 4\,m$), which occurs between the ſeconds, fourths, fifths, and ſevenths, major and minor: the difference of theſe ſemitones being the major comma $\frac{80}{81} = 11\,\Sigma + m$.

GREATHAM FLEET, in *Geography*, a river of England, which riſes in the county of Durham, and runs into the German ſea, 5 miles S. of Hartlepool. N. lat. 54° 43′.

GREATMAN'S BAY, a bay of Ireland, on the N. coaſt of Galway bay; ſix miles N. from S. Arran iſles.

GREAVES, JOHN, in *Biography*, was born at Colmore, near Alresford, in Hampſhire, in the year 1602. He was educated in the claſſics, and in the other elementary parts of learning by his father, who was rector of the place, and the moſt celebrated ſchool-maſter in that country. When he was fifteen he was ſent to Baliol college, Oxford, where he applied himſelf with great aſſiduity to the ſtudies of the place, and took his firſt degree in the year 1621. Three years after this he ſtood candidate for a fellowſhip of Merton college, when he was the firſt on the liſt of five who were then elected. In 1628 he took the degree of M.A., and more particularly directed his attention to the ſtudy of the mathematics and oriental learning, and became the friend of the moſt eminent ſcholars in the univerſity, among whom were Mr. Briggs, Savilian profeſſor of aſtronomy, and Mr. Peter Turner, profeſſor of geometry in Greſham college, London. Had he wanted any motive to induce him to purſue his ſtudies with vigour, the example of his contemporaries would have furniſhed that motive. Mr. Greaves read over all the writings of the moſt celebrated mathematicians of that and the preceding age, and he made himſelf familiar with the ancient Greek, Arabian, and Perſian authors. In the year 1630, upon the reſignation of Mr. Turner, he was elected profeſſor of geometry at Greſham college, in conſequence of the high reputation which he ſuſtained in the univerſity. At this period he was introduced to archbiſhop Laud, the chancellor of the univerſity of Oxford, from whom he received ſeveral marks of favour. Soon after this, Mr. Greaves reſolved to travel for improvement, and in 1635 we find him in Holland, attending the lectures of James Golius, profeſſor of Arabic at Leyden; from thence he proceeded to Paris; afterwards to Rome, Florence, and Padua, making exact obſervations upon every thing deſerving of notice. Upon his return he determined to take a voyage to Egypt, a deſign which met with the decided approbation of the archbiſhop. His object in this was not only to make himſelf acquainted with ſuch remains of antiquity which that far-famed country poſſeſſed as might ſerve to illuſtrate ancient literature, but alſo to make aſtronomical and geographical obſervations; he therefore furniſhed himſelf with inſtruments of every kind for the purpoſe, and ſuch printed Greek and Arabic books as he thought might be advantageouſly exchanged for MSS. and other objects worthy of collection. He embarked in the river Thames for Leghorn in the year 1637, accompanied by his friend Mr. Edward Pococke, and proceeded firſt to Italy, and thence to Conſtantinople, where they arrived about Michaelmas. Here he was received with great attention by ſir Peter Wyche, to whom he brought out letters of recommendation from archbiſhop Laud. He was immediately introduced to Cyril Lucar, the Greek patriarch, who afforded him much valuable aſſiſtance in purchaſing Greek MSS. The venerable patriarch promiſed to recommend him to the monks of mount Athos, in Macedonia, where, he ſaid, "he would have had the liberty of entering all the libraries in that place, to have collected a catalogue of ſuch books, as either were not printed, or elſe, by the help of ſome, theſe might have been more correctly ſet out." Theſe, by diſpenſing with the anathemas which former patriarchs had lain upon all Greek libraries to preſerve the books from the Latins, the patriarch propoſed to have preſented to the archbiſhop of Canterbury, for the better proſecution of his grace's deſigns in the edition of Greek authors, but the death of that patriarch fruſtrated Mr. Greaves' intention of viſiting the celebrated mount, and occaſioned his being a ſufferer in another reſpect; for having procured from a Greek monaſtery ſome MSS. of the fathers, he was under the neceſſity of reſtoring them, and loſing his money to avoid a greater inconvenience. Mr. Greaves, having loſt his friend, determined to proceed to Egypt, but before his departure he had an opportunity of ſhewing his great attention to aſtronomical ſcience: knowing that there would be an eclipſe of the moon in the courſe of a few months, he furniſhed proper perſons with convenient inſtruments for obſerving it at Conſtantinople, Bagdad, Smyrna, and Alexandria, and gave them neceſſary inſtructions for the purpoſe. For his conduct in this reſpect Dr. Halley paid him the higheſt compliment by ſaying that a greater ſervice could not be rendered to the ſcience of aſtronomy than by taking the phaſes of the moon's eclipſes at thoſe places, in order to determine their longitudes, ſince in and near them were made all the obſervations by which the mean motions of the ſun are limited. Mr. Greaves having finiſhed his arrangements for this buſineſs, went by Rhodes to Egypt, and arrived there in the month of September 1638. This was the boundary of his intended journey, and here an immenſe field for the exerciſe of his inquiſitive genius opened upon his view. He omitted no opportunity of examining whatever the heavens, the earth, or ſubterraneous parts offered him, that might be deſerving of notice; but complains of having his aſtronomical obſervations frequently interrupted by the clouds and rain, which he found to be frequent, eſpecially in the middle of winter. But what particularly engaged his attention, and employed his care, were the pyramids, of which, at that time, there was no ſatisfactory account before the public. This taſk he undertook, and towards the cloſe of the year 1638 he took a careful ſurvey and menſuration of them. Having gratified his curioſity, furniſhed his mind with a large ſtock of uſeful knowledge, and collected ſome Greek, Arabic, and Perſian MSS., as well as ancient coins, and other varieties, he embarked at Alexandria in the month of April 1639, and arrived at Leghorn in June. He now made a ſecond tour of Italy, which occupied him nine months. At Florence he was received with particular marks of reſpect by the grand-duke of Tuſcany, Ferdinand II., to whom he addreſſed a Latin poem ſent from Alexandria; and he alſo was permitted to have free acceſs to the Medicean library, which had been refuſed to him as a ſtranger when on his former tour. From Florence he went to Rome, whence he returned to Leghorn, and embarked on board a veſſel for London, with a rich cargo of MSS., gems, coins, and other valuable antiquities. Upon his arrival in England he found his native country diſtracted by the conteſts between the king and parliament: he was, from principle, a friend to the royal party, and involved himſelf in much trouble by the zeal which he diſplayed in the cauſe of monarchy, and in his attachment to archbiſhop Laud. Having made a ſhort ſtay at Greſham college, he went to Oxford to digeſt and prepare his papers for publication, in which he was aſſiſted by archbiſhop Uſher, who had long known and eſteemed him; and he now drew a map of the Leſſer Aſia, at his grace's requeſt, who was writing his diſſertation on that country, which was printed in 1641. In this year archbiſhop Laud having preſented to the univerſity a ſecond collection of medals, the taſk of arranging them was confided to Mr. Greaves, which he performed to the entire ſatisfaction of that learned prelate. By continuing to reſide ſo long at Oxford, Mr. Greaves loſt his profeſſorſhip at Greſham college, but he was almoſt at the ſame time choſen the Savilian profeſſor of aſtronomy at Oxford, and obtained likewiſe a royal diſpenſation to hold his fellowſhip at Merton college, on account of the diminution in his ſtipend as profeſſor, ariſing from the circumſtances of the civil war. The labours of the profeſſorſhip being ſuſpended, he proceeded with his literary avocations, and in the year 1644 tranſlated into Latin the “Lemmata of Archimedes,” correcting the diagrams, and ſupplying what was frequently found defective in the demonſtration itſelf. This piece was publiſhed by Mr. Samuel Foſter in his Miſcellanies, or “Mathematical Lucubrations,” 1659. Mr. Greaves, about the ſame time, compiled “A Perſian Lexicon,” out of ſuch words as could be met with in the evangeliſts, the pſalms, and two or three Arabian and Perſian nomenclators. In 1645 he drew up a ſcheme for gradually introducing the new or Gregorian ſtyle, by omitting the intercalary day of the leap-year for forty years, which ſcheme was highly approved by the king and council, and would probably have been carried into execution, had the times been favourable to the innovation. In 1646 he publiſhed his work entitled “Pyramidographia,” or a deſcription of the pyramids of Egypt, and ſoon after a “Diſcourſe on the Roman Foot and Denarius,” from whence, as from a common ſtandard, the meaſures and weights uſed by the ancients may be deduced. About the year 1648 Mr. Greaves found that he ſhould be under the neceſſity of reſigning his profeſſorſhip, he accordingly, before his intereſt was entirely gone, introduced a ſucceſſor, *viz.* Mr. Seth Ward, afterwards biſhop of Saliſbury. He then went to London, where he married, and living upon his patrimony, devoted his time to literary labours. He publiſhed many learned works, among which was “Elementa Linguæ Perſicæ,” 4to. to which the author ſubjoined “Anonymus Perſa Siglis Arabum et Perſarum Aſtronomicis.” In 1652 he publiſhed an aſtronomical work, to which he prefixed “A ſhort Hiſtory of the Riſe and Progreſs of Aſtronomy among the Arabians,” and ſubjoined his Binæ Tabulæ. Beſides theſe, he publiſhed many other works, and had prepared many more for the preſs, when he was attacked by a diſorder that proved fatal to him. He died in the fiftieth year of his age. Of his learning, ingenuity, diligence, and wonderful perſeverance, there is abundant evidence. He was highly eſteemed by many of his moſt eminent contemporaries both at home and abroad; ſteady in his principles and in his friendſhips, and his death was lamented as a real loſs to ſcience and literature. Biog. Brit.

GREBANISH HEAD, in *Geography*, a cape of Scotland, on the E. coaſt of the peninſula of Harris. N. lat. 57° 48′. W. long 6° 43′.

GREBE, in *Ornithology*, is claſſed by Linnæus under the genus of *Colymbus*, which ſee.

GREBENAU, in *Geography*, a town of Germany, in the principality of Heſſe Darmſtadt; 35 miles S. of Caſſel. N. lat. 50° 43′. E. long. 9° 31′.

GREBENSKOI. See COSSACKS.

GREBENSTEIN, a town of Heſſe-Caſſel, 12 miles N.W. of Caſſel. N. lat. 51° 26′. E. long. 9° 22′.

GREBER, GIACOMO, in *Biography*, a German muſician, who had been ſome time in Italy, and who brought hither a female ſinger, his ſcholar, la ſigniora Margarita de l'Eſſine. He ſet to muſic a paſtoral entertainment, entitled “The Loves of Ergaſto,” after the manner of the Italian opera, that is, in recitative, with airs intermixed. This was the firſt performance in ſir John Vanburgh's new theatre in the Haymarket, afterwards called the Opera Houſe. Greber's ſcholar, Margarita, ſung in moſt of the early attempts at operas in England, and from the name of her maſter, Greber, was long called “Greber's Peg;” which occaſioned his name to be better known, and longer remembered than his works. See MARGARITA.

GRECI, in *Geography*, a town of Naples, in the province of Principato Ultra, founded by a colony of Albanians, who left their country after their prince George Caſtriot, near Ariano.

GRECOURT, JOHN-BAPTIST JOSEPH VILLART DE, in *Biography*, was born at Tours, in France, in 1683. He was devoted by his friends to the church at a very early period, and was in poſſeſſion of a canonry when he was only fourteen years of age. He became celebrated as a preacher, but his diſcourſes were ſatirical rather than moral, and did not redound much to his credit as a preacher of the goſpel. Quitting his profeſſion he became a man of the world, and made his way to the faſhionable circles by his convivial talents, and his faculties of writing and reciting licentious and burleſque verſes. He was patronized by the marſhal duke d'Etrees, who frequently carried him to his ſeat, which the poet called his earthly paradiſe. The life which he led would not bear reflection; and though he apparently ſpent a joyous courſe, yet there was a ſmall portion of reſpectability attached to his character. He died in 1743. His printed works were tales, epigrams, ſongs, fables, and other light pieces. Few of them riſe above mediocrity, but they are lively, pleaſant, and popular. His poem, entitled “Philotanus,” which was a ſatirical hiſtory of the bull Unigenitus, had prodigious ſucceſs. The verſes are burleſque, ſome of them extremely humorous, though their general texture is mean and vulgar. Moreri.

GREDING, in *Geography*, a town of Germany, in the principality of Aichſtatt, on the Schwarzach; 13 miles N.E. of Aichſtatt.

GREE, a town of Perſia, in Segeſtan; 20 miles S.W. of Meimend.

GREE, in our *Law Books*, ſignifies agreement, contentment, or good liking. Thus, to make *gree* to the parties, is to ſatisfy them for offence done. “Judgment ſhall be put in ſuſpence, till *gree* be made to the king of his debt.” Stat. 25 Edward III.

The word is formed from the French *gré*, *good will*, *good liking*, or *allowance*.

GREECE, in *Geography*, a country of Europe, ſubject to the Turks, and more generally known under the name of *Turkey in Europe*, which ſee.

GREECE, in *Ancient Geography*. See GRÆCIA.

GREEK *Accents*. See ACCENT.

GREEK *Bible*. See BIBLE.

GREEK *Church*. See CHURCH

GREEK *Church, Muſic of the*. The ſchiſm between the Greek and Roman churches, which happened in the ninth century, prevented ſuch changes as were made in the Roman ritual, after that period, from being adopted by the Greeks; and the notation uſed before ſeems long to have continued in the Eaſt. In Ruſſia, however, all the rituals were called in at the beginning of the laſt century; and a uniform liturgy was eſtabliſhed, in which the modern method of writing muſic was received. But in the Greek iſles a notation peculiar to its inhabitants is ſtill in uſe, which is not only as different from our's as their alphabet, but totally unlike that in the ancient miſſals.

In examining the moſt ancient of theſe in the Vatican library, which were written in capitals, the firſt notation which we could diſcover, conſiſted chiefly of accents; and when ſmall letters were afterwards uſed, theſe accents were only ſomewhat lengthened. In the tenth and eleventh centuries, they very much reſemble the characters to be found in contemporary Latin miſſals. However, the melodies in the lower ages became more elaborate, and the notes more numerous than in thoſe of higher antiquity.

St. John Damaſcenus, who lived in the eighth century, is celebrated by the writers of his life, and by eccleſiaſtical hiſtorians, as the compiler and reformer of chants in the Greek church, in the ſame manner as St. Gregory in the Roman. And Leo Allatius (De Libris Eccleſ. Græcorum) under the title "Octoëchus" (Οκτωηχος; eight tones), tells us they were compoſed by J. Damaſcenus. Zarlino goes ſtill farther, and informs us (Inſtit. Harm. 4to. parte. cap. viii.) that in the firſt ages of Chriſtianity the ancient Greek notation by letters having been thrown aſide, John Damaſcenus invented new characters, which he accommodated to the Greek eccleſiaſtical tones; and that theſe characters did not, like our's, merely expreſs ſingle ſounds, but all the intervals uſed in melody; as a ſemitone, tone, third minor, third major, &c. aſcending and deſcending, with their different duration. This reſembles, in many particulars, the notation in the eccleſiaſtical books of the Romiſh church, before the time-table, and characters in preſent uſe were invented, or, at leaſt, generally received.

The abate Martini of Venice (ſee "Preſent State of Muſic in France and Italy") having viſited the Greek iſles in hopes of acquiring ſuch a knowledge of the muſic practiſed there at preſent, as would enable him to judge whether any of the miraculous powers attributed to it by their anceſtors ſtill remained, as well as to compare its excellence with that of his own country; and as this learned and ſagacious enquirer confided to us his papers on that ſubject, we ſhall communicate to our readers a ſketch of their contents.

The ſyſtem of modern Greek notation ſeems much more complicated and obſcure than the ancient. The characters convey nothing to the mind either by their form or names, the greateſt part of which cannot be conſtrued; and the reſt are conſtrued to no purpoſe. Their ſignification, as words, does not point out their meaning as muſical characters; and all that we can diſcover is, that ſome of them ſeem deſcriptive of geſticulations; ſuch as ἐρχνισμα, which, perhaps, directed the prieſt to look up, or ſtretch his hands towards heaven. Σταυρος, which might direct him to make the ſign of the croſs, or to carry the croſs. Λυγισμα, *flexio, contortio.* Indeed, it is ſaid in the papers, that ſome of theſe characters are for the Χειρονομια, or *legerdemain*, and not δια φωνην, for the *voice*. This is the more likely, as the Greek ſervice abounds in geſticulations and manual dexterity.

The abate was informed, that though the oriental Greeks have ſigns for muſical ſounds equivalent to our's, they ſing more by tradition than ſcience. However, the diſtinctions for the duration of ſounds, ſuch as our time-table furniſhes, are ſtill wanting. The abate procured an extract from a tract upon the muſic of the modern Greeks, written by Lampadarius; but who he was, or when he lived, no one could inform him. In this it appears, that the characters amount to more than fifty; among which moſt of the names of thoſe muſical terms, given by Du Cange, from a MS. treatiſe on the eccleſiaſtical muſic of the Greeks, are to be found. (Gloſſ. Med. et Inf. Græcitatis.) Du Cange, who has ſo amply collected and explained the characters uſed by the modern Greeks in chemiſtry, botany, aſtronomy, and other arts and ſciences, is ſilent as to their muſical notation; nor have we been able to acquire any information on that ſubject, except that with which the abate Martini has ſupplied us. The title of the treatiſe by Lampadarius is the following: Τεχνολογια της μουσικης τεχνης. The extract from it, which is in our poſſeſſion, is too long for inſertion here; nor would it be of much uſe could we allow it room, as no equivalents to the Greek characters are to be found in our own notation. But with reſpect to the author, we find among the memoranda which we made in the king of Sardinia's library at Turin, an account of a Greek MS. of the fifteenth century, N. 353. b. I. 24, in which Lampadarius is often mentioned as author of the muſic to the hymns and prayers it contains. Fabricius likewiſe, Bibl. Græc. vol. ii. p. 269, 564, and 586 ſpeaks of a MS. in the Selden collection at Oxford, and another in the Jeſuits library at Louvain, in which there are explanations of the notes uſed by the modern Greeks, and muſical compoſitions by ſeveral authors, particularly Lampadarius. In the patriarchal church of Conſtantinople there are four ſingers, who are placed on the right and left ſides of the choir; the firſt on the right is called Πρωτοψάλτης, the principal ſinger; the firſt on the left Λαμπαδαριος, Lampadarius; the two others who aſſiſt the principals are called *domeſtici.* It is probable that Lampadarius, who flouriſhed about the year 1300, either took his name from the office he filled; or, on account of his eminence in muſic, that his name was given to the office.

To inſert here the muſical characters ſtill uſed in the rituals of the Greek church out of Ruſſia, and endeavour to explain them, will perhaps be conferring but a ſmall favour on our readers; for from the ſcarcity of muſic written in ſuch characters, ſo few will be their opportunities of making uſe of any knowledge they may acquire by the ſtudy of them, that it would be like learning a dead language in which there are no books, or a living language without the hopes of either reading or converſing in it.

Thoſe readers who may be deſirous of gratifying themſelves in matters of curioſity, may conſult Dr. Burney's Hiſtory of Muſic, vol. ii. p. 50. where they will find the fourteen muſical characters that occur in the Greek MSS of the Evangeliſts, written in capitals during the ſeventh, eighth, and ninth centuries, though at preſent they are wholly unintelligible, even to the Greeks themſelves. It is obſervable that the more ancient the MSS. the fewer and more ſimple are the notes: the "Codex Alexandrinus," in the Britiſh Muſeum has none; and the Evangeliſteriæ MSS. in the Harleian collection, 5785, 5598, both of the tenth century, have only ſuch as theſe, which were copied in Greece by the abate Martini.

The "Codex Ephrem," in the king's library at Paris, of the fifth century, has likewiſe the ſame kind of muſical notes, and it is aſſigned as a reaſon for the "Codex Alexandrinus" not having them, that it was written for private uſe, not for the ſervice of the church.

Kircher undertakes to give his reader an idea of modern Greek muſic and its characters; and has indeed collected a great number of notes and their names, but pretends not to furniſh equivalents in the muſic of the weſtern world. And to inſert ſuch barbarous names, and more barbarous characters here without explanation, would no more help to initiate a ſtudent in the myſteries of Greek muſic, than the Hebrew or Chineſe alphabet. At the firſt glance they very much reſemble the characters uſed in Choregraphy, an art invented about two hundred years ago to delineate the figures and ſteps of dances. They are too numerous and complicated to be inſerted and explained here; however, we have given the names and correſpondent notes in the Hiſtory of Muſic, vol. ii. p. 51 – 52, by the ſtudy of which the muſical reader will be able to form ſome idea of the melody which they are intended to expreſs.

There are eight aſcending, and ſix deſcending characters, ſome for ſingle ſounds, and others for wider intervals, as thirds and fifths, ſuch as Zarlino, in the paſſage mentioned above, had imagined were invented by J. Damaſcenus; and all theſe have their particular *Chironomia*, or ſigns for the geſtures with which the prieſt is to accompany the inflections of voice.

The beginning, or firſt note of every chant, is called *Iſon*, which is equivalent to the key or tone in which any melody is ſung.

Kircher, to whom even Egyptian hieroglyphics are eaſy, has reſolved the names of theſe Greek notes into Latin. Muſurgia, ubi ſupra.

The abate Martini heard the Greeks, in Paſſion Week, ſing ſeveral tropes or modes, which they now term ηχοι, in four parts, in the ſtyle of Paleſtrina: and this kind of muſic they call Cretan, but why, is not eaſy to divine, unleſs they learned counterpoint while the Venetians were maſters of the iſland.

The abate ſays that he often heard the common people of Greece ſing in concert, and obſerved that they made frequent uſe of the *fourth*: "della conſonanza che noi chiamiamo oggi quarta." By this he muſt mean that they uſed it as a concord in two parts, or if there were more than two parts, in poſitions where our harmony forbids the uſe of it; otherwiſe it would not have affected his ear as a ſingularity.

The fact is curious, and we find it confirmed by Zarlino, who obſerved the ſame practice in the Greek church at Venice. The fourth, we find, was in ſuch favour during the time of Guido, as to be preferred in diſcant to every other concord, and thought to conſtitute the moſt pleaſing harmony. This partiality may probably have ariſen from the importance of fourths in the ancient Greek ſyſtem, and the want of a temperament to render thirds and ſixths more agreeable; but the improvements in harmony ſoon brought it into diſgrace in Italy, while, from a contrary cauſe, it has kept its ground to the preſent time in Greece, at leaſt among the populace. And, indeed, even in Italy, it ſeems to have retained a part of its ancient privileges long after the time of Guido, and when harmony was thought to be in great perfection: for Zarlino ſays, that Juſquin, and the other old Flemiſh maſters, uſed it frequently in their compoſitions: "nella parte grave, ſenza aggiungerle altro intervallo."

The preſent ſtate of Greek muſic, indeed, does not confirm or favour the opinion of Dr. Brown, who aſſerts with his uſual courage, that, "about four hundred years after Guido, the debauched art once more paſſed over into Italy from Greece: certain Greeks, who eſcaped from the taking of Conſtantinople, brought a refined and enervate ſpecies of muſic to Rome, &c." As many travellers aſſert that the modern Greeks have no muſic in parts, we may ſuppoſe, that in thoſe places where it was heard by the abate Martini, it had been brought thither by the Venetians, during the time that they had poſſeſſions in the Archipelago.

That the Greek muſic has undergone many alterations ſince the ancient treatiſes that are come down to us were written, is certain from the change and increaſe of its vocabulary. Bryennius has given, as names of intervals, a liſt of barbarous terms not to be found in any preceding writer within our knowledge; and in the Greek gloſſary of Du Cange, and the abate Martini's papers, a great number occur that are not to be found either in writers of high antiquity, or in Bryennius.

The technical language of the Greeks has always been copious, and in muſic perhaps its ſeeming redundance is more conſpicuous than in any other art or ſcience. But in other arts and ſciences words are repreſentatives of things exiſting; whereas, in denominating the tones and inflexions of voice, which, to realize, require new creation, there can be no correſpondence between the type and ſubſtance. The colours, the forms, and objects, which a painter wiſhes to repreſent, are in nature; and the poet, in all the ebullition of wild enthuſiaſm and fervid imagination, deſcribes what he has ſeen and felt, or what *is* to be ſeen and felt, and for which common language muſt ſupply him with ſymbols. But it has never entered the thoughts of man to give names to all the minute ſhades of colour between black and white, or to the gradations by which light is propagated between the time of total darkneſs and the ſun's meridian. And yet, in a ſcale of ſounds, from the loweſt muſical note in the human voice to the higheſt, where octaves are not repreſented by ſimilar ſigns and appellatives, the names and characters muſt be numerous. The lines and clefs of the European muſic have certainly freed it from many perplexities with which it was embarraſſed, even in the artleſs times of canto fermo.

But however flowery the Greeks may have made their eccleſiaſtical melody, or however they have multiplied its characters, the deſire of permanence in the heads of the weſtern church, with reſpect to all ſacred matters, long kept muſic in the plain and ſimple ſtate in which it was left by pope Gregory the Great; for we do not find, till the invention of counterpoint, that it received any material change or improvement. Our own bible and liturgy, if they remain in their preſent ſtate five or ſix hundred years, will, perhaps, be unintelligible to the vulgar, though written in the beſt language of this country when they were introduced into the church. And the Greek and Roman languages, which were ſo well underſtood by the primitive Chriſtians, became dead and obſolete by degrees, to all but the learned in after ages. The precluſion of change or innovation in ſacred concerns which has occaſioned permanence, has likewiſe been the cauſe of inelegance and obſcurity.

"Peter the Great, like his predeceſſors, had a particular partiality for the muſic of the church; maintained his own choir, or ſingers for divine ſervice, and read publicly in the church the epiſtles and the hours, which, in that country, is permitted to be done by any layman, who delights in ſuch exerciſe, as well as by the prieſts." (King's Rites of the Greek Church.)

Many of the kings of France not only ſung in the choir, but compoſed hymns for it, and ſet them to muſic. (Laborde.)

(Laborde.) And we have heard his preſent majeſty, at ſix o'clock prayers in St. George's chapel at Windſor, officiate alone as clerk ; repeating the reſponſes, and reading the pſalms aloud verſe for verſe, with the miniſter, and uttering the amen in the clerical ſtyle.

Muſic has been very much cultivated at Peterſburgh in the Imperial chapel and metropolitan church during the laſt century, as well as in the theatre. And though no inſtruments are admitted in the Greek church, any more than in the Siſtine or pontifical chapel at Rome, yet every vocal refinement, both in compoſition and performance, that can with propriety be allowed in eccleſiaſtical muſic, has been received in the church ſervice at Peterſburgh, in the Imperial chapel and cathedral of which capital, near a hundred voices are daily employed ; and at Moſcow, in ſeveral churches, when the ſovereign is there, forty or fifty.

The muſic of the Hymnologia of the Ruſſian ambaſſador's chapel in London, is ſung to figurative muſic in three and four parts, diſtinct from the intonations or canto fermo. It conſiſts of ſhort, elegant, and ſimple ſtrains or movements, in the Italian ſtyle, in plain counterpoint, compoſed to Slavonian words, by Bortnianſki, who was ſent to Italy, early in life, by the empreſs Catherine, to ſtudy compoſition.

The taſte for good muſic paſſed from the theatre to the church. The plain chant of the modern Greeks is different from that of other Chriſtian churches. It is more varied than the Gregorian chant ; and that of the hymns rather reſembles the figurative muſic of motets, than canto fermo. The empreſs Elizabeth, who was well acquainted with the kind of counterpoint *à capella*, and had great pleaſure in uniting her voice with the choir, would never allow the Italian *florid ſong* to have admiſſion in the ſacred ſervice ; but ſays the Gotha Almanac, in an abridged hiſtory of the muſic of Ruſſia, 1772, " Italian muſic has invaded even the Greek church as well as the Roman." This voice of complaint borders on *croaking*. We have taken conſiderable pains to obtain information on the ſubject, and have heard the ſervice of the Greek church performed in ſeveral parts of Europe ; and we have been favoured with a ſcore of ſome of the muſic in preſent uſe in that ſervice, compoſed by Bortnianſki, a native of Peterſburgh, and find that it is neither ſo bald and dry as canto fermo, nor ſo florid and flighty as that of the Italian theatre. It is plain counterpoint, *non fugato*, in which the words ſeem well accented, the parts moving all together ; ſo that there is meaſure, clearneſs, tranquil and ſoothing air, pure harmony, and natural and ſimple modulation. Nothing vulgar occurs, nor any thing to remind us of the opera houſe, yet the ſtrains are not without grace or gravity. It ſeems to excite attention by its ſweetneſs and ſimplicity, more than by the art of fugue, or extraneous modulation.

GREEK *Muſic*, *Ancient*. We ſhall here introduce ſome obſervations on the ſubject, extracted from a diſſertation written ſeveral years ago.

Section I.—*Of the Notation or Tablature of Ancient Muſic, including its Scales, Intervals, Syſtems, and Diagrams.*

The muſic of the ancients, according to Euclid, Alypius, and Martianus Capella, was divided into ſeven conſtituent parts : theſe were *ſounds*, *intervals*, *ſyſtems*, *genera*, *modes*, *mutations*, and *melopœia*, or the compoſition of melody. To theſe diviſions, which comprehended only what was denominated harmonics, or the ſcience of muſic, ſtrictly ſo called, were added five other requiſites, no leſs eſſential for a muſician to know, than the preceding ſeven : and theſe were, *rhythm*, or the regulation of cadences in all kinds of movement ; *metre*, or the meaſure of verſes ; *organic*, or the inſtrumental art ; *hypocritic*, or geſture ; and *poetic*, or the compoſition of verſes. And ſtill to theſe diviſions, Ariſtides Quintilianus, and ſome other muſical writers, add *odicum*, or the art of ſinging ; which, indeed, ſeems of more importance to muſic, than either the *organic* or *hypocritic art*. In order to communicate to our readers all the information we are able, upon ſo dark and difficult a ſubject, we ſhall conſider the muſic of the ancient Greeks under ſuch heads only as abſolutely concern muſic, according to our acceptation of the word ; for it is plain that ſeveral of its ancient diviſions more immediately belonged to poetry. Indeed theſe two arts were at firſt ſo intimately connected, and ſo dependent on each other, that rules for poetry were, in general, rules for muſic ; and the properties and effects of both were ſo much confounded together, that it is extremely difficult to diſentangle them.

Leaving, therefore, for the preſent, all other diſtinctions, diviſions, and ſub-diviſions, with which ancient muſical treatiſes abound, we ſhall proceed to fulfil the title of this ſection.

In the ſtudy of modern muſic, the firſt objects of enquiry are the names by which the ſeveral ſounds in the ſcale are expreſſed ; and, if we regard muſic as a language, the ſcale or gammut may be called its alphabet.

Plutarch ſays, that it is not ſufficient for a muſician to know what kind of muſic ſhould be ſet to any particular poem ; he ſhould likewiſe know how to write it down in all the genera, that is to ſay, in the *diatonic* or natural ſcale, conſiſting of tones and ſemitones as at preſent ; in the *chromatic*, in which the ſcale was divided into ſemitones and minor thirds ; and in the *enharmonic* genus moving by quarter tones, and major thirds, as will be explained hereafter.

It does not appear from hiſtory, that the Egyptians, Phœnicians, Hebrews, or any ancient people, who cultivated the arts, except the Greeks and Romans, had *muſical characters ;* and theſe had no other ſymbols of ſound than the letters of their alphabet, which likewiſe ſerved them for arithmetical numbers and chronological dates.

As the notation of the Greeks was imagined in the infancy of the art of muſic, when the flute had but few holes, and the lyre but few ſtrings, the ſimplicity of expreſſing the octave of any ſound by the ſame ſign, as in modern muſic, was not thought of ; the moſt ancient and conſtant boundary of muſical tones having been the *diateſſeron*, or fourth, the extremes of which interval were fixed, though the intermediate ſounds were mutable : and in the manner of tuning theſe conſiſted the difference of intervals in the ſeveral genera.

The Greek ſcale, in the time of Ariſtoxenus, the oldeſt writer upon muſic, whoſe works are come down to us, extended to two octaves, and was called *ſyſtema perfectum, maximum immutatum ;* the great, the perfect, the immutable ſyſtem ; becauſe its extremities formed a perfect conſonance, including all the ſimple, double, direct, and inverted concords, with all the particular ſyſtems ; and it was the opinion of the ancients that this diſdiapaſon, or double octave, was the greateſt interval which could be received in melody.

This whole ſyſtem was compoſed of five *tetrachords*, or different ſeries of four ſounds, and one note added at the bottom of the ſcale to complete the double octave ; whence the ſtring which produced this ſound was called προσλαμβανόμενος, *proſlambanomenos*, or note ſubjoined to the ſcale ; for though this was conſtantly the loweſt ſound in all the modes, it was not included in the tetrachords.

All theſe ſounds had different denominations in the ſyſtem, like our gammut, A *re*, B *mi*, C *fa ut*, &c. beſides two different characters, one vocal, and the other inſtrumental, appropriated to each ſound in the ſeveral modes and genera, for the purpoſe of writing down melodies.

That the fourth was a favourite and important interval in the muſic of the ancients, is plain from the great ſyſtem of two octaves having been compoſed of five of theſe tetrachords, in the ſame manner as the ſcale of Guido is of different hexachords.

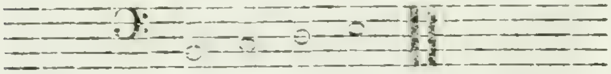
The firſt tetrachord is called by the Greek muſicians *hypaton*, or principal; the ſounds of which are denominated:

1. *Hypate hypaton*, principal of principals;

2. *Parypate hypaion*, next the principal;

3. *Lichanos hypaton*, or index of principals; from its having been played with the index or fore-finger. This third ſound of the firſt tetrachord in the diatonic genus was likewiſe called *hypaton diatonos*.

4. *Hypate meſon*, or principal of the middle or mean tetrachord; for this ſound not only ſerved as the laſt or higheſt note of the firſt tetrachord, but as the firſt or loweſt of the ſecond; whence theſe two tetrachords were called conjoint, or connected. Theſe four denominations of the ſounds in the firſt tetrachord may be compared with the terms B *mi*, C *fa ut*, D *ſol re*, and E *la mi*, in the Guido ſcale; or with the ſounds



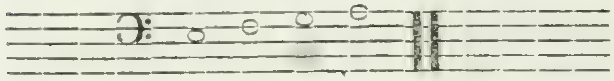
The ſounds of the *meſon*, or middle tetrachord, were placed in the following order:

Hypate meſon, or principal of the mean tetrachord;

Parypate meſon, next to the middle principal;

Lichanos meſon;

Meſe, or middle, as this ſound completes the ſecond tetrachord, and is the centre of the whole ſyſtem. The ſounds of this tetrachord corrreſpond with thoſe which in the baſe of the ſcale of Guido are called E *la mi*, F *fa ut*, G *ſol re ut*, and A *la mi re*, which are equivalent to



The meſe in ancient muſic was of equal importance with the key note in modern muſic: being an octave above the proſlambanomenos, which was the loweſt ſound of the ancient modes, and a kind of key note to them all.

Euclid calls meſe the ſound by which all other ſounds are regulated. And Ariſtotle, in his XXXVIth Problem, ſect. 19. ſays that all the tones of a ſcale are accommodated, or tuned, to the meſe. The ſame author likewiſe tells us, Problem XX. that all melody, whether it moves above or below the meſe, has a natural tendency to that ſound.

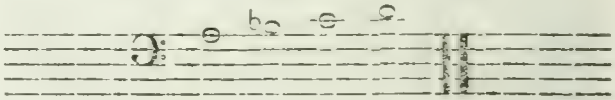
The third tetrachord, beginning by the laſt note of the ſecond, was thence called *ſynemmenon*, the *united*, or *conjunct* tetrachord; the ſounds of which proceed in the following order:

Meſe;

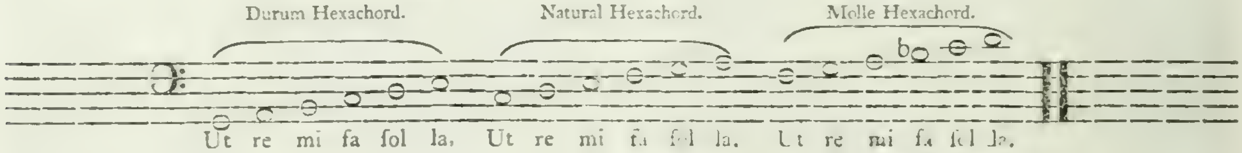
Trite ſynemmenon, or third ſtring of this tetrachord from the top;

Paranete ſynemmenon, penultima of this tetrachord;

Nete ſynemmenon, laſt of the ſynemmenon tetrachord; the four ſounds of which correſpond with thoſe in the centre of our gammut, that are called A *la mi re*, B *fa*, C *ſol fa ut*, and D *la ſol re*, or



After aſcending regularly thus far, up to D, by three conjoint tetrachords, the fourth tetrachord in the great ſyſtem is begun by *deſcending* a minor third to B natural, the octave above the firſt ſound of the loweſt tetrachord. Something of this *dodging* kind is to be found in the ſcale of Guido, divided into hexachords: for, after aſcending ſix notes regularly in the *durum hexachord*, it is neceſſary to deſcend a major third, if we would begin the *natural hexachord*; and when the natural hexachord is completed, if we would begin at the *molle*, it can only be done by a leap of a third below. This will beſt appear by an example in notes:



It appears from the Greek tetrachords, as well as from this example, that neither the ancients nor the early moderns admitted the *ſharp ſeventh* of a key into their ſcales.

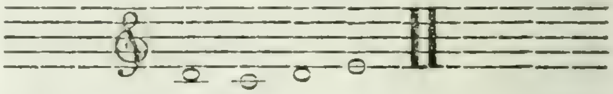
The fourth tetrachord, aſcending, is called *diezeugmenon*, disjunct, or ſeparated, as it begins at B natural, which is not a note in common with any one in the other tetrachords. But though this ſyſtem of four ſounds is only an octave higher than that of the firſt tetrachord, and though the next is but a replicate of the ſecond, we ſhall preſent them to the reader, as the ſeveral ſounds of which they are compoſed have in the Greek muſic different denominations.

The firſt ſound of the ſecond octave, or ſeries of eight ſounds in the ancient great ſyſtem, is *meſe*, and the firſt of the fourth tetrachord begins with the note

Parameſe, near the *meſe*, or middle ſound; the next is called

Trite diezeugmenon, or third ſtring of this tetrachord from the top: then follows the *paranete diezeugmenon*; and laſtly, the

Nete diezeugmenon, or final ſound of this tetrachord; which includes the ſounds B *mi*, C *ſol fa ut*, D *la ſol re*, and E *la mi*, in the middle of the Guido ſcale, or



The laſt ſound of the fourth tetrachord is the firſt of the fifth, which is called the *hyperbolæon*, or ſupreme tetrachord; the ſounds of which aſcend in the following order:

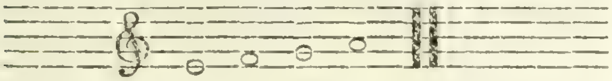
Nete diezeugmenon, laſt of the diezeugmenon tetrachord;

Trite hyperbolæon, third ſtring of the hyperbolæon tetrachord;

Paranete hyperbolæon, penultima of the ſupreme tetrachord;

Nete hyberbolæon, laſt of the ſupreme, or higheſt tetrachord, and of the great ſyſtem, or diagram.

This laſt tetrachord, being added to the ſcale long after its firſt formation, was called *hyperbolæon*, from its ſounds being more acute than the reſt, and beyond the common bounds of the ſcale; in the ſame manner, as, with us, the notes above D in the treble are ſaid to be *in alt.* This tetrachord includes the ſounds E *la mi,* F *fa ut,* G *ſol re ut,* and A *la mi re,* or

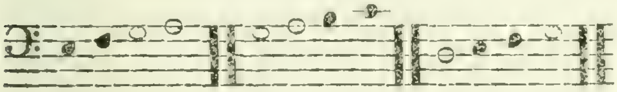


The ancients uſed likewiſe four different monoſyllables ending with different vowels, by way of *ſolmiſation,* for the exerciſe of the voice in ſinging; like our *mi, fa, ſol, la.* Theſe were, for the firſt note of each tetrachord, τᾶ, for the ſecond τῆ, for the third τῶ, and for the fourth, if it did not ſerve as the firſt of the adjoining and relative tetrachord, τε; but if it began a new tetrachord, it was called by the firſt name, τᾶ.

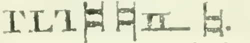
The repetition of theſe monoſyllables is a further proof that the fourth in the ancient muſic ſerved as a boundary to a ſyſtem of four ſounds, in the ſame manner as a hexachord did in the Guido ſcale, and as an octave does for eight ſounds in the more modern practice.

Any interval between the terms of which one or more ſounds intervened, was by the ancients called a *ſyſtem:* EG, for example, conſtituted a ſyſtem of a third minor; EA, of a fourth; EB, of a fifth, &c,

Theſe ſmaller ſyſtems were of different ſpecies; thus there were three kinds of tetrachords, that differed in melody by the poſition of the ſemitone, which was ſometimes at the beginning, ſometimes at the end, and ſometimes in the middle; as in the following example, where the black notes are ſemitones, and the white, tones.



As the Greeks uſed all the four and twenty letters of their alphabet for muſical characters, or ſymbols of ſound; and as their moſt extenſive ſyſtem or ſcale did not exceed two octaves, or fifteen ſounds, it ſhould ſeem as if their ſimple alphabet was more than ſufficient to expreſs them; for their muſic being at firſt only a notation of their poetry, the rhythm, or air, muſt have been determined by the metre of the verſes, without the aſſiſtance of ſigns of proportion peculiar to muſic. But ſuppoſing it was neceſſary for them to have different characters to expreſs the different feet of the verſe, it is certain that vocal muſic was in no want of them; and inſtrumental being chiefly vocal muſic played by inſtruments, had likewiſe no need of them, when the words were written, or the player knew them by heart.

However, in order to multiply theſe characters, the letters of their alphabet were ſometimes written in capitals, and ſometimes ſmall; ſome were entire, ſome mutilated, ſome doubled, and ſome lengthened; and beſides theſe diſtinctions in the form of the letters, they had others of ſituation, ſometimes turning them to the right, ſometimes to the left; ſometimes inverting, and ſometimes placing them horizontally; for inſtance, the letter *gamma,* by theſe expedients, ſerved to expreſs ſeven different ſounds:  Some of the letters were alſo barred, or accented, in order to change their ſymbolical import; and theſe ſtill not ſufficing, they made the common grave and acute accents ſerve as ſpecific muſical notes.

It is a matter that has been long diſputed among the learned, whether *accents* were originally *muſical characters,* or marks of *proſody.* It is in vain to ſet about determining a queſtion concerning which the proofs on both ſides are ſo numerous. (See Gally and Spelman *againſt accents,* and Primatt and Forſter in defence of them.) Mr. Weſt is firmly of opinion "that accents were originally *muſical notes,* ſet over words to direct the ſeveral *tones* and inflexions of the voice, requiſite to give the whole ſentence its proper harmony and cadence." (Pind. vol. ii.) And the abbé du Bos, who frequently by a peremptory deciſion cuts the knot of ſuch difficulties as he is unable to untie, aſſerts, without ſufficient proof, that as poets originally ſet their own verſes, they placed for this purpoſe a figure, or accent, over each ſyllable. So that, according to this writer, we are at preſent not only in poſſeſſion of the *poetry* of Homer, Pindar, Anacreon, and Sappho, but their *muſic.* Why then do we complain of the total loſs of Greek muſic? (See Reflex. Critique, c. iii. p. 85.) But as muſic had characters different from accents ſo early as the time of Terpander, to whom the invention is given by the Oxford Marbles, which place this event about ſix hundred and ſeventy years before Chriſt; and as accents for proſody are likewiſe proved to be of high antiquity, it ſeems as if there could have been no neceſſity for the ancients to uſe one for the other.

But it has already been remarked that the letters of the alphabet, though turned, diſtorted, and mutilated, ſo many different ways, were inſufficient to expreſs the ſounds of all the modes in the three genera; ſo that recourſe was had to accents, as the ſcale became more extended, in order to augment the number of characters. And Alypius, in the enumeration of the notes in the enharmonic genus, tells us, that *trite ſynemmenon* is repreſented by *beta* and the *acute accent;* and *paranete ſynemmenon enarmonios* by *alpha,* and the *grave accent.*

This is a proof that the accents were known at the time of Alypius, and were then uſed chiefly for proſody, not muſic, for which they were only called in occaſionally. Indeed they are mentioned as accentual marks by writers of much higher antiquity than Alypius; for not only Cicero and Plutarch, but Ariſtotle and Plato, ſpeak of them as merely regarding the elevation and depreſſion of the voice in ſpeech. However, in the early Greek and Roman miſſals, as will be ſhewn hereafter, the muſical characters uſed in *canto fermo,* ſeem to have been only *lengthened accents.*

Theſe various modifications of letters and accents in the Greek notation compoſed in all one hundred and twenty different characters, which were ſtill conſiderably multiplied in practice; for each of theſe characters ſerving many purpoſes in the vocal as well as inſtrumental tablature or gammut, and being changed and varied according to the different modes and genera, as the names of our notes are changed by different cleffs and keys, the one hundred and twenty Greek characters produced one thouſand ſix hundred and twenty notes!

Two rows of theſe characters were uſually placed over the words of a lyric poem; the upper row ſerving for the voice, and the lower for inſtruments.

If we had not the teſtimony of all the Greek writers who have mentioned theſe characters, for their uſe and deſtination, it would be natural to ſuppoſe that the double row of different letters placed over each other, and above the words of a poem, were intended to expreſs *different parts,* with reſpect to *harmony;* as with us, in modern muſic, the treble notes are written over the baſe, and the firſt treble over the ſecond; but Alypius, who is extremely minute in his inſtructions concerning the uſe of theſe characters, in all theſe modes, tells us, in expreſs terms, that the upper line of the notes is for the words, and the lower for the lyre. (Σημεια τα μεν ανω, της λεξεως· τα δε κατω της κρουσεως. Introd. Muſ. edit. Meibom. p. 2.) We are told, not only by Alypius, but by Gaudentius, p. 23, that of the two rows of letters uſed for muſical characters, the upper is for the words, that is, *to be ſung*, and the under *to be played.* And he afterwards proves them to have been uniſons to each other, both by his definitions and by placing them oppoſite to the ſame ſound in all the ſcales.

In this author, the notes of the great ſyſtem of the Lydian mode in the diatonic genus are arranged in the following order:

7 ⊤ R Φ C P M I Θ Γ Ʊ Z E Ʊ ⊖ ⅄ M′ I
⊢ Γ L F C ◡ Π < V N Z ⊏ ⊔ Z η ⊬ Π′ <′

And theſe he defines in ſuch a manner as leaves no room to doubt of the identity of their ſignification.

It is ſomewhat ſtrange that the notes for the voice in ancient muſic ſhould be placed *above* thoſe for the lyre, and conſequently further from the words. Meibomius, in his preface, has, however, given a curious reaſon for this cuſtom, from a fragment of Bacchius, ſenior: "The upper line of notes is for the poem, the lower for the lyre; becauſe the mouth, which alone gives utterance to the words, is placed by nature above the hands, which produce tones from the inſtrument.

7⊢ *Proſlambanomenos*, an imperfect *Zeta*, and *Tau* placed horizontally.

⅂ Γ *Hypate hypaton*, an averted *Gamma*, and a *Gamma* direct.

R L *Parypate hypaton*, an imperfect *Beta*, and a *Gamma* inverted.

Φ F *Hypaton diatonos*, a *Phi*, and a *Digamma*.

C C *Hypate meſon*, *Sigma* and *Sigma*.

P ◡ *Parypate meſon*, *Rho*, and *Sigma* inverted

M Π *Meſon diatonos*, *Mu*, and a lengthened *Pi*.

I < *Meſe*, *Iota*, and a horizontal *Lambda*.

Θ V *Trite ſynemmenon*, *Theta*, and an inverted *Lambda*.

Γ N *Synemmenon diatonos*, *Gamma* and *Nu*.

Ʊ Z *Nete ſynemmenon*, an inverted *Omega* and a *Zeta*.

Z ⊏ *Parameſe*, *Zeta*, and *Pi* placed horizontally.

E ⊔ *Trite diezeugmenon*, *Epſilon*, and an inverted *Pi*.

Ʊ Z *Diezeugmenon diatonos*, as Nete ſynemmenon, which was the ſame ſtring in the lyre.

⊖ η *Nete diezeugmenon*, horizontal *Phi*, and a ſmall *Eta* lengthened.

⅄ ⊬ *Trite hyperbolæon*, an inverted *Upſilon*, and an imperfect *Alpha*.

M′ Π′ *Hyperbolæon diatonos*, *Mu*, and a lengthened *Pi*, accented.

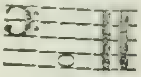
I <′ *Nete hyperbolæon*, *Iota*, and an accented *Lambda*, placed horizontally.

It is from the indefatigable labour of the learned Meibomius, in his Commentaries upon the ancient Greek muſicians, particularly Alypius, that we are able to decypher theſe characters; which, before his time, had been ſo altered, corrupted, disfigured, and confounded, by the ignorance or negligence of the tranſcribers of ancient manuſcripts, that they were rendered wholly unintelligible.

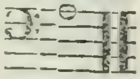
With our utmoſt ſtudy, reading, and contemplation, we could reduce the Greek notation to no order, nor aſcertain whether it was to be read upwards or downwards. The neglect of theſe diſtinctions will introduce an univerſal ſcepticiſm concerning every part of ancient muſic.

Galilei, Zarlino, Bontempi, Tevo, M. Rouſſeau, Dr. Brown, and others have aſſerted, that the terms *high* and *low* had different acceptations among the ancients, from thoſe in which they are underſtood by the moderns, without guarding, as they ought to have done, againſt ſuch conſequences, with reſpect to the ſituation of the ſcale, as it was natural for the reader to draw from that aſſertion.

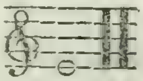
At length, an infallible rule preſented itſelf to us in the works of the great Euclid, who has been regarded for ſo many ages as the legiſlator of mathematicians, and whoſe writings have been their code. In his ſection of the Canon, p. 37, edit Meibom. he repreſents *proſlambanomenos* by the *whole ſtring:* ſo that, if any thing concerning ancient muſic can be made certain, it is, that this whole ſtring repreſented the *loweſt ſound* in the Greek ſcale, which, in the Hyperborian mode, was equivalent to the note A



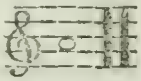
Half the ſtring, *Meſe*, its octave, a,



Third part, *Nete diezeugmenon*, fifth of the octave, e, - - - -



And the fourth part of the ſtring, *Nete hyperbolæon*, the double octave, aa, -



which include all the concords that the ancients admitted. Eight ninths of the ſtring are allotted to the ſound *Hypate bareia gravis*, which is B in the baſe, one tone higher than *proſlambanomenos*, or A.

This repreſentation of the whole ſtring and its diviſions into harmonic and aliquot parts, muſt put an end to every doubt concerning the order of the ſcale, which may have ariſen from the inverted application of the words *high* and *low*, conſtantly occurring in all the more ancient and authentic Greek writers on muſic.

Sect. II.—*Of the three genera, Diatonic, Chromatic, and Enharmonic.* See GENERA, DIATONIC, CHROMATIC, and ENHARMONIC reſpectively.

Sect. III.—*Of Modes.* See MODES.

Sect. IV.—*Of Mutations.* See MUTATIONS.

Sect. V.—*Of Melopœia.* See MELOPŒIA.

Sect. VI. *Of Rhythm.* See RHYTHM.

Sect. VII.—*Of the Practice of Melopœia.* See MELOPŒIA.

Sect. VIII.—*Whether the Ancients had counterpoint or muſic in parts.*

This is a ſubject which has given birth to many learned diſquiſitions and diſputes; and as it long remained a mere matter of opinion, thoſe who believed, and thoſe who denied the point in queſtion, conſequently treated each other with all due polemic acrimony. The champions for antiquity thought themſelves involved in the controverſy; and whether they were poſſeſſed of muſical knowledge, or were ſenſible to the charms of harmony, or not, they determined to regard every man as an enemy to ſound literature, who did not ſubſcribe to the articles of their faith.

A poem, called "Le Siècle de Louis le Grand," written by Charles Perrault, of the Academy of Sciences, and brother to Claude Perrault, the famous phyſician and architect, occaſioned the long and acrimonious diſpute between him and Boileau, and ſoon brought on a general war among the learned throughout Europe, concerning the ſuperiority of the ancients or moderns, with reſpect to arts, ſciences, and literature. This piece was firſt read by the author at the Academy of Sciences in 1687, and was ſoon followed by his "Parallele des Anciens et des Modernes." The notes to Boileau's tranſlation of Longinus were intended as a reply to Perrault, and are full of bitter invectives, not only againſt him, but the moderns in general. Racine, La Bruyere, and Fontenelle, took ſides in the quarrel, which in France was kept alive, with great animoſity, for near thirty years.

In England, the controverſy between ſir William Temple and Mr. Wooton, Mr. Boyle and Dr. Bentley, and Swift's "Battle of the Books," were conſequences of this quarrel.

Thoſe who had written *ex profeſſo* on muſic, had frequently differed in their opinions concerning counterpoint having been known by the ancients, previous to the learned, in general, intereſting themſelves in the diſpute; and before we give our own opinion, as an individual, it is incumbent on us, as an hiſtorian, to inform our readers, who were the principal champions on both ſides. Would it not render our article too long, the reaſons aſſigned by each for ſeizing his ſword, that is, his pen, in the quarrel, ſhould likewiſe have a place here. But our limits will only allow us to ſay, that the moſt eminent defenders of ancient harmony in our ſenſe of the word, are Gaffurio Zarlino, Gio. Battiſta Doni, Iſaac Voſſius, Zaccharia Tevo, the abbé Fraguier, and Mr. Stillingfleet, author of "Principles and Power of Harmony."

Their oponents are Glarianus, Salinas, the cavalier Hercules Bottrigari of Bologna, Artuſi, Cerone, Kepler, Merſennus, Marſilius Ficinus, Kircher, Claude Perrault, and the late elegant and learned poet Mr. Maſon, who had ſtudied modern muſic, and has left his decided opinion againſt the ancient Greeks having cultivated counterpoint. (Hiſt. Muſ. vol. i. p. 125.) To theſe we may add Bontempi, the firſt Italian muſical hiſtorian, the learned Dr. Wallis, M. Burette, who has explored the ſubject, and conſidered it in all its ramifications. Padri Martini of Bologna, a learned and diligent inquirer, has given a ſpecimen (Stor della Muſ. t. i. p. 174.) of ſuch meagre counterpoint as was likely to have been produced without the uſe of imperfect concords, which the Greeks termed diſcords. The late ſhrewd and penetrating critic J. J. Rouſſeau is very explicit upon this ſubject in his "Muſical Dictionary," at the article *Counterpoint*, which he terminates by ſaying, "It has long been diſputed whether the ancients knew counterpoint; but it clearly appears from the remains of their muſic and writings, eſpecially the rules of practice, in the third book of Ariſtoxenus, that *they never had the leaſt idea of it*."

After this liſt of the moſt reſpectable writers on both ſides of this long diſputed queſtion, it now remains to tell the reader ingenuouſly our own ſentiments: and to confeſs the truth, we will venture to ſay, that we do *not* believe the ancients ever did uſe *ſimultaneous harmony*, that is, *muſic in different parts*; for without thirds and ſixths it muſt have been inſipid; and with them, the combination of many ſounds and melodies moving by different intervals, and in different times, would have occaſioned a confuſion, which the reſpect that the Greeks had for their language and poetry would not ſuffer them to tolerate.

Sect. IX.—*Of the Dramatic Muſic of the Ancients.* See DRAMATIC *Muſic*.

The Greek dramas conſiſted of ſoliloquy, dialogue, and chorus, and it has naturally been ſuppoſed, that theſe were ſung to different kinds of muſic. Soliloquies full of ſentiment and paſſion had probably a different, more elaborate, and refined melody, than the dialogues; but the chorus muſt neceſſarily be ſet to meaſured muſic, or the performers, if left *ad libitum*, could never have kept together.

Sect. X.—*Of the effects attributed to the muſic of the ancients.*

Materials for this part of our diſſertation are ſo numerous, that if we were only to preſent the reader with all the ſtories that have been related by the moſt grave and reſpectable hiſtorians and philoſophers of Greece and Rome, concerning the moral, medicinal, and ſupernatural powers of ancient muſic, this ſection would be as full of the miracles of muſicians, as the "Golden Legend" is of thoſe operated by the ſaints. The credulous and excluſive admirers of antiquity have, however, ſo long read and reverenced all theſe narrations, that they are impreſſed by them with an extravagant idea of the excellence of ancient muſic, which they are very unwilling to relinquiſh; and yet, after a moſt careful inveſtigation of the ſubject, and a minute analyſis of this muſic, by examining its conſtituent parts, we have not been able to diſcover that it was ſuperior to the modern in any other reſpects than its ſimplicity, and ſtrict adherence to metrical feet, when applied to poetry. For, as *muſic*, conſidered abſtractedly, it appears to have been much inferior to the modern, in the two great and eſſential parts of the art, *melody* and *harmony*.

We have conſidered the marvellous effects aſcribed to ancient muſic, under three ſeveral heads:

Firſt, in ſoftening the manners, promoting civilization, and humanizing men, naturally ſavage and barbarous:

Secondly, its effects in exciting, or repreſſing the paſſions:

And thirdly, its medicinal power, in curing diſeaſes.

And we think, that the whole may be conſtrued into poetical fables, allegories, and vulgar errors. Many ſtrange ſtories of the power of muſic over man and beaſt have gained admiſſion into books, even in this philoſophical and unbelieving age, at which poſterity will doubtleſs ſtare!

GREEK *Croſs*. See CROSS.

GREEK *Empire*. See EMPIRE.

GREEK *Grammar*. See GRAMMAR.

GREEK *Language*, the language of the Greeks. Whether we conſider the high antiquity of this tongue, its varied excellencies, the unrivalled models of compoſition which it contains, or the extenſive influence which the ſtudy of it has produced on the more modern dialects of Europe, it claims, in an eminent degree, the attention of learned men, as a ſubject no leſs curious than uſeful. The advantages to be derived from the ſtudy of thoſe authors who have written in this tongue, are too notorious to need deſcription, and are recommended to us by the united teſtimony of the learned in every age and country. The Greeks have left the moſt durable monuments of human wiſdom, fortitude, magnificence, and ingenuity, in their improvement of every art and ſcience, and in the fineſt writings upon every ſubject neceſſary, profitable, elegant, or entertaining. They have furniſhed the brighteſt examples of every virtue and accompliſhment, natural or acquired, political, moral, or military; they excelled in mathematics and philoſophy; in all the forms of governments, in architecture, navigation, commerce, war; as orators, poets, and hiſtorians, they ſtand as yet unrivalled, and are likely to continue unrivalled for ever; nor are they leſs to be admired for the exerciſes and amuſements they invented and brought to perfection, in the inſtitution of their public games. Nor can we become ſenſible of theſe admired excellencies in any of the beſt tranſlations from the Greek. They may indeed communicate ſome knowledge of what the originals contain: they may preſent us with propoſitions, characters, and events; but allowing them to be more faithful, more accurate than they really are, or can well be, ſtill they are no better than copies in which the ſpirit and luſtre of the originals are in a great degree neceſſarily loſt. The powers of the Greek are vaſtly beyond thoſe of any other tongue. Whatever the Greek writers deſcribe is always felt, and almoſt ſeen; motion and muſic are in every tone, and enthuſiaſm and enchantment poſſeſs the mind when we peruſe them with taſte and judgment.

The Greek tongue, as it was ſpoken in different provinces, was divided into different *dialects*, called the *Attic*, the *Ionic*, the *Doric*, and the *Æolic*. The Attic is that which was uſed at Athens, and in the adjacent country; thoſe who have particularly diſtinguiſhed themſelves in this dialect, are Thucydides, Ariſtophanes, Plato, Iſocrates, Xenophon, and Demoſthenes. The Ionic differed very little from the ancient Attic; but having afterwards made its way into ſome towns of Aſia Minor, and into the adjacent iſlands which were colonies of the Athenians and Achaians, (among which are reckoned Samos, Miletus, Epheſus, Smyrna, and ſome others,) it imbibed a new tincture, and fell very far ſhort of that delicacy to which the Athenians afterwards attained. The principal writers in this dialect were Hippocrates and Herodotus. The Doric firſt prevailed among the Lacedæmonians and the inhabitants of Argos. It travelled afterwards into Epirus, Sicily, Rhodes, and Crete. This dialect has been uſed by Archimedes and Theocritus, (both of Syracuſe,) and Pindar. The Æolic was ſpoken at firſt among the Bæotians and their neighbours, and afterwards it paſſed into Æolia, a province of Aſia Minor, between Ionia and Myſia, which included ten cities, all Greek colonies. The chief writers in this dialect were Sappho and Alcæus, of whoſe writings little has ſurvived the loſs of ancient learning; but this idiom is occaſionally blended with the uſe of the other dialects in the compoſitions of Homer, Theocritus, Pindar, and others. It may be remarked farther that the lapſe of time which occaſioned the difference of theſe dialects, as they aroſe from a common ſtem, has moreover cauſed them to differ from themſelves. For inſtance, in the Attic there is a wide diſtinction between the ſtyle of Demoſthenes, and that of Thucydides. Nor has the Ionic dialect invariably continued the ſame, the people of Aſia ſpeaking it differently from the old Ionians of Greece, who followed the ancient language of Athens, and the ſame obſervation holds in regard to the Dorians and Æolians.

The ramification of the Greek tongue into its ſeveral dialects, while it forms one leading cauſe of its copiouſneſs, occaſions one of the moſt ſerious difficulties in the acquiſition of it by learners. This difficulty, however, will be much diminiſhed, if the dialects be reduced to thoſe unavoidable changes, which are founded in the nature of language, and in the organs of ſpeech. The changes we mean are ſuch as flow from the fluctuation of the vowel ſounds, from the different manner of combining, or of reſolving any two concurrent vowels, and laſtly, from the ſubſtitution or interchange of the homogeneous conſonants, *i. e.* the conſonants of the ſame organs.

Oriental grammarians, with much propriety, have divided the conſonants into three claſſes, correſponding with the organs employed in ſounding them. Thus π, β, φ, being ſounded by the lips, are hence called *labials*. On the other hand, τ, δ, θ, ς, λ, ν, ρ, enunciated by a contact of the tongue with the extremities of the upper teeth, are, for a ſimilar reaſon, ſtyled *dentals*; while κ, γ, χ, uttered by a contraction of the *larynx*, receive the name of *gutturals*. This diſtribution of the conſonants, though here confined to the Greek alphabet, neceſſarily extends to any other ſyſtem of letters, and well deſerves the attention of him who would acquire a philoſophical acquaintance with the origin and derivation of words. To the interchange of the homogeneous conſonants, it is chiefly owing that the primæval language of men, at firſt rude and barren, became copious and refined (the ſame original term hence ſplitting into many), was afterwards diverſified into diſtinct dialects, and at length loſt in diſtinct languages. Nor is it, we conceive, beyond the reach of philological enquiries to prove that the ſimple terms of any one language have their kindred terms in all other languages, diſguiſed indeed by the differences of character, termination, and meaning; and that they may be traced back through the ſeveral ſtages of ſocial life, till they meet, like ſo many ſhoots, in one common root.

The Greek language is a very copious ſubject, and a full account of it would carry us beyond the limits neceſſarily preſcribed by our plan; we ſhall therefore content ourſelves with ſome remarks calculated to aſcertain its origin, and to unfold thoſe analogies by which it grew from a few ſimple roots to the copiouſneſs and refinement which diſtinguiſh it beyond moſt other tongues.

In enquiring into the origin of the Greek tongue, or in referring it to a higher dialect, we of courſe mean its roots or primæval words, which were ſimple, few in number, and conſiſting of two, three, or at moſt four letters; while its compound terms, which are exceedingly numerous and diverſified, muſt have been indigenous, the products of time, and of improvement in knowledge and the arts of life, long after the introduction of its more elementary parts into Greece. With this limitation we have no heſitation in ſaying, that the ſimple words of the Greek language are all derived from the Hebrew, Arabic, and Perſian, and principally from the firſt of theſe tongues. And for the affirmation that the Greek is derived from the Hebrew, or that the Greek primitives are Hebrew radicals, we offer the following obſervations. Moſes, in the tenth chapter of Geneſis, the fountain head of univerſal hiſtory and geography, enumerates thoſe heads of ſeparate families by whom the earth was divided after the flood. He deſcribes them by thoſe names which the nations that ſprung from them, or the countries they ſeverally occupied, retained in his time. By thoſe parts of the earth, which he calls איי הגוים, or *the iſles of the nations*, it is underſtood that he means *Europe*, and its adjacent iſlands. Theſe were divided by the ſons and grandſons of *Japheth*, or rather by *Gomer* and *Javan*, and their ſons,—"In their lands every one after his tongue, after their families in their nations." This diviſion muſt have been regularly conducted. It muſt have taken place in the time of the patriarchs here mentioned; for the act was *theirs*, and the nations retained their names to the time of Moſes; nay many of them long afterwards, for we find them recognized by hiſtory and geography. *Javan* is well known as the parent of the *Greeks*, the name *Ionians* being anciently applied from him to the ſeveral branches of that nation. Τους Θρακας, και Αχαιους, και Βοιωτους Ιωνας εκαλουν. *Heſychius.* Παντας Ελληνας Ιωνας οἱ Βαρβαροι εκαλουν. But it appears from the ſacred hiſtory that Javan ſpoke the Hebrew tongue; and he, with the colony under him, muſt have introduced it with them, and made it the firſt language of Greece. The letters of the Greek tongue refer its origin to the ſame oriental ſource; for they are nearly the ſame with the *Samaritan* when inverted, or written after the European manner, from left to right; and with little variation they have ever retained the names of the Samaritan or Hebrew alphabet. This is confirmed by Diodorus the Sicilian, lib. v. who gives it as the opinion of perſons in his days, that letters were invented by the *Syrians*, from whom the Phœnicians firſt learnt their uſe, and then communicated them to the Greeks. Theſe Aſſyrians, Herodotus deſcribes (l. iii.) as the inhabitants of Jeruſalem, to which he gives the name of *Cadytius*, the name it had of old, and ſtill continues to have in the Eaſt. The authority of Herodotus and Diodorus, Pliny, it is probable, chiefly had in view, when he ſays, Hiſt. l. viii. c. 58; "Literas ſemper arbitror Aſſyrias fuiſſe; ſed alii apud Ægyptios a Mercurio, ut Gellius; alii apud Syros repertas volunt, utique in Græciam intuliſſe e Phœnice Cadmum ſedecim numero."

From the ſame authority it appears that the Phœnicians only changed the ſhape or form of the Hebrew letters, and were not the firſt who diſcovered them; nor were they the firſt who introduced the uſe of letters into Greece. For Diodorus declares that Linus compoſed a book concerning the exploits of the firſt Dionyſius in *Pelaſgic characters*, and that the ſame were uſed by Orpheus and Pronapides, the preceptor of Homer, lib. iii. Zenobius writes that Cadmus ſlew Linus for teaching characters differing from his: and Pauſanias in his Attics aſſures us, that he himſelf ſaw an inſcription upon the tomb of Corœbus, who lived at the time when Crotopus, a contemporary with Deucalion, was king of the Argives. The firſt tribe who ſettled in Greece were called *Pelaſgi*, (probably from πελαγος, *ſea*,) which name correſponds to our appellation of *iſlanders;* and is the ſame in import with what Moſes calls the firſt inhabitants of Europe, *the iſles of the nations.* The firſt European coloniſts, it appears to us probable, with the uſe of the primæval language of men, introduced its *letters* or *characters*, which, by their diſperſion and conſequent relapſe into barbariſm, neceſſarily became corrupted, though not entirely loſt; while Cadmus introduced the original alphabet in a more pure or improved ſtate. The Phœnician and the Pelaſgic characters, previouſly uſed in Greece, were eſſentially the ſame, and different only in degrees of refinement: and it is a remarkable fact, that after the introduction of the Cadmean alphabet the Pelaſgic has left no trace of its exiſtence, which in our opinion clearly proves that theſe two ſyſtems, in conſequence of their affinity, coaleſced, and have been perpetuated under one and the ſame form. See Lennep. De Analogia, vol. iii. p. 28.

The introduction of the Phœnician alphabet preceded the Chriſtian era only about fifteen centuries; and it is curious to obſerve the form and extent of it as taught by Cadmus. It ſtood thus, α, ε, ι, ο, υ; β, π; γ, κ; δ, τ; σ, ρ, λ, μ, ν. Hence it appears that the diviſion of the Greek or Phœnician alphabet correſponds to that which obtains in all the Oriental languages; the vowels being ſeparated from the conſonants, and the conſonants themſelves claſſed conformably to the organs employed in ſounding them. It appears farther, that the alphabet at this time exiſted in its moſt ſimple ſtate, and was afterwards enlarged by combining its more ſimple elements. Thus ε repeated gave birth to η, which conſiſts of one epſilon turned backwards to face another, as ε϶, and thence abbreviated into the form of η. Alſo ο was doubled, which formed the long ω, its figure having faithfully preſerved the double οο blended into one letter. The early Greeks expreſſed the aſpirate by the figure H, which the Latins have hence copied: and this letter combining with the *labials* β, π, gave birth to φ; with the gutturals γ, κ, to χ; with the *dentals* δ, τ, to ϑ. Moreover, the ſibilant σ coaleſcing with π, β, φ, produced ψ; with κ, γ, χ, produced ξ; with τ, δ, ϑ, produced ζ. The alphabet of Cadmus was accordingly augmented by the following letters η ω, φ ϑ χ, ξ ψ ζ. The Greeks, wiſhing to diſplay their own improvements, have dignified theſe compound letters (which in reality are only combinations of the ſimple elements,) as the *inventions* of Palamedes in the times of the Trojan war, or of Simonides of Cos, who flouriſhed about 800 years before Chriſt. See Bent. on Phalaris, p. 241.

Theſe eight letters, by whomſoever formed, were firſt received by the Ionians, whoſe alphabet, conſiſting of four-and-twenty letters, was called the *Ionic*, in oppoſition to the *Attic alphabet*, which conſiſted of merely the ſixteen ſimple elements, the Athenians having, with the other ſtates of Greece, for a long time rejected the additional letters, though after the death of Euripides, in the archonſhip of Euclid, they were admitted by public authority; and thus the Greek alphabet, as we now find it, became the common alphabet of all the Greeks.

Laſtly, the Greek language is of Hebrew extraction, becauſe its roots will, upon examination, appear to have been no other than radicals of that language. In proof of this aſſertion we give the following ſhort liſt of them as ſpecimens.

אב, *ab* or *aab*, ſtem, root; hence απο, origin, beginning. It means alſo *pubes*, youth; hence ηβη. אבה, *abe*, to love; hence ηπιος, mild. איש, *aes*, man, one, εις, οιος, ſolus. אכל, *akal*, to eat, κολος, a piece of bread, χειλος, the lip, χιλος, food, χιλοω, to feed; κυλην, *culina*, kitchen. אלף, *alph*, αλφω, αλφαω, αλφαιω, αλφαινω, αλφεω, to ſtudy, invent, inveſtigate; אמל, *amal*, to be languid, feeble, αμαλος, tender; אמה, *ame*, ωμος, the ſhoulder; אמן, *amen*, to be true, hence αμην, μην, μεν. This word in Hebrew alſo means to defend with fidelity; hence αμυνω and αμυναθω, to aid, protect; אים, *aeem*, ωμος, cruel; אי, *aee*, an iſland; hence αια, the earth; אפן, *aphen*, a wheel; hence απηνη, a wain or carriage; ארך, *arek*, to ſtretch forward, ορεγω; ארון, *a cheſt*, ερειον, *urna;* ארץ, *aretz*, in Chaldean ארק, earth, to cultivate the earth, hence εργον, εργαζομαι, in Syriac, ארע, *aro;* hence αροω, to plow, αρουρα and ερα, terra; ארר, *arr*, to curſe, hence αρα, αραομαι; אש, *fire*, εσχαρα, a hearth; אשה, a ſacrifice, εστιαω, to feaſt, εσθιω, to eat, Ηφαιστος, Vulcan, is אבאשת, father of fire, or of ſacrifice; בא, *baa*, βαω, to go; בגה, *baga*, φαγω, to eat; בהמה, *beme*, ποιμνη, a flock; במה, *buma*, a high place, where an altar was raiſed, βωμος, an altar; בין, *been*, to underſtand, πινυω and πινυτος, prudent; ברך, *buruk*, to pray, bleſs, to rain, βρεχω, to rain, πρωκη, a drop. Hence alſo in the ſenſe of to ſupplicate came βρεγμα, the bending of the knee, ſupplication. Hence moreover βρακκαι, a covering for the knees, breeches; גאה, *gae*, γαιω, to glory; גור, to move round, tarry, γυροω, *gyro*; מגור, *magur*, a place of abode, μεγαρον, a reſidence; דין, *deen*, to contend, to litigate; τεινω, δειναζω, δεινος; דיק, *deek*, a defence, τειχος, a wall; דמה, *dama*, to ſubdue, δαμαω; הוד, *eud*, to venerate, to celebrate, praiſe, αιδω, αειδω, to ſing, αιδεω, to reverence, αυδαω, to expreſs; היה, εω or ειμι, *to be;* זון, to entertain, ξενος, a hoſt, ξενιζω; זוע, *zuo*, to move, σευω; חוה, *khue*, to illumine, αυω, ευω; חרי, ηρως, a hero, κυριος, a lord; חתת, to be inferior, ηττaω; טלא, *tula*, to ſtain, τιλαω; טלה, *tule*, a lamb, ταλασιον, κτιλος; יין, *een*, οινος, wine; οινων and οινωνη, a wine-cellar; ינה, *ene*, to afflict, ανια, ανιαω; כוה, *kue*, to burn, καιω, καω; כח, *kuk*, power, κικυς, κικυς, κικυω; להג, *leg*, to read, to collect, λεγω, λογος, λογιζω; מהל, to pollute, μολυς, μολυνω; מום, *mom*, a ſtain, μωμος, αμωμος, without a ſtain, blameleſs, μωμαω, to cenſure; נוה, *noe*, to inhabit, ναιω; עור, *aor*, to excite, ορω; פרש, *phereſh*, to explain, φραζω; צהר, *zer*, to ſhine, σειριαω, σειριαινω, to ſhine, σειριος, Sirius, σειρ, the ſun; קול, *kol*, to call, καλεω; קוה, *kue*, to expect, lean upon, κιω; תורבה, *turbe*, τυρβα, turba, a multitude, alſo θορυβος, a tumult, θορυβεω; רוה, *roe*, ρευω, ροω, ραινω, ερωεω, ερευδω, to flow, to water; רפא, *rapha*, to repair, to ſew, to heal; ραπτω, ραφις, a needle, ραφιον, a claſp; שוע, *ſoa*, σαω, to ſave; שיר, *ſeer*, συριγξ, συρισσω, to play on a pipe; תור, *tor*, to inveſtigate, contemplate, θηραω, θεωρεω; תנין, *tanin*, a viper. . . .

Theſe examples are ſufficient to ſhew how the Greek has been derived from Hebrew roots. Some thouſands of Greek primitives owe their origin to the ſame ſource; and it is not too much to ſay that, if the Hebrew language had been preſerved in the full extent in which it once flouriſhed, not a Greek term could be named, which might not be traced to ſome one of its roots. But as its records are comparatively ſo ſcanty, many of the parent terms of Greece may more immediately be found in the kindred tongues of Syria, Chaldea, Arabia, and even Perſia, which laſt, though different in ſtructure from the Greek, contains a multitude of its radical terms. The concluſion that Greek originally flowed from the Hebrew tongue, ſerves to explain many of the properties which diſtinguiſhes this celebrated language, and to correct many errors into which learned men have fallen in treating this ſubject.

"The eaſtern tongues, ſays Dr. Gillies, (Hiſtory of Greece, vol. i. p. 15.) are in general extremely deficient in vowels. It is, or rather was, much diſputed, whether the ancient orientals uſed any characters to expreſs them. Their languages, therefore, muſt have had an inflexible thickneſs of ſound, extremely different from the vocal harmony of the Greek, which abounds not only in vowels, but in diphthongs. This circumſtance denotes, in the Greeks, organs of perception more acute, elegant, and diſcerning. They felt ſuch faint variations of liquid ſounds as eſcaped the dulneſs of Aſiatic ears, and invented marks to expreſs them. They diſtinguiſhed in this manner, not only their articulation, but their quantity, and afterwards their muſical intonation." We do not think this obſervation altogether juſt, but think it rather founded in a miſconception of the oriental languages. In theſe every conſonant included in itſelf the vowel neceſſary to its enunciation; and while they thus preſented a ſeries of conſonants to the eye, each in pronunciation is accompanied with its appropriate vocal ſound, which rendered every word juſt as many ſyllables as it had of conſonants, and gave to the language an exact mixture of vowels and conſonants. When the Hebrew tongue ceaſed to be a living language, its true pronunciation was of courſe loſt; and with it was loſt the ſound and even the exiſtence of the included vowel; and to ſupply this loſs were invented the vowel points in Hebrew, Arabic, and the accents in Greek, which appear to be of kindred or rather of the ſame invention with the diacritical marks in the Aſiatic tongues. The early Greeks, being ſenſible of the included vowel in the parent tongue, gave it a ſeparate exiſtence, by annexing it to the conſonant: and as this vowel, though originally the ſame and always ſhort, was liable to fluctuation, and to perceptible difference of ſound, it naturally gave birth to the ſeveral ſhort vowels. In Homer the digamma, which was a labial conſonant, interpoſed between two vowels, which otherwiſe would have formed a diphthong. And this circumſtance might lead us to conclude that the early Greeks conformed to the Aſiatic tongues in rejecting the uſe of diphthongs, and that the uſe of diphthongs prevailed only as the digamma was laid aſide. In the more ancient languages of Aſia, all the included vowels were ſhort, and every vowel that had an independent form was probably *long:* but ſhort as well as long vowels came in time to have a ſeparate exiſtence; and the Shanſcrit, ſo far from being deficient in vowels, can boaſt of *ſixteen,* a number more than the double of thoſe in Greek.

We remark, in the ſecond place, that the derivation of the Greek primitives from the oriental tongues will, in general, ſet aſide as nugatory and erroneous the derivations of the ancient *ſcholiaſts,* and of thoſe modern lexicographers who have adopted their explanations. Theſe ſcholiaſts and grammarians are valuable as expounders of the Greek text; but as they were apparently ignorant of the oriental tongues, the account which they give of the words thence derived are often frivolous in the extreme. It is neceſſary to juſtify this aſſertion by a few examples. Αιμασια, *a hedge or fence,* occurs in Theocritus, Idyl. i. 47, and the ſcholiaſt derives it from ἁιμα, blood; becauſe thoſe who paſs through ſuch a fence are made to bleed. This derivation, nugatory as it appears, is adopted by Hederic in his lexicon: whereas its origin is the Hebrew אמץ, *amez, to ſtrengthen, to ſecure,* and thence applied to a *hedge,* which by ſurrounding defends a place. On the ſame principle κηπος, *a garden,* the origin of which neither Hederic nor any of the ancient ſcholiaſts, we believe, have attempted to unfold, is borrowed from קוף, *koph,* to ſurround: hence the term denoted a place ſurrounded or ſecured as a garden is. Lennep indeed derives it from καπος, *breath,* a word quite foreign to the purpoſe. The word βουριια, which occurs in Theocritus, Idyl. vii. 10, is thus explained by the ſcholiaſt; πηγη εν Κῳ, απο του βου μοριου, και του ῥεω η ὁτι βοος ῥινι παραπλησιος, *i. e.* a fountain in Cos, from the particle βου (large), and ῥεω, to flow, or becauſe it reſembles the noſtrils of an ox; whereas βουριια is evidently the Hebrew באר, *baar,* or בור, *bur,* a fountain. The Greek ſcholia, annexed to every author, abound with ſuch puerilities as the above; nor is the "Etymologicum Magnum" to be excepted, though the Greek lexicographers have ſought for no better or more rational guides in their enquiries after the origin of the words which they explain.

Hemſteruſe, Valckenaer, Ruhnken, Villoiſon, Lennep, Scheid, are indeed juſtly celebrated among modern critics for their reſearches into the origin and meaning of the Greek tongue. Their theories contain many valuable obſervations on the analogy by which that language grew from comparatively few radicals to its preſent complicated form; but their ſyſtem of etymologies appear to us, for the moſt part, fanciful and erroneous; becauſe in no inſtance, or at leaſt in very few inſtances, have they ſought the Greek terms in the languages of the Eaſt, whence aſſuredly they had been derived. Hemſteruſe derives θεος, Deus, from the verb θεω, to run, to diſpoſe; while its real origin, in our opinion, is the Hebrew and Arabic צאה, *zae,* pronounced in the latter language *dhao,* to ſhine. The Chaldeans repreſented the Supreme Good under the figure of light; and to this repreſentation the ſacred writer ſeems to allude, when he ſays that God is light. The ſame writer deduces οβριμος, *ſtrong,* from βριθυς; while its ſource is אבר, *abur,* to be ſtrong. From the ſame origin he ſuppoſes πριν or πρι, *before,* to have flowed, though it ſeems to point to the Hebrew פרע, *phra,* which in Arabic means the head or root of a family, and hence it came to ſignify origin or priority in the form of πρι: hence *prior* or *prius* in Latin.

Scheid derives τερας, an omen, from τερω, *tero,* to wear, becauſe omens, ſays he, obterant, quaſi, ſive ſtupore percellant, enecent que mortales. But the word is the Hebrew טיר, *teer,* a bird, divination, which was taken from birds. The ſame writer will have τενδω, or τενθω, *to eat,* to have come from τεινω, or τειω, to ſtretch, though far more naturally it points to the Perſian דנד, *dand,* dens, *a tooth;* and hence τενδω primarily meant, to cut with the teeth. The Hebrew צהר, *zer,* to ſhine, to ſcorch, gave birth to ξηρος, aridus; but Villoiſon fooliſhly derives it from ξεω, radere. The ſame critic as wiſely traces ξυλον to the ſame root, becauſe, ſays he, lignum ſit ad radendum aptum. But its origin is evidently אשר, a grove, hence αξυλος, wood, and by dropping the firſt vowel ξυλον, and by tranſpoſition αλσος, nemus.

cernus. Οπταω, *aſſo*, ab, οπτος, aſſus, ſays Scheid, quod ab οπτω, quod idem atque οκω, et ακω, *pungo pungendo figo.* But the parent word is אפה, to roaſt; and οπταω, to fry, ἁπτω, to kindle, εψω, to boil, are, with all their compounds, but the common offspring of this term. We ſhall only add one inſtance more from the Etymologicum of Lennep. Ορχεομαι ſalto ab ορω. Dici videtur a motu in altum. Componendum quoque eſt cum ερχομαι (venire.) Ab ορω factum ex ορεω, hinc ορεγω, *cum contentione moveo*, pec. in altum: unde facillima via ad ορεχω; ορχω, ορχεω. Rectiſſime igitur Etymol. c. 634, 52, παρα το ορεγω, και εκτεινειν τας χειρας—και ορχεισθαι Α[illegible], [illegible] ον. Unum tamen addidiſſe liceat, ſecundum analogiæ leges, ab ορχος (derivata voce verbi ορχω) pp. repetendum fuiſſe ορχεω, cujus Media forma eſt ορχεομαι.

This paragraph is a fair ſpecimen of the manner in which theſe etymologiſts have, by certain analogies, founded on their own fancies rather than on the real ſtructure of the Greek tongue, yoked together under one common root words the moſt foreign to each other.

The verb ορεχω did not come from ορω, or ορεω, but from ערג, *areg*, to deſire, or to ſtretch to an object, when deſired. From the ſame origin are derived ορεγνυμι, ορεχθεω, ορεχθω, ορεκτιαω, ορειχνομαι, ορεγνυκομαι, οργαω, and αργαω, all of which are but different modifications of the ſame primitive words by different people who uſed the ſame tongue. On the other hand, ερχομαι, to come or go, originated in ארח, *arukh*, or ארך, *arek*, to travail, prolong, extend. On the other hand ορχος, which means a row of plants, or the order in which any thing is done, is from the Hebrew ערך, *arek*, to arrange or place in order. From ορχος, arrangement, meaſure, rhythm, came the verb ορχεω, or ορχεομαι, to move to the ſounds of muſic in a dance or to battle. The movements in a dance and in war appear to have been regulated by the ſame meaſures; and hence dancers and warriors had the ſame names applied to them. *Mars* being called ορχηστης, as the author of the Etymologicum writes, ὡς προς πολεμον ευκινητος. Hence, too, a leader, *i. e.* one who put the men in order of battle, was called ορχαμος; and, moreover, πρυλις, which denoted a ſpecies of dance, came in Latin to ſignify prælium. Such learning, acuteneſs, and diligence as were poſſeſſed by Hemſteruſe, and the celebrated men abovementioned of his ſchool, however perverſe, could not altogether have been miſapplied. Their labours, therefore, muſt preſent ſome inſtances of juſt etymology, but their ſyſtem, upon the whole, appears to us both fanciful and erroneous, and calculated more to perplex their readers than to furniſh them with ſolid information.

Etymology, as it may ſerve to aſcertain the primary ſenſe of a word, to unfold a general principle in the formation of language, to exemplify the manner in which philoſophical notions, political occurrences, and religious inſtitutions influence the mind and give birth to new modes of ſpeech, is a ſubject of rational and uſeful enquiry. In this enlightened view it blends itſelf with the hiſtory of philoſophy, of politics, and of religion, with the ſtructure of the human frame, and even with the theory of the human mind. Connected with any or with all of theſe purpoſes, none but the uninformed will neglect or decry this branch of philology as vain and uſeleſs; and without ſuch connection none but pedants will purſue or extol it as worthy of attention. As the Greek originated in the Aſiatic languages, a knowledge of theſe languages to a certain extent is abſolutely neceſſary, to form a rational and competent etymologiſt in the dialects of Greece: and many paſſages muſt exiſt in the Greek writers, eſpecially the more ancient poets, which can be underſtood only by light reflected from the Eaſt. It will not be foreign to our purpoſe to illuſtrate this poſition by a few examples. The firſt we ſelect occurs in Homer's Iliad, ii. 815:—

> Εστι δε τις προπαροιθε πολεως αιπεια κολωνη
> Εν πεδιω απανευθε, περιδρομος ενθα και ενθα,
> Την ητοι ανδρες Βατιειαν κικλησκουσι,
> Αθανατοι δε τε σημα πολυσκαρθμοιο Μυριννης.

Of this paſſage the following is a literal verſion: *There exiſts apart in the plain, in the front of the city, (namely* Troy*) a lofty mount, acceſſible by a circular aſcent. This men call* Batieia; *but the Immortals the tomb of far-ſounding Myrinne.*

The language of the Trojans, though a dialect of the Greek, was, we may well ſuppoſe, from their ſituation, mixed by an influx of Aſiatic terms. Of this claſs is Βατιεια, which in Hebrew is בית, *beit*, and means an *abode.* In Iſaiah, xiv. 18, and Job, iii. 15, it ſignifies the laſt home of man. The term here occurs in the Syriac form ביתא, *bateea*, and has the ſenſe which it bears in the Jewiſh ſcriptures. Hence we diſcover the meaning of the paſſage, which has eſcaped the knowledge of the critics, ancient and modern. Βατιεια means the ſame thing with σημα, and the clauſe, πολυσκαρθμοιο Μυριννης, is to be connected with the former as well as with the latter; and the import of the phraſe is, *Men call it (Batieia) the grave, and the Immortals the tomb, of Myrinnes.* By *men* Homer meant the vulgar people of Troy; by the *Immortals* he intended the poliſhed Greeks. Here we ſee the partiality or rather the pride of the poet reſpecting his language and countrymen. The phraſe is purely oriental. The elegant Shanſcrit is ſtyled *Daeb Nagoree*, writings of the Immortals. Conformably to the ſame lofty figure, Homer calls Greek, from its ſuperior poliſh, *the language of the immortal gods*, while he characterizes the dialect of Troy, from its barbarity and rudeneſs, the *language of men.*

The explanation which the critics have given of Βατιεια is various, each rendering it more uncertain and improbable. Heſychius explains it to be πολις Τρωικη. Others derive the term from βαω, or βαινω, to go; and others again from βατος, *bramble*, becauſe, as Heyne ſays, collis ſentibus obductus eſſe potuit. As the commentators did not know the origin or meaning of the word, it is not to be expected that they ſhould underſtand the ſingular phraſeology grounded upon the uſe of it. Euſtathius's account of it is, το μεν ὁλως κρειττον των ονοματων θεοις διδωσιν ὁ ποιητης; *the poet aſcribes the beſt name to the gods.* The ſcholiaſt ſays, τον μεν πρωγενεστερον ονομα εις θεους αναφερει ὁ ποιητης, το δε μεταγενεστερον εις ανθρωπους; *the poet refers the more ancient name to the gods; the more recent name to men*; which cannot be true: for Βατιεια is at leaſt equally ancient with σημα. Clarke comes nearer the truth, who ſuppoſes the language of the *Immortals* to mean the language of the learned; and this great critic would have ſeen that Homer intended to contraſt not the language of the learned with the vulgar Greek, but the poliſhed language of the Greeks with the barbarous dialect of the Trojans, if he had been aware that βατιεια, in this dialect, meant a *tomb*, or the ſame thing with σημα. We ſhall only obſerve that this word exiſts in Celtic, and bears the ſame ſignification—*bedd, a grave.*

The next paſſage in which the uſe of the Oriental tongues ſerves to illuſtrate obſcurities in Greek authors, we ſhall ſelect from the Agamemnon of Æſchylus. On this paragraph much has been written, and written in vain by the critics. *Clytemneſtra*, the lady Macbeth of ancient days, boaſts in it of her fidelity, during the abſence of her lord, and the joy with which ſhe would receive him on his return.

> Ουδε οιδα τερψιν, ουδε επιψογον φατιν,
> Αλλου προς ανδρος μαλλον η χαλκου βαφας.

The lines are thus rendered in the elegant and poetical verſion of Mr. Potter:

——— Never knew I pleaſure
In the blamed converſe of another man,
More than the virgin metal in the mines
Knows an adulterate and debaſing mixture.

On this paſſage the author has the following note: Paw honeſtly ſays, "aliquid ſubeſt quod non intelligo." Mr. Heath diſapproves the alluſion, though he thinks it a proverbial expreſſion, the grace of which is loſt on our ignorance, and ſays, "quod nos non videmus alius olim forſan videbit."—In the old Perſian called the *Pehlevi*, the firſt principle of things was called באב : and though ſuppoſed to be fire by the diſciples of Zoroaſter, the term is a modification of אב, *ab*, water, which the Arabians maintained to be the original element. With the notion that water is the primary matter, the early Greek philoſophers appear to have borrowed the term. Hence βαπτω, *to plunge*, (which Lennep abſurdly deduces from βαω): hence too βαφη, *immerſion;* and the phraſe χαλκου βαφη is a metaphor for a *ſtab* or *wound*, it being produced by a weapon plunged into the body as into water. The ſentiment which the words convey to the herald, whom Clytemneſtra addreſſed, is to this effect, *I know no pleaſure with any man, and feel no more the ſting of calumny, than the point of ſteel.* But the language is ſtudiouſly equivocal; and in this peculiarity conſiſted at once the ſkill and the obſcurity of it. While the queen *appeared* to expreſs the above meaning, ſhe in reality expreſſed quite the reverſe. I know no greater pleaſure, though no report more diſgraceful, than a ſteel plunged in him, (namely Agamemnon,) by another huſband. This artful equivocation ariſes from the manner in which the clauſe αλλου προς ανδρος is connected. If taken with τερψιν the lines convey the *firſt* ſenſe; but with χαλκου βαφας, they convey the *laſt*.

For this interpretation we have the beſt authority, namely that of the *Chorus*, who were preſent: who, perceiving that the herald was miſled by the artful ambiguity of the words, hints at their true ſignification as ſoon as the queen withdrew from the ſtage.

Αυτη μεν ὁυτως ειπε μανθανοντι σοι
Τοροισιν ἑρμηνευσιν ευπρεπως λογον.

Which may be thus renderd: *This woman hath told thee learning (thee who haſt yet to learn,) what ſhe is, a tale which diſcerning interpreters perceive to be very becoming,—well to become her character and views.* Here τοροισιν ἑρμηνευσιν depend on ευπρεπως; and the Chorus intimate, that her words, underſtood, as they ſeem to have been by the herald, were falſe and unbecoming, but ſtrictly true and appropriate in the ſenſe in which *they*, who knew the woman better, had reaſon to regard them. Taken in the firſt ſenſe, the metaphor χαλκου βαφας is too violent for the ſimplicity of the ſentiment; and the falſehood, moreover, is ſo glaring as to claſs the queen with the baſeſt of deceivers, without a trait of that maſculine intrepidity and elevated ardour with which ſhe preſſed to the object of her deſire. In the latter it exactly ſuits the dark ambiguity of prophetic language: and the boldneſs of it is in uniſon with that vehemence and glow of pleaſure, with which ſhe anticipated the plunging of the weapon in the boſom of her huſband. For theſe reaſons the Chorus juſtly pronounce her language ευπρεπες, as at once expreſſive of her true feelings, her artifice, and her intrepidity.

Lycophron, who flouriſhed under Ptolemy Philadelphus, is known to have ſtudiouſly affected the uſe of hard and obſcure terms; which, from their antiquity, muſt demand the attention of Aſiatic ſcholars. In his *Caſſandra*, the only remains of his voluminous productions, occur theſe lines:

Τραμπις τ' εχινος και Φερεκλειοι ποδες
Διττους σταθμους ἆξει, κ'απι Γυθειου πλακας;
Εν αἷσι προς κινουρα, καμπυλας σχασας
Ηιονας [illegible], εκτορας πλημμυριδος.

They contain a prophetic addreſs to Paris, now commencing his expedition for the rape of Helen, and may thus be literally rendered: —*The ſhip and feet of Pherecleus will bear thee to the two ports and coaſts of Gythium, having in theſe fixed to the rocks the crooked teeth of the pine, Hectors (i.e. ſuſtainers,) of the flood.* Pherecleus as an artiſt conſtructed the ſhip, and as a ſoothſayer, conſulted the gods, and endeavoured to conciliate them to the projected expedition. As ſuch, he was naturally led to give the veſſel the name of τραμπις, which with the Greek termination is the Chaldean and Phœnician term for the tutelary gods, תרפים, *tarpim*, or *trapim*. The ſcholiaſt ſays, it is the name of *a foreign ſhip;* and in this he is followed by Heſychius. It was certainly uſual to carve the images of the gods on the ſhip, which they were ſuppoſed to protect; and to them the ſailors fled in ſeaſons of danger. (See Hor. i. 14.) The figures, which at this day are often framed in the forepart of the ſhip, are but the remains of the ſame cuſtom. The practice, no doubt, originated with the Phœnicians: and it was natural for them to call their ſhip by the name of thoſe gods which were ſuppoſed to preſerve them. The rudders, the oars, the ſails, by which the veſſel was moved, are here affectedly called the *feet* of Pherecleus, he being the author of them. Of the derivation of the term the ſcholiaſt and Heſychius appear equally ignorant, and the whole of this paſſage is a ſtriking inſtance how incompetent the ancient commentators were to explain in many places the terms of the Greek tongue.

The ancients had ſtatues of their gods erected before their doors, and in the entrance of their harbours. Theſe received the ſalutations of ſtrangers and paſſengers. Lucretius mentions this cuſtom in his firſt book. Hence the doors and ports received the name of σαλαμβαι, as being places where the gods were *ſaluted*, from the Arabic שלאם, *ſalaam*, ſalutation. The account which the ſcholiaſt gives of this term is ridiculous: σαλαμβαι δε αἱ θυραι λεγονται, παρα το ἐν σαλῳ βαινειν. The explanation of Heſychius is more rational, though not the true one; σαλαμβη ἡ οπη δι ἧς το σελας βαινει. This is a fair ſpecimen of the manner in which the Greek words, derived from the Eaſt, are explained in the old gloſſaries. But farther, πλακας, *coaſts*, is the Hebrew פלג, *paleg*, or *plag*, (the vowels being arbitrary, and not exiſting but as included in the conſonants of the original,) and ſignifies to divide, and thence as a noun any thing divided, ſuch as portions of the land and ſea. From the ſame original is derived πελαγος, as ſerving to divide the earth into diſtinct territories: hence too, the Latin *plaga*, a clime or region. Finally, the unuſual term κινουρα originated in the Perſian *kinaar*, an extremity or limit which, as the limits of a river came hence to ſignify its *banks;* as the limits of the ſea its *ſhores*, or the *rocks* lining them. The limits of a door are its poſts; and hence the Celtic word *kynnor*, the door poſts; and probably from the ſame ſource, on account of their remoteneſs, has been derived the appellation aſſigned to the Canary Iſlands.

The attempts of Paris, under the auſpices of Pherecleus, to appeaſe or conciliate the gods, are alluded to by Horace, lib. i. 15. who appears to have had the paſſage of Lycophron in his view. Pherecleus, the firſt adviſer, perhaps, of the expedition, is repreſented by Homer as properly puniſhed; for he received an ignominious death from the hand of Merion. The poet adds, Il. v. 65. επει ουτι θεων εκθεσφατα ηδη, ſince he did not at all know the decrees of the gods. To ſay that Pherecleus did not poſſeſs this knowledge, appears not only a proſaic, but an unneceſſary ſaying: for who is the man that is acquainted with the divine decrees, while yet unfulfilled? But when it is conſidered that Pherecleus had *pretended* to be ſo knowing, and probably predicted ultimate ſucceſs, while the event turned out very different from his predictions, there is much propriety and even point in the remark; ſince it holds forth the *diviner* as a *deceiver*, who by his impoſtures brought ruin upon himſelf and his country. From this we may conclude, that the beauties of Homer, who confines himſelf beyond any other poet to general nature, yet in many inſtances depend upon circumſtances unknown to, or unobſerved by modern readers.

The prevailing taſte for oriental literature promiſes to contribute much to the improvement of philology. And when claſſic ſcholars ſhall engage with due attention in this purſuit, the more ancient Greek writings will ſhare in the general benefit, by the light reflected upon them from the Eaſt. The derivation of the Greek from the oriental tongues, the frequent uſe of terms which Homer, Heſiod, Lycophron, and others have adopted in their primary ſignifications, have occaſioned difficulties which a critic, however able, but verſed only in Greek and Roman authors, is hardly able to ſolve. Theſe difficulties, inſtead of being explained, have been gloſſed over by the futile etymologies of the ancient ſcholiaſts and lexicographers: and they can be properly felt and ſucceſsfully removed only by thoſe who have extended their ſtudy from the elegant language of the Greeks, to the no leſs poliſhed languages of Perſia, Arabia, and Judea. Of this poſition the examples above cited afford ſufficient illuſtration: and they are, it is hoped, too curious, new, and ſolid, not to be undeſerving of a place in a dictionary of ſcience.

In the laſt place, the derivation of the Greek from the ancient languages of the Eaſt, will account for the origin of the much diſputed *digamma*. In theſe tongues gutturals abounded, which, like other conſonants, contained in themſelves the vowel neceſſary to their pronunciation. But it is the tendency of every guttural, when become habitual, to ſoften down, in the rapidity of utterance, into a mere aſpirate, till it at length vaniſhes. Thus *cornu* has degenerated into *horn*; χαμος, into *humus*, earth, and into *homo*, a creature of earth, man. Thus alſo the Hebrew חי (χι,) which ſignifies *life*, *ſoul*, *ſelf*, appeared in Greek in the form of ἑυ, ὁι, ἑ. Moreover כבד, *kabád*, a liver, gave birth to ἥπατ-ος. This word retains an unqueſtionable mark of its derivation, for it has the form כבד, *kabad*, or, כבר, *kabar*: and this variation has been transfuſed into the Greek ἧπαρ and ἥπατ-ος. Hence we obtain the origin of the aſpirate placed over a vowel. It was originally a guttural, which loſing its power as a conſonant left the included vowel behind, with an inverted comma above, to perpetuate that part of the letter which fell into diſuſe.

The guttural, when ſoftened into an aſpirate, is apt to be dilated into a long vowel. Hence the reaſon why η, in the ancient Greek, ſeems to have been accompanied by an aſpirate, as in ἧπαρ. On the ſame principle that a guttural ſoftens into an aſpirate, the aſpirate often melts into a gentle breathing, or becomes in pronunciation quite quieſcent, as the Latin *honor* and *honeſtus* become in Engliſh *honour* and *honeſt*, the *h* being mute. On the ſame principle too *gh* became ſilent in our tongue, as in *taught*, *ſought*. So in the Greek חאן, *khaan*, a king, has degenerated into ανασσω, which Homer pronounced ϝανασσω. This leads us to remark, that the aſpirate, inſtead of vaniſhing, was changed into a labial letter *w*, *v*, *b*, *f*, or ϝ. Thus laugh, cough, which are ſtill ſtrong guttural ſounds among our northern neighbours, are ſounded *laff*, *coff*, among us. Thus alſo in Greek, what was at firſt written χανασσω, was pronounced ϝανασσω; and the words ἑυ, ἑι, ἑ, were ſounded *wou*, *woy*, *we*, or fou, foi, fe.

But the digamma did not always originate in a guttural, but ſometimes in conſonants allied to our *w* or *y*. Thus from ידע, *yido*, is derived the Greek ειδω, which in Homer is ſounded *wido*, becauſe the original is *yido*, hence the Latin *video*. So again fron יין, *yin*, is taken οινος, *wine*, ſounded *winos*: hence *vinum*, and *wine*.

We have already obſerved, that in Hebrew every conſonant contained in itſelf the vowel neceſſary to its pronunciation. This vowel the Greeks detached and gave it a ſeparate exiſtence, by ſubjoining it to the concomitant conſonant. And as the Hebrews ſeem at firſt to have ſounded every conſonant, thus dividing each word into as many ſyllables as it had of conſonants; and as they farther ſeem to have uſed vowels only in conjunction with conſonants, and to have conſidered them as unfit to be employed alone and independent, ſo the Greeks, in imitation of them, uſed at firſt only ſhort vowels: they next adopted the long or compound vowels η and ω; but ſtill avoided the diphthongs, and when any two vowels concurred, they converted the firſt of them into a labial conſonant. Thus, λαμπετοωντι, was ſounded not *lampetoonti*, but lampetowonti, or *lampetovonti*; and μουσαων, pronounced *mouſawon*, or *mouſavon*; ειπω, *wipo*.

This letter is called *digamma*, becauſe it has the form of two *gammas*, one upon another like our capital F, and alſo called *Æolic*, as ſuppoſed to belong excluſively to the *Æolic* dialect. But this account of it proves, that it did not belong, as Dr. Bentley and others have ſuppoſed, to the Æolic dialect only, but to all the dialects of Greece, in their more ancient mode of pronunciation. It follows alſo that the univerſal opinion of the learned, who ſay that the *digamma* at *firſt* prevailed, and was afterwards ſucceeded by the *aſpirate*, is the reverſe of the truth. For the true ſtate of the caſe is, that gutturals at firſt prevailed; theſe ſoftened into mere aſpirates; and theſe again were changed for a more eaſy and agreeable letter, which being ſimply a labial was diverſified by different people into *y*, *w*, *v*, ϝ, *b*, or *f*. But the digamma, it will be ſaid, is to be found only in Homer, by far the moſt *ancient* writer of Greece, while the aſpirate is in all the more *recent* authors. The anſwer is this: the uſe of the aſpirate obtained in the written language, and was, therefore, leſs ſuſceptible of corruption. On the other hand, that of the digamma prevailed in pronunciation, which was more liable to change, and to deviate from the original terms. Homer, we may naturally ſuppoſe, adopted the firſt in compoſing and *writing* his poems, and the laſt in *reciting* them to the people. The written form, we may preſume, was at firſt uſed but little, but prevailed by degrees; while the peculiarities of pronunciation in their turn began to decline. The language, as written by Homer, at length became faſhionable in the converſation of poliſhed people, and the aſpirate, being thus triumphant in the daily converſe of learned men, would of courſe, in their writings, triumph over oral and temporal corruptions.

The change of a guttural into an aſpirate, or into a long vowel, or into a labial letter called the *digamma*, is not peculiar to any one language, but is founded on the ſtructure of the organs of ſpeech; and inſtances of it prevail in all languages, both ancient and modern.

The preſervation of the aſpirate in the written language of

Homer, while the *digamma* was uſed in reciting them, is a proof (if a proof be wanting) that Homer did actually uſe a *written* language, and that his works were preſerved by a written language: otherwiſe the aſpirate would have been loſt, and the *digamma* alone would have prevailed in all the Greek authors who ſucceeded that celebrated bard. If an editor of Homer in modern days would inſert the digamma, he would corrupt the original orthography of Homer, and ſubſtitute in the room of the original characters the corruptions of pronunciation.

We ſhall now make ſome obſervations on the leading parts of ſpeech, which may ſerve to unfold the peculiar nature and amazing extent of this language. As gender is the diſtinction of ſex, there cannot in ſtrictneſs be in any language more than *two* genders, maſculine and feminine; nouns expreſſing inanimate objects, or things without life, being in a philoſophical ſenſe *neuter* or *neither* gender. But neuter nouns had by analogy aſſigned them the terminations of maſculine and feminine nouns; and unfortunately for Greek, and the other European languages affected by it, the termination became ſoon regarded as an index of the gender, without any reference to the meaning. Thus nouns deſignating females ended in α or η; and for this reaſon the names of inanimate things, and alſo adjectives, having the ſame ending, are ſaid to be *feminine*. For the ſame reaſon nouns in ος or ης, though meaning things without life, are generally maſculine, becauſe theſe happened to be the predominant terminations of the names of males. There are, therefore, in this language two principles which regulate the gender of nouns, the ſignification and the termination: the former aſcertaining the gender of living things, or things whoſe ſex it is of importance to diſtinguiſh, the latter that of inanimate objects. There is, however, a third principle, on which is founded the diſtinction of gender, we mean the analogy which inanimate objects ſometimes have to living creatures. There are ſome terminations common to males and females, and theſe afford ſuch analogy an opportunity to operate. Thus λογος, reaſon, though expreſſive of what is neither male nor female, is made maſculine, as ſignifying the commanding and the moſt excellent faculty of the human mind; whereas ὕδωρ, *away*, from its affinity to γη, the earth, or from the paſſive nature of its ſignification, a characteriſtic more of the female than of the male, is made feminine. That this analogy is not fanciful might be proved by many inſtances. In Ariſtophanes βατος is maſculine; but Theocritus (Idyl. i. 132.) in repreſenting it as producing *violet*, makes it feminine. This affinity to the female ſex is the reaſon why *arbor*, with the ſpecific names of trees in *us*, are always feminine, though the termination is decidedly maſculine. In caſes where the termination abſolutely belongs to the names of males or females, this principle of *analogy* neceſſarily gives way to the termination. Thus, becauſe η final is invariably appropriated to feminine nouns, θαλασση, *the ſea*, is feminine: on the other hand, χρονος, *time*, is maſculine, from its termination as well as from analogy.

Nouns and verbs in Greek have a *dual number* to expreſs two things, or ſuch things as are in pairs, as hands, eyes, feet. The uſe of the dual occurs frequently in the poets, though not peculiar to them, nor always obſerved by them, when ſpeaking of two objects. The dual number is by no means neceſſary in language, though it may enable the Greek to expreſs the number two or pairs with more emphaſis and preciſion. It was, therefore, rejected by the Æolians and by the Latins, who derived their tongue from the Æolic dialect. The ſeventy tranſlators, moreover, have rejected the uſe of the dual number, and in this they have been followed by the writers of the New Teſtament and the Greek fathers.

Caſes have been defined by all modern grammarians to be *changes* in the termination of nouns; but the name πτωσις, in Greek expreſſive of caſes, clearly ſhews that this is not the primary meaning of a caſe. For πτωσις means *a fall*, and, from ſignifying *a fall*, it came to ſignify the place in which a noun fails in a ſentence. The idea, then, which a caſe at firſt expreſſed is the *poſition* of a noun in a ſentence, and by that poſition expreſſing the relation of one word to another. Thus, if a noun denoted the *direct* ſubject of a propoſition or diſcourſe, it is ſaid to be in the *right caſe*, πτωσις ορθη, *i. e.* the direct or ſtraight poſition; but if a noun expreſs an object or quality *indirectly*, it is ſaid to be in an *oblique poſition*, πτωσις πλαγια, and this deviation from a direct to an indirect poſition, as the ſubject of diſcourſe, is in the language of grammarians farther called κλισις, declenſion. Farther, caſes expreſs the relation of things in motion or action, and the relations neceſſary for the purpoſes of language are chiefly the following: the relation of *cauſe*, the relation of *effect*, the relation of *beginning*, the relation of *medium* or *inſtrument*, and the relation of *end*. A noun denoting the relation of cauſe, *i. e.* denoting the agent of an active or the ſubject of a neuter or connecting verb, is in the *nominative*; that of effect in the *accuſative*; that of beginning in the *genitive*; that of medium or inſtrument in the *ablative*; and that of end in the *dative*. The nominative alone is called the *right* or direct caſe, the reſt are all deemed *oblique* caſes; though the accuſative, as expreſſing a direct part of a propoſition, might more properly be called a right, than an oblique caſe.

Moreover, the relations of bodies in motion or action were at firſt expreſſed by *prepoſitions*: and as our ideas of relation ariſe from the things related, and which ſucceeded them in their formation, prepoſitions ſhould, and probably did, in the early uſe of language come after, inſtead of going before the nouns which they governed. In conſequence of this arrangement, they combined into one word with the final ſyllables of the connected noun, and thus ſerved to give it a diverſity of terminations. Hence the origin of caſes in the ſenſe in which caſes have hitherto been underſtood by modern grammarians. It is worthy of remark, before we quit this ſubject, that the nominative, as expreſſing *cauſe*, has a cloſe affinity to the genitive, which means beginning. But the former fixes the attention on the noun, as an *agent* or a cauſe in action: while the latter holds forth its noun as the *ſource* or *beginning* of motion. The beginning of a thing is often the author and owner of that thing: hence the genitive has the ſecondary ſenſe of *poſſeſſion*. On the other hand, the accuſative is nearly allied in ſenſe to the dative; but the former is not uſed in its ſtrict and original ſignification, unleſs it denotes an *effect*, or the thing in which *action* terminates; while the latter, in ſtrict propriety, marks the end to which *motion* points, and in which it terminates. The genitive ſtands oppoſed to the dative, as beginning to the end, like the oppoſite points of a right line; while the ablative expreſſes the medium or inſtrumentality of the motion by which that line is generated. The ablative caſe therefore denotes one of the moſt important and diſtinct relations in language, and yet the Greek, with all its boaſted copiouſneſs and preciſion, has not a diſtinct termination to expreſs this caſe, but denotes it ſometimes by the genitive, and at others by the dative, with or without a prepoſition. Finally inanimate things only move after they are put in motion, or act as they are acted upon. This is probably the reaſon why neuter nouns in Greek have no termination to expreſs cauſe, diſtinct from that which marks effect, that is, why the nominative and the accuſative of Greek neuter nouns are always the ſame.

A multitude of nouns in all languages expreſs the abſtract ideas of action, and conſequently are derived from verbs, as ſubſequent to verbs in their formation. Our ideas moreover of the perſons, the characters, the offices of men, are derived from the ſame ſources; and from verbs are derived the nouns which expreſs thoſe perſons, characters, and offices.

The name of the *actor* is derived from the correſponding verb by adding της, ης, ας, ευς; as μαθεω, *to learn*, μαθητης the perſon that learns, a learner; ιχνευω, *to ſeek*, ιχνευτης; μαστευω, *to enquire*, μαστηρ, *the perſon who enquires*; σπειρω, *to ſow*; σπορευς, *a ſower*.

Nouns expreſſing the action of the verb abſtractedly conſidered, or the effect of that action, are derived from the correſponding verbs by adding σις in the room of the final ω; as τερπ-ω, *to delight*, τερπσις; τερψις, *delight*, *the act of delighting*; τεκ-ω, *to produce*; τεκσις, τεξις, *the act of producing, production*; κριν-ω, *to judge*, κρινσις, κρισις, *judgment*. Hence it is evident that verbs in πω or πτω, βω, φω, muſt have their correſponding nouns in ψις: thoſe in κω, γω, χω, and thoſe in σσω (for γω) in ξις; and thoſe in ζω and σσω (for ζω) in σις. The penultimate vowels α and ε are changed into η, and ο into ω: as μαθεω, *to learn*; μαθησις, *inſtruction*; ορθοω, *to rectify*; ορθωσις, *rectitude*.

Other verbs are changed into abſtract nouns by changing the laſt ſyllable into μα or μος, or ſimply into η, the penultimate ε being changed into ο after the analogy of the perfect middle; as βλεπω, *to ſee*; βλεπμα, βλεμμα, *a ſight*; κριν-ω, κρινμα, κριμα, *judgment*; τρωω for τραυ-ω, *to pierce*; τραυμα, *a wound*; ἁρπαζω, *to plunder*; ἁρπασμος, *plunder*; ὁριζω, *to define*; ὁρισμος, *definition*; φθειρω, *to corrupt*; φθορα, *corruption*; σπειρω, *to ſow*; σπορα, *ſeed*.

Adjectives are converted into abſtract nouns by changing the laſt ſyllable into της, or into υνη, or into ας, or into ια; ποιος, *qualis, ſuch*; ποιοτης, *quality*; κακος, *baſe*; κακοτης, *baſeneſs*; μονος, *alone*, or *one*; μονας, *the number one, monad*; δυω, *two*; δυας, *the number two*; αληθης, *true*; αληθεια, *truth*; δοκιμος, *approved*; δοκιμασια, *approbation*.

Adjectives, being the names of qualities, are taken from the names of the objects to which thoſe qualities in a prominent manner belong; as ονος, *an aſs*; ονοτος, *contemptible*; ανεμος, *wind*; ανεμοεις, *windy*; ανεμωλιος, *empty, like the wind*. But adjectives are derived from nouns by annexing to them the verbs expreſſive of ſimilitude, εικος, *like*; ειδος *reſemblance*; ειος, *ſuch, like*; as ανθρωπος, *a man*; ανθρωπικος, *man-like, manly*; ανθρωπειος for ανθρωπ-ιος, *man-like*; alſo ανθρωπωδης, for ανθρω-ποειδης, having the form of a man, manly. This compoſition is the origin of that claſs of nouns called *patronymics*. Πηλευς, Πηλειδης, one having the form of Peleus, *i. e.* the ſon of Peleus.

There are in Greek but two perſonal pronouns, that is, ſubſtitutes for nouns, or, as we have explained them in the article Grammar, numeral adjectives, aſſuming the character of nouns by aſſociation with the verb. Theſe are εγω, *I*; συ or τυ, *thou*; and they are evidently derived from the Hebrew אנכי, *ankee*, *I*, which in Greek is written in the various forms of εγω, εγων, εγωνη, ιωγα, ιωγγα; אתה, *ata*, and by dropping א, תה, *tau*, or the Æolic τυ: ὑ always expreſſes the ſubject or agent in one of the oblique caſes, and therefore, as not wanting, has not a nominative caſe. Its origin is the Hebrew חי, *khi*, *life*, *ſoul*, *ſelf*, which latter is the ſenſe of ὑ. Pronouns of the third perſon are only definitives or reſtrictive adjectives agreeing with the noun defined, expreſſed, or implied. The chief of theſe is ὁ, *the*, *he*, which very improperly has been called an *article*; whereas it is a *definitive* derived from the Hebrew ה, *ha*, which, as an abbreviation of הן, *en*, ſerves to direct the attention to an object, and thus to diſtinguiſh that object from all other things. Ὁς, *who*, αυτος, *the ſame*, ὁυτος, *this*, are but different modifications of ὁ. In ſpeaking briefly of the verb, we ſhall do little more than copy Mr. Jones's ſyſtem, as explained in that part of his Greek grammar where he treats of the origin of verbs. This ſyſtem is founded on the Hebrew tongue, in which all the varieties of mood, tenſe, number, and perſon ariſe from the combination of the perſonal pronouns with a radical noun or verb. Though a multitude of abſtract nouns are borrowed from verbs, yet all or moſt of the Greek verbs are nouns converted into verbs, by annexing to them the perſonal pronouns. His own words are: We acquire the ideas of action by reflecting on ourſelves, or obſerving others in certain circumſtances; and the moſt ſimple way which nature could at firſt ſuggeſt of expreſſing theſe ideas was to combine the name of the perſon or thing which acts with the perſon or thing acted upon. Thus οινος and εγω joined, and abbreviated, is οινοω: and this term would be ſufficient to expreſs *I drink wine*, though it originally meant only *wine I*: aſſociation ſupplying to the ſpeaker, and to the perſon addreſſed, the intermediate notion of *drinking*. From this account of the origin of verbs, he deduces three concluſions of importance to be obſerved. *Firſt*, verbs were originally the names of things; and thus received their characters as verbs from aſſociation. *Secondly*, that every verb conſiſts of a pronoun expreſſing an agent, and of a noun or the ſubſtitute of a noun expreſſing an object. *Thirdly*, that the terminations, ω, εις, ει, ετον, ομεν, ετε, ουσι, were originally the perſonal pronouns, and from theſe, with the changes which they underwent, have proceeded all the variations of mood, tenſe, number, perſon and voice.

The firſt perſon, ω, is a fragment of εγω; and by the ſame analogy that εγω becomes εμε, verbs in ω are changed into verbs in εμι; as ἱσταω, ἱσταεμι, *to place*, θεω, or τιθεω, τιθεεμι, *to fix*; δοω, or διδοω, διδοεμι, *to give*; κλυω, or κικλυω, κλυεμι, or κικλυεμι, *to hear*. The perſonal terminations of verbs in εμι are therefore but a modification of thoſe in ω, and conſequently a modification of the perſonal pronouns εμι, ες, ει, ετον, εμεν, ετι, εσι. On this principle the verbs in μι, which grammarians have hitherto divided into four diſtinct claſſes, are, according to Mr. Jones's theory, but one claſs, having each the ſame perſonal termination, and differing only by different modes of contraction; as ἱσταεμι, ἱστημι; τιθεεμι, τιθημι; διδοεμι, διδωμι; κικλυεμι, κικλυμι. This complex ſpecies of verbs is hence reduced into great ſimplicity, and the acquiſition of them rendered very eaſy. The firſt perſon optative, even of verbs in ω, conforms to the analogy of verbs in μι, τυπτοιμι, which originated in τυπτομι, though obſolete. From this ſource the Latins have derived the final *m*, amabam.

The ſecond perſon in Hebrew is ת, *tha*, or *ta*, a fragment of אתה, *ata*. Hence the Ionians formed this perſon in θα—οισθα, *thou knoweſt*; ησθα, *thou waſt*. The above fragment, conſiſting of *th* or *t* only, has been corrupted into ς. Hence the ſecond perſon in every tenſe of the active voice terminates in ς, with ε or α ſhort preceding. The ſubjunctives ι, υ, form no part of the original pronouns, but were inſerted, as is often the caſe, to lengthen the preceding vowel. The third pronoun in Hebrew is הוא, *hoe*, which is the parent of *he* in Engliſh, and in Greek of ὁ. This, with the ſubjunctive ι, forms the third perſon, τυπτει. To the original ὁ the Ionians added σι. Thus in verbs in μι, τιθεεσι, τιθησι, for τιθη, and in the ſubjunctive of verbs in ω, we meet with ελθησι for ελθη. In Shanſcrit, a language which has a great ſimilitude to the Greek, *ſu* or *ſuh* means *be*.

In Arabic the ordinal of *two* is *tan*. Hence the Greek dual τον or την, τυπτετον, or τυπτετην, *they two beat*. The perſonal termination in the plural are all formed from the ſingular. Thus εμι, by the analogy of the third declenſion, is εμες, and in this form it was uſed by the Doric, the moſt ancient dialect of Greece, τυπτομες, ετυψαμες. In the common tongue the final ς became corrupted into ν. The ſecond plural is the ſame in its origin with that of the ſingular *ta* or *te*, τυπτετε, and the third plural is the ſame with the third ſingular differently contracted, τιθεεσι τιθησι, *he places*, τιθεισι, *they place*. The third of verbs in ω is formed from the third of thoſe in μι, with the ſubjunctive υ annexed, τυπτεσι, τυπτευσι, which is the Æolic form, and hence in the common tongue, τυπτουσι. The vowel ε, not only in ſingle inſtances, but in whole claſſes of words, is changed into ο. Thus in the formation of nouns from verbs τεμνω, *to cut*, τομη, *a ſection*; in forming the perfect middle, πειθω, *to perſuade*, πεποιθα, and ſometimes the perfect active βρεχω, *to rain*, βεβροχα; in forming circumflex from other verbs, τρεμω, *to tremble*, τρομεω; by corruption in ſingle words οδοντες, εδοντες, *teeth*, γονυ, *genu*. On the ſame principle the Æolic ευσι became ουσι.

The perſonal terminations of the imperfect or paſt tenſe in μι, are εν, ες, ε, ετον, ετην, εμεν, ετε, εσαν; as τιθεεμι ετιθε-εν, διδο-εμι εδιδο-εν, ιστα-εμι ιστα-εν, κικλυ-εμι εκικλυ-εν. Theſe are alſo formed, according to Mr. Jones's theory, without the reduplication, θεεμι εθε-εν, δο-εμι εδο-εν, στα-εμι εστα-εν, κλυ-εμι εκλυ-εν. Theſe are hence contracted either with or without the reduplication; ετιθεεν ετιθην, εθεεν εθην, εδιδοεν εδιδουν, εδοεν εδων, εκικλυεν εκικλυν, εκλυεν εκλυν. By the converſion of ε into ο, on the principle above illuſtrated, the perſonal terminations of the verbs in μι, it was that εν, ες, &c. became ον, ες, ε, ετον, ετην, ομεν, ετε, οσαν. The firſt perſon ſingular in Hebrew is אני, *eni*, *I*. Hence the perſonal termination εν or ον. The third plural εσαν or οσαν, is the Perſian אישן, *eeſan*. Hence we read ηλθοσαν in verbs in ω, and ετιθεσαν in verbs in μι; but οσαν is contracted in the common tongue into ον; as ετυπτοσαν, ετυπτον.

The ſecond aoriſt is the ſame tenſe with the imperfect, and verbs of the imperfect differ from verbs of the ſecond aoriſt, not becauſe they expreſs different modifications of paſt time, but becauſe they came from different roots. Thus, from τυπτω and σπαιρω are derived the imperfect ετυπτον and εσπαιρον; while ετυπον and εσπαρον, in the ſecond aoriſt, have been deduced from the obſoletes τυπω and σπαρω; as is the ſignification, ſo are the terminations the ſame in both. The pluperfect has its perſonal terminations from the imperfect, by annexing the ſubjunctive ι in each perſon—εν, ες, ε, &c. ειν, εις, ει, &c. The characteriſtic of the firſt future is σ inſerted before the final ω of the preſent—τυπτω or τυπω, τυπσω τυψω, λεγω, λεγσω, λεξω. And what grammarians call the ſecond future, is no other than the firſt future, where, after a very general analogy, σ is dropped. Thus, βαδιζω, 1 fut. βαδισω, βαδιω; εκχεω, 1 fut. εκχεσω, εκχεω, *I will pour*; εξελαω, *to expel*, εξελασω, contracted εξελω. So τυπω, ſaid to be the ſecond future, is a contraction of τυπεσω, from the root τυπεω. And this obſervation holds in regard to all other verbs ſuppoſed to be the ſecond future, while, in fact, no ſuch tenſe exiſts.

The ſubjunctive mood is derived from the indicative, by changing ε into η, ο and ου into ω, and ſubſcribing ι where it occurs. It is thus formed, in every tenſe, through the active, the paſſive, and the middle voice. Thus, τυπτω, τυπτεις, &c. have given birth to τυπτω, τυπτης, &c.: ſo, in the firſt future, τυψω, τυψεις, τυψει, originated τυψω, τυψης, τυψη, which is not the firſt aoriſt, as is ſuppoſed by grammarians, but the firſt future, which is, indeed, proved by its ſignification, as well as by analogy: for, in all inſtances this ſenſe expreſſes *a future* time, not abſolutely ſo, but time future in regard to another verb connected with it in the ſentence. The optative has its tenſes, in general, derived from the correſponding tenſes in the indicative, by changing ε into ο: but the firſt perſon, as has been obſerved, is derived from verbs in μι; as, if τυπτεεμι, τυπτεις, τυπτοιμι, τυπτοις. The third plural, like the third ſingular, follows the analogy of verbs in μι—τυπτοιησαν, contracted τυπτοιεν; in the ſame manner as δοιησαν becomes δοιεν.

The imperative mood, originally in the firſt perſon, retained εν of the imperfect tenſe; as λαβεν, *let me receive*. Thence, dropping the final ν, it has, in the common tongue, the firſt perſon in ε—τυπτε. The pronoun τυ, which, in Perſian, is *to* added in the form of τω, conſtitutes the ſecond or third perſon—τυπτετω. And εσαν, contracted into σαν, forms the third plural—τυπτετωσαν, which, by dropping σα, is again abridged into τυπτετων, erroneouſly ſuppoſed to be the dual number. When a command is given, it is neceſſarily given in the preſent time, and it can be executed, not in the *paſt*, but in the *future*. It is impoſſible, therefore, in reaſon, that the imperative mood can have a *paſt* tenſe. Thus, τυπτε is the preſent imperative, or that of the ſecond future; and τυψον the firſt future, not the firſt aoriſt. In ſome of the dialects ι is ſubſtituted for the ſubjunctive vowel. On the other hand, the Ionians change ν, with or without its concomitant vowel, into α. Thus, in the imperfect, for ην, or εν, they uſed εα, *I was*: for the pluperfect ετετυφειν or ετετυφεν, ετετυφεα, which the Attics contracted into ετετυφη; and in the third perſon plural, of the paſſive form, for τυπτοιντο, they write τυπτοιατο, and for κεινται, κεαται. In the ſame manner τυψον, which is ſaid to be the firſt aoriſt, but which, in reality, is the firſt future, becomes, when τω is added, not τυψοντω, but τυψατω. From the imperative thus principally ending in ον, we obtain the attic third perſon plural in οντων—τυπτουντων, ποιουντων, which are contractions of ποιουντωσαν, τυπτοντωσαν, the firſt being ποιεεν or ποιουν, and τυπτον for τυπτεν. By the above Ionic analogy, we alſo obtain what is called the Æolic firſt aoriſt, τυψεια, which has the perſonal terminations of the firſt aoriſt indicative. It is thus changed from τυψειην or τυψοιην, uſed for τυψοιμι, in the ſame manner as φιλοιην is for φιλοιμι.

The infinitive is formed by adopting εν, or, as it is in Hebrew, εν—τυπτεν, and by ſubjoining ι, τυπτειν. In the perfect it has εναι, τετυφεναι; but in the firſt aoriſt ν is dropped —τυψαι, probably for τυψαναι, which, after the analogy of the perfect, would be τυψεναι. In the Ionic and Attic dialects, the infinitive, however, is formed from verbs in μι, though obſolete, τυπτεμι, τυπτεμεν; θεεμι, or θεμι, θεμεν; δοεμι or δομι, δομεν; ειμι, *I am*, ειμεν or εμμεν. To theſe, after the analogy of the perfect, is added αι—τυπτεμεναι, θεμεναι, δομεναι, εμμεναι.

The paſſive voice is formed by combining the ſubject of diſcourſe with the perſonal pronoun in the dative caſe—μοι, σοι, τοι. Thus οικοςμοι, *houſe for me*; οικοςσοι, *houſe for thee*; οικοςτοι, *houſe for him*. Theſe combinations, which by a ſlight change become οικιζομαι, οικιζεσαι, οικιζεται, came to convey the idea, *I have a houſe*, *thou haſt a houſe*, or *I am houſed*, *thou art houſed*. And this is the reaſon why the paſſive form in all authors have either an active or a paſſive ſignification, the context alone ſerving to aſcertain the ſenſe of the verb. The dual τον is made paſſive by changing τ into σθ—τυπτετον, τυπτεσθον and not τυπτεθον; and it is worthy of remark, that in the firſt perſon plural θ takes σ before it very frequently, as τυπτομεσθα for τυπτομεθα, and in the imperative σθι for θι.

As the perſonal pronoun, combined with the radical word to form the paſſive voice, was εμοι, the primary form of the verb muſt have been τυπτεμαι, and not τυπτομαι; and in the imperfect ετυπτεμην, and not ετυπτομην: but afterwards ε was changed into ο, as in other numerous inſtances. Hence the paſſive form of verbs in ω was originally the ſame with that of verbs in μι: and this form had only two ſenſes, μαι for the preſent, and μην for the paſt. The ſecond perſon ſingular is formed in the common tongue by dropping σ, and contracting the two ſucceeding vowels in every mood and tenſe. Thus τυπτεσαι, τυπτεαι, τυπτη; imperfect ετυπτεσο, ετυπτεο, ετυπτου; firſt aoriſt middle ετυψασο, ετυψαο, ετυψω; optative τυπτοισο, τυπτοιο: θεισο, θειο. The firſt future middle is derived from the firſt future active, by changing ο into ομαι, τυψομαι. The ſecond future middle is derived from τυπεσω, (which is from the obſolete τυπεω,) τυπεσομαι. This drops σ, and is contracted—τυπεομαι, τυπουμαι. Hence what is called the ſecond future is no other than the firſt future. The ſame obſolete radical has given riſe to the ſecond future paſſive, which is no other than the firſt future—τυπεω, τυπησω, τυπησομαι; while the firſt future is from the obſolete in [illegible].

The termination ην of the two aoriſts paſſive is borrowed from verbs in μι; and from this form, though obſolete, verbs in theſe tenſes are in reality derived. Thus ετυπην, which is erroneouſly ſuppoſed the ſecond aoriſt paſſive, is only the paſt of verbs in μι; as σπαρημι, (the obſolete of σπειρω,) is εσπαρην; τυπημι, ετυπην. What grammarians call the firſt aoriſt paſſive is from verbs in φθεω; as τυφθεω, τυφθημι, ετυφθην; λεχθεω, λεχθημι, ελεχθην. In the third plural σ is dropped—φανθησαν, φανθην, φανθεν. So in the active voice, τυπτοιεν for τυπτοιησαν; τιθειεν for τιθειησαν; ετυψαν for ετυψασαν; and ετυπτον for ετυπτοσαν. In the infancy of language, while words were yet ſcanty, the moſt natural way whereby a writer or ſpeaker might give an additional weight to his meaning, was to repeat ſuch terms as he wiſhed to render *emphatic*. The more ancient any language is, the more numerous appear the traces of ſuch repetition; and, next to the Hebrew, they form a remarkable feature in the Greek tongue. Thus, μαω, μαω, *I deſire, deſire*, blended into one word, become μιμαω, and means *I greatly deſire*; βαω, βαω, *I walk, walk*; βιβαω, *I ſtride*: and ſuch words are numerous in this tongue; from which we may draw the following inferences.

Firſt, that the augment is only the remains of a verb *doubled*, in order to augment the ſenſe. *Secondly*, this augment takes place in the preſent tenſe as well as in the imperfect; as ταινω, τιταινω; κληγω, κικληλω; θημι, τιθημι. *Thirdly*, that the augment of the imperfect, and of the aoriſts, is but a corruption, ſtill more remote of the reduplication; and that the dialect, which prefixes a conſonant to the vowel like the perfect, ſuch as πεπληγοντο, for επληγοντο is the moſt ancient uſage, and comes neareſt to the primitive ſimplicity of the language. *Fourthly*, the augment is applied to the firſt and ſecond futures; and the effect of it is to increaſe the ſignification of the verb; τυψω, τετυψω; κραξω, κεκραξομαι, *I will cry loudly*; καμω, κεκαμω, *I will greatly fatigue*. *Fifthly*, that the form called by grammarians *paulo poſt futurum*, is not a diſtinct tenſe, but the firſt future middle augmented: τισομαι, τετισομαι; τυψομαι, τετυψομαι. *Sixthly*, that the augment of the perfect comes neareſt to the original reduplication than that of any other tenſe, which is preſerved ſtill more diſtinctly in the augment of verbs beginning with vowels ολ-ωλα, οπ-ωπα, and the like.

The Ionians, we have obſerved, changed ν into α; and this analogy, perhaps, converted the imperfect form τετυπον, or τετυφον, into τετυπα, or τετυφα. The third perſon plural would be then τετυφασαν. Hence the Bœotians uſed τετυφαν. The Dorians write τετυφαντι, which, in the common tongue, is ſoftened into τετυφασι. The ſimple and natural way of forming the perfect was to give it the characteriſtic of the preſent which it always implies, as an action, though paſt, ſtill continuing in its effect; τυπτω, τετυπα; λεγω, λελογα. But from the facility by which letters of the ſame organs are changed for one another, τετυπα became τετυφα, and λελογα, or λελεγα, became λελεχα. Hence τετυπα, and λελογα, which are improperly called the perfect middle, ſeem to have been the original perfect active, accidentally corrupted. And as there is no foundation for the diſtinction of perfect active and perfect middle, in fact there is none in ſignification. When, from whatever cauſe, α in ſome verbs became the characteriſtic of the perfect, it prevailed in other verbs, which ſtill retained the characteriſtic of the preſent—πειθω, πεποιθα, πεπεικα. The diſtinction, therefore, of perfect active and perfect middle is a fiction of grammarians, founded on the interchange of ſimilar conſonants, or the blind impulſe of analogy.

Prepoſitions form the moſt difficult part of the Greek tongue, not only becauſe they, for the moſt part, govern different caſes, but becauſe each has a great variety of ſignifications. Yet the author of the Greek grammar, above mentioned, has laid down two obſervations, which tend greatly to ſimplify this branch of the Greek language. The primary meaning of a prepoſition, ſays he, is to be ſought in the root from whence it is derived, and the meaning ſo obtained, or one obviouſly connected with it, and flowing from it by analogy, it preſerves in all caſes whatever. A prepoſition combines with its own ſignification the meaning of the caſe in which the dependent noun is uſed; and it governs the genitive, the dative, or the accuſative, as the writer wiſhes to fix the attention of his readers on the *origin*, the *inſtrumentality*, or the *object* of the governed noun.

We cannot forbear tranſcribing one inſtance (which is the firſt that occurs) of his manner of explaining the prepoſitions—ὑπο (from the Hebrew אב, *ab, a ſtem* or *root*; and as the root is underneath, the plant or tree ſpringing from it, the primary ſenſe of ὑπο is) *under*, ὑπο ασπιδος, *under a ſhield*. Farther, the root of a tree is the *cauſe* of its growth; hence ὑπο denotes the cauſe or *agent* of the action ſpecified in connection with it. "And they were baptized *by him*, ὑπ' αυτου; he being the cauſe of their baptiſm." Finally, as a root ſhoots upwards, ſo as to appear above the ground, ὑπο is ſometimes to be rendered *from under*—ὑπο ζευγοῦ *from under the yoke*—απο, (from the ſame Hebrew origin with ὑπο; and as the root is the origin of a thing, it denotes *beginning, cauſe, motive*, and is rendered) *from*. As by the uſe of απο, the attention is directed backward to the beginning of motion, its governed noun is always in the genitive. "He was not able to ſee Jeſus, απο οχλου, *from the crowd*," *the crowd being the cauſe of his inability*. From ſignifying beginning, απο came to expreſs the exact point of time at which motion begins. "They went *from ſupper*, απο δειπνου, *i. e. immediately after ſupper*. It expreſſes alſo the *diſtance* to which a thing has advanced, in conſequence of moving, απο της γης, *far from the land*. The conſequence of diſtance in moſt caſes is *ſeparation*, or *privation*, απο των ὁπλων, *from their arms*, i. e. *without them*. Taken in this ſenſe, απο, abbreviated into α, as in Latin *ab*, becomes *a*, and compounded with nouns, adjectives, and verbs, imparts to them a contrary ſignification; πτολεμος, *war*, απτολεμος, *unwarlike*. On the contrary, the effect of diſtance in ſome caſes is *increaſe*, as a ſtream grows larger the farther it flows from its ſource, or as a tree becomes greater with its gradual expanſion from the root. For this reaſon απο abbreviated, ſometimes increaſes the ſignification of its compound.

The Greek ſurpaſſes almoſt all other languages in the number and variety of its terms; and the cauſes of its ſuperior copiouſneſs are, *firſt*, the many dialects which it comprehends, and which ſerved to divide by accidental corruption the ſame primitive into many words; *ſecondly*, the facility with which nouns combined with the perſonal pronouns in the formation of verbs, and the great variety of ways the ſame noun may be converted into verbs, ſo as to form diſtinct verbs, yet allied in ſenſe and ſound to each other; *thirdly*, the various ways in which verbs, adjectives, and participles have been changed into abſtract nouns; and *laſtly*, the great multitude of compound terms, formed by the union of verbs or adjectives with nouns, and of prepoſitions with verbs. The combination indeed of prepoſitions with ſimple verbs is the moſt fertile cauſe of the extent and comprehenſion of the language. The ſimple verb βαλλω, thus combined, has given birth to no leſs than *fifty-two* compound verbs. This ſingle inſtance ſufficiently ſhews the genius of the language, and proves that, however few its ſimple primitive words may have been, its derived and compound words are in a high degree voluminous and varied, yet connected by an obvious and uniform analogy, both in regard to the formation and the meaning of each term.

But this language is not leſs remarkable for the harmony of its ſtructure, than for the comprehenſion and variety of its terms. The perfection of language, as well as of muſic, depends on the melody of its ſounds; their meaſure or rhythm, their variety, and their ſuitableneſs to the ſubject, which they are meant to deſcribe or expreſs. The circumſtances of the Greeks in the earlieſt periods of their ſociety, rendered them peculiarly attentive to all theſe objects. They lived continually in crowds; all matters of conſequence were decided by the voice of the aſſembly, and, next to the force of his arms, every warrior felt himſelf indebted to the perſuaſive accents of his tongue. The perpetual neceſſity of employing the power of eloquence, during the infancy of their political ſtate, made them retain the original tones and cadences, by which men, as yet unpractiſed in the uſe of arbitrary ſigns, had made known their affections and their wants. Theſe tones and cadences, imitating the language of action, (the firſt and moſt natural language of ſavages,) poſſeſſed a degree of energy and of warmth which can never be attained by the mere artifice of articulate ſounds. By uniting them to theſe ſounds, the Greeks gave all the force of a natural to an arbitrary ſign. Muſic and action were incorporated in the ſubſtance of their ſpeech; and the deſcriptive power of words was extended to all thoſe objects which can be characterized by ſound and motion, or which the various modifications of thoſe qualities can ſuggeſt to the mind of man. Gillies' Hiſt. of Greece, vol. i. p. 238.

GREEK, *modern* or *vulgar*, is the language now ſpoken in Greece, and called Ρωμαικη γλωσσα, from Conſtantinople being called *Roma Nova*.

There have been few books written in this language, from the taking of Conſtantinople by the Turks; ſcarcely any thing but ſome catechiſms, and the like pieces, compoſed or tranſlated into the vulgar Greek, by the Latin miſſionaries.

The native Greeks are contented to ſpeak the language without cultivating it; the Turkiſh politics not allowing any of the ſubjects of their eſtates to apply themſelves to the arts and ſciences.

It is not eaſy to aſſign the preciſe difference between the *vulgar* and the *ancient* Greek: it conſiſts of the terminations of nouns, pronouns, verbs, and other parts of ſpeech, which make a difference between thoſe two languages much like that obſerved between ſome of the dialects of the Italian or Spaniſh: we inſtance in thoſe languages as being the moſt known; but we might have ſaid the ſame thing of the Hebrew, Sclavonic, &c. dialects. The *modern* Greek alſo curtails words, runs them into one another, and adds a ſort of enclitic particles to the end of them: it confounds the vowels η, ι, υ, and the diphthongs ει and οι, which they pronounce and often write only *iota*. They likewiſe often confound caſes, moods, tenſes, and particles. See Brerewood's Inquiry concerning the Diverſity of Languages, &c. chap. 2.

Beſides, the modern Greek has divers new words not in the ancient; particularly ſeveral participles which appear as expletives, and which are introduced to characterize certain tenſes of verbs, and other expreſſions, which would have had the ſame meaning without ſuch particles, had cuſtom diſpenſed with them; divers names of dignities and offices unknown to the ancient Greeks; and abundance of words borrowed from the vulgar tongues of the neighbouring nations.

Accordingly one may diſtinguiſh three ages of the Greek tongue: the firſt ends at the time when Conſtantinople became the capital of the Roman empire; not but there were ſeveral books, eſpecially of the fathers of the church, written with great purity after that time; but as religion, law, and policy both civil and military, began then to introduce new words into the language, it ſeems neceſſary to begin the ſecond age of the Greek tongue from that epocha, which laſted to the taking of Conſtantinople by the Turks, where the laſt age commences.

GREEK *Lexicon*. See LEXICON.

GREEK *Maſonry*. See MASONRY.

GREEK *Maſs*. See MASS.

GREEK *Monks*. See ANACHORET.

GREEK *Orders*, in *Architecture*, are the Doric, Ionic, and Corinthian; in contradiſtinction to the two Latin orders, the Tuſcan and Compoſite. See ORDER.

GREEK *Pitch*. See PITCH.

GREEK *Rite*, or *ritual*, is diſtinguiſhed from the Latin. See RITE.

GREEK *Statue*. See STATUE.

GREEK *Teſtament*. See BIBLE and TESTAMENT.

GREEK *Valerian*. See VALERIAN.

GREEK *Wine*. See WINE.

GREEK *Year*. See YEAR.

GREEN, in *Biography*, an organ-builder, on the model of Snetzler, whom he ſucceeded, and has left behind him monuments of his ſkill and ingenuity in many of our churches and manſions of the nobility and gentry.

To this modeſt and ingenious man, ever ready to adopt any hint tending to the perfection of his art, we are indebted for the improvement of the mechaniſm of the moſt noble and comprehenſive of all inſtruments, having eaſed the touch, voiced the pipes, and contrived a ſwell of the whole inſtrument, in a manner ſuperior to any of his predeceſſors. He died when ſcarcely arrived at the midway of the period of mortal life.

GREEN, MATTHEW, was born, probably in London, about the year 1696. He was educated among the diſſenters, and his learning extended to the knowledge of a little Latin. At this period, thoſe who diſſented from the eſtabliſhed church were rigid in their principles and gloomy in their manners. He appears to have been, on this account, diſguſted with thoſe who were the aſſociates of his youth, and to have completely abandoned the party. He ſpeculated freely on religious ſubjects, and at length adopted the ſyſtem of outward compliance with eſtabliſhed forms. At one time he appeared to be ready to join the quakers, but ſomething occurred which prevented him from making an outward profeſſion of their principles. His circumſtances were very narrow, but he was fortunate enough to obtain a place of ſome truſt in the Cuſtom houſe. He died at the age of forty-one, in the year 1735. His diſpoſition was remarkably mild, and his converſation abounded with wit. He was ſubject to low ſpirits: as a cure for this, he compoſed the work by which, as an author, he is principallly known, "The Spleen." This poem preſents a picture of his mind and manners, which implies a practical philoſophy of the ſober and rational Epicurean caſt. The other works of Mr. Green conſiſt of "The Grotto;" "Verſes on Barclay's Apology;" "The Seeker;" and ſome ſmaller pieces. "In manner and ſubject," ſays the critic, "they are ſome of the moſt original pieces in the language: they rank among the eaſy and familiar, but are replete with uncommon thoughts, new and ſtriking images of remote ideas by ſome unexpected ſimilitude, in which wit principally conſiſts. Few poems will bear more repeated peruſals; and with thoſe who can fully enter into them, they do not fail to become favourites." Gen. Biog.

GREEN, one of the original colours of the rays of light. Graſs and herbs, and even all vegetables in places expoſed to the open air, are green; and thoſe in ſubterraneous places, or places inacceſſible to the air, white and yellow. Thus when wheat or the like germinates under-ground it is white or yellow; and when it is in the open air, green; though this too is yellow before it be green.

GREENS, *Artificial*, are very rarely ſimple colours, but produced by mixture of yellow and blue.

Two powders, the one blue, and the other yellow, well mixed, appear perfectly green; though, when viewed with a microſcope, we obſerve a chequer of blue and yellow.

The tincture of red roſes with oil of tartar per deliquium, or with ſpirit of ſal ammoniac, produces green. The tincture of many red flowers is changed into green by an alkali. The tincture of red roſes, and the yellow tincture of crocus, or the blue tincture of cyanus, and the white ſpirit of ſal ammoniac, produce green. The ſolution of verdigris becomes colourleſs by the affuſion of the ſpirit of nitre, and by the affuſion of the oil of tartar it becomes green again.

As no vegetable has yet been diſcovered, which is capable of giving to cloth of any kind a permanent green colour, the dye for this purpoſe is a compound colour, formed in dye-vats either by putting a yellow on a blue ground, or a blue on the yellow ground, or by mixing the blue and yellow materials, and dyeing with them as with a ſimple colour. The common and moſt permanent green is given to woollen cloth in the following manner. The cloth, being firſt dyed blue in the indigo vat (ſee INDIGO), is then well ſcoured, and afterwards dyed in a bath of weld or any other yellow dye with alum and tartar, as in the mode of dyeing of ſimple yellows, except that the yellow materials are uſed in greater quantity than the yellow alone of equal body would require. Very deep greens are made to acquire a ſlight brown or kind of burniſh by adding to the bath ſmall quantities of logwood and ſulphat of iron. As for ſilks, they are firſt ſtrongly alumed, then dyed yellow with weld, and afterwards finiſhed in the indigo vat. Silk, cotton, and linen are dyed green in the ſame general mode, but with conſiderable variations in the different proceſſes. The moſt beautiful green hitherto known, and which perfectly well reſiſts the action of light and air, is given by the combination of Pruſſian blue and yellow, but this colour is deſtroyed by ſoap and alkalies. To cotton this colour is given, by firſt dyeing it olive with weld, or any other yellow dye, and a compound mordant of alum and iron, and then raiſing the green by pruſſiat of potaſh. (See PRUSSIAN *blue*.) Berthollet obſerves, that in the proceſs for this purpoſe there ſeems to be a mutual diſtribution of the mordants and colours, the Pruſſian colour taking the iron and becoming blue, whilſt the alum and weld remaining in the olive form a faſt yellow, and unite with the blue into a fine green. The only ſimple green in common uſe is that of the carbonated oxyd of copper precipitated from verdigris by an alkali. A ſolution of verdigris is made in vinegar, and a few hours before dyeing a ſolution of as much pearlaſh as verdigris is added to it, the mixture is heated, and the cotton, previouſly alumed, is paſſed through this bath. The colour then given is a ſoft apple-green. Aikin's Dict.

The dyers make divers ſhades, or caſts of green, as *light* green, *yellow* green, *graſs* green, *laurel* green, *ſea* green, *dark* green, *parrot* green, and *celadon* green.

GREEN, *Brunſwick*, is a pigment uſed by ſome of the German artiſts, which they prepare by adding to the ſaturated ſolution of one part of muriated ammonia in cold water, three parts of copper clippings; and by covering the glaſs veſſel that contains it with gauſe ſo as to keep out the duſt, and placing it in a warm ſituation, ſo that the moiſture may evaporate, which purpoſe will be effected in a few days. The muriat of ammonia ſoon begins to be decompoſed by the copper, which is corroded and converted into a green oxyd. When the whole is evaporated to dryneſs, let it be digeſted in two or three ſucceſſive portions of ſpirit of wine, as long as any green oxyd is taken up; then add the ſolutions together and expel the liquor by a gentle heat, the reſidue is a pure dark green ſub-muriat of copper, known in the ſhops by the name of refined Brunſwick green.

GREEN, *Mountain*, or *Hungary green*, is a ſort of greeniſh powder found in little grains, like ſand, among the mountains of Kernauſent in Hungary, and thoſe of Moldavia. Though ſome hold, that this mountain green is factitious, and the ſame with that the ancients called *flos æris*, prepared by caſting water, or rather wine, on copper red-hot from the furnace, and catching the fumes thereof on copper plates laid over for that purpoſe: or by diſſolving copper-plates in wine, much as in making verdigris. The painters make uſe of this colour for *graſs* green. It is ſometimes counterfeited by grinding verdigris with ceruſe.

GREEN, *Calcined*, and *diſtilled green*. See VERDIGRIS.

GREEN, *Pruſſian*. See the proceſs for making PRUSSIAN *blue*.

GREEN, *Sap*. See *colours from* FRUITS, BUCKTHORN, and SAP-*green*.

GREEN, *Saxon*, an extremely beautiful green colour, ſo called becauſe the blue part is given by the Saxon blue or ſulphat of indigo; the proceſs of dyeing which is this; the cloth or ſilk is firſt to be dyed a Saxon blue, in the following manner. Having ground nine parts of indigo with twenty of red arſenic into a fine powder, add forty-eight parts of ſtrong ſpirit of vitriol; which mixture ſwells, grows hot, and emits a ſulphureous ſmell. After ſtanding in a moderate warmth of twenty-four hours, pour off the liquid part, which will be of an extremely deep blue. A ſmall quantity of this liquor, dropt into hot water, inſtantly ſpreads, tinges it of a fine light blue, and fits it for dyeing the prepared wool, cloth, or ſilk ; and by increaſing or diminiſhing the proportion of the blue compoſition, the colour may be rendered deeper or lighter. This, Dr. Lewis ſays, is the method uſed for preparing the blue compoſition by the dyers of Norwich, who purchaſed this ſecret from Saxony.

The cloth or ſilk, thus dyed blue, is next alumed, and then dipped in the yellow decoction of weld or fuſtic, and the deſired colour will be obtained.

Fuſtic is commonly preferred as the yellow material, becauſe it is leſs liable to be altered by the adhering acid of the ſulphat of indigo than weld or the other yellows. To correct this effect of the acid, and enable quercitron to equal the fuſtic in this reſpect, (whilſt its natural colour much excels it,) Dr. Bancroft adviſes, after the cloth has received the blue, to mix chalk with the alum mordant, in order to neutralize the adhering acid, before the yellow is given.

Or the ſubject may be dyed green at one operation, by boiling it for a little time in a mixture of the blue and yellow liquors. For this purpoſe the cloth is firſt alumed and well rinſed ; and the cloth is then dyed in a ſtrong decoction of fuſtic, to which, when cooled to a blood heat, is added ſulphat of indigo. Dr. Bancroft recommends for dyeing a beautiful Saxon green, the following expeditious proceſs, by uſing the compound alum and tin mordant ; put into the boiler ſix or eight pounds of quercitron bark to every one hundred pounds of cloth ; boil with a ſufficient quantity of water ; then add ſix pounds of the murio-ſulphat of tin, (in preference to the nitro-muriat,) and four pounds of alum : when theſe have boiled five or ſix minutes, lower the heat with cold water to blood-warm, after which, add as much ſulphat of indigo as may be thought neceſſary for the intended depth of colour, and then dye the cloth in this bath with proper care. Aikin's Dict.

By combining any blue and yellow dyes, in different proportions, all the ſhades of green may be produced, from the blueiſh green of the cabbage-leaf to the greeniſh-yellow of the olive.

Green, in *Agriculture*, a term provincially ſignifying graſs-land, or ſuch as is in the ſtate of turf.

Green, in *Geography*, a county of America, in New York, taken from Ulſter and Albany counties, bounded on the N. by Albany and Schoharie, E. by the river Hudſon, S. by the county of Ulſter, and W. by the county of Delaware ; 30 miles in length from E. to W., and from 12 to 20 in breadth. The number of its inhabitants is 15,870, and its chief town is Kaatſkill.—Alſo, a county of Pennſylvania, bounded N. by Waſhington, S. and W. by Virginia, E. by Monongahela river ; 33 miles long, and 18 broad. The number of its inhabitants is 8605.—Alſo, a county of Kentucky, extending from Ohio river on the N., to Teneſſee ſtate on the S., and bordering W. on the Miſſiſſippi river, and E. upon Hardin and Jefferſon counties. The number of its inhabitants is 6025, of whom 816 are ſlaves.—Alſo, a county of N. Carolina, in the diſtrict of Newbern, containing 4218 inhabitants, of whom 1496 are ſlaves.—Alſo, a poſt-town in Kennebeck county, and ſtate of Maine, ſituated on the E. ſide of Androſcoggin river, 164 miles N.E. from Boſton ; containing 933 inhabitants.—Alſo, a poſt-town in Franklin county, Pennſylvania, ſituated near the Conegocheague creek ; 156 miles W. by S. from Philadelphia ; containing about 80 houſes, 2 German churches, and a Preſbyterian church, and 884 inhabitants.—Alſo, a townſhip in Franklin county, and alſo a townſhip in Waſhington county, in the ſame ſtate.—Alſo, a navigable river of Kentucky, which riſes in Mercer county, has a gentle current, generally in a W. direction, and is navigable nearly 150 miles : at its confluence with the Ohio it is upwards of 200 yards wide.—Alſo, a ſmall river which riſes in the town of Marlborough, in Vermont, and falls into Connecticut river, above Deerfield, in Maſſachuſetts.—Alſo, a river of New Brunſwick, which runs into the St. John. N. lat. 47 20'. W. long. 67 58'.—Alſo, a river of Canada, which runs into the river St. Lawrence, 106 miles below Quebec.

Green *Bank*, one of the banks near the iſland of Newfoundland ; 129 miles long, and 48 wide. N. lat. 45° 30'. to 46 50'. W. long. 53° 30' to 53° 50.'

Green *Bay*, a bay on the W. ſide of lake Michigan, about 90 miles long, and 15, 20, or 30 broad in different parts, lying nearly from N.E. to S.W. At its entrance is a ſtring of iſlands extending N. to S., called the "Grand Traverſe ;" theſe are about 30 miles in length, and ſerve to facilitate the paſſage of canoes, as they afford them a ſhelter from the winds. The communication between lake Michigan and the Green bay is ſufficiently deep for a veſſel of 60 tons, with a proportionable breadth ; the land adjoining to the bottom of the bay is very fertile, the country generally level, and the views of it agreeable and extenſive. The inhabitants of its coaſts call this bay the Menomie bay. N. lat. 45°. W. long. 87° 58'.—Alſo, a bay on the E. coaſt of the iſland of Antigua, S. from Green iſland.

Green *Briar*, a large and fertile county of Virginia, ſurrounded by Bath, Randolph, Harriſon, Kanhaway, Botetourt, and Montgomery counties : about one hundred miles long and 45 broad : containing 3894 free inhabitants, and 271 ſlaves. The chief town is Lewiſburg ; 103 miles W. of Staunton.—Alſo, a river of Virginia, which purſuing a S.W. courſe, runs into the eaſtern ſide of the great Kanhaway. N. lat. 37° 57'. W. long. 80° 58'.

Green *Bug*, in *Agriculture*, the name of a ſmall inſect, which is often found deſtructive to different plants in both fields and gardens. It alſo frequently proves deſtructive to hop crops. It is very difficult to deſtroy it in many caſes.

Green *Cheeſe*, in *Rural Economy*, the name of that ſort of cheeſe which is prepared with ſome kind of green vegetable juice, as that of ſage and other ſimilar plants.

Green *Copperas*, See Copperas, and *Sulphat of* Iron.

Green *Creek*, in *Geography*, a river of Pennſylvania, which runs into the Suſquehanna. N. lat. 40° 58'. W. long. 76 30'.

Green *Crop*, in *Agriculture*, that ſort which is formed of ſome kind of green vegetable ; ſuch as that of ſome ſort of artificial graſs, the turnip, cabbage, tare, rape, &c. which are ſo termed in contradiſtinction to thoſe of the grain deſcription. The introduction of crops of this nature between thoſe of the grain kind, has conſtituted one of the moſt important improvements in modern agriculture. By this means, land has not only been prevented from being exhauſted and worn out, but brought into the moſt proper condition for the growth of grain, without undergoing the injurious proceſs of naked or ſummer fallowing. It has likewiſe had the effect of greatly increaſing the number, and improving the quantity of all ſorts of live ſtock, in conſequence of their having more abundant ſupplies of food, and theſe at the ſame time of better qualities. There can therefore be no doubt of the great advantage of theſe crops, which ſhould of courſe be grown as extenſively as poſſible by the farmer, as by them he may be enabled to ſupport much larger ſtocks of cattle and ſheep than could otherwiſe be the caſe, and at the ſame time raiſe much larger quantities of good manure. See Manure. Beſides this, great advantage might, in different inſtances of cattle-farms of the breeding kind, be derived from the more extenſive cultivation of ſuch green crops as the winter ſupport of the ſtock.

And crops of this nature have likewiſe been found of extenſive utility in the feeding of milch-cows in winter dairying, as is fully ſhewn in the various trials made by J. C. Curwen, eſq. in a northern diſtrict of the kingdom, in the view of ſupplying the poor of a large town with milk. The value of which crops in this ſort of application, on the ſuppoſition of their being ſold to the cow-keeper, and the expences of their cultivation, are ſtated in the following manner.

Green Crops.

				£.	*s.*	*d.*
Twenty-two acres of green crop, at 10*l.* *per* acre - - -				220	0	0
Expences of raiſing and cleaning.						
Four acres of cabbages, at 12*l.* *per* acre	48	0	0			
Two acres of Swediſh turnips, at 5*l.* *per* acre	10	0	0			
Six acres of common red turnips, at 4*l.* *per* acre	24	0	0			
One acre of Kahlrabi -	5	0	0			
Nine acres of rape or cole, at 3*l.* 10*s.* *per* acre	31	10	0			
				118	10	0
Gain on crops £.				101	10	0

It is conſidered that the improvement of the land, and the value of the ſucceeding crops, are fully adequate to the rent and taxes.

This ſtatement ſhews in the moſt clear point of view the vaſt benefit of this kind of crops even in this ſort of application, and that they ſhould not be diſregarded by thoſe engaged in the buſineſs of huſbandry. But in ſome other modes of application they will be found far more important and beneficial.

By ſome they have alſo been conſidered as of great utility when turned into the ſoil by way of a manure, though others are wholly of a different opinion; probably in conſequence of the trials having been made in very oppoſite deſcriptions of ſoils, and under very different circumſtances of them. It is extremely probable, likewiſe, that the advantage of this practice will be much greater where the crops are turned in during the ſummer months than in other caſes, in conſequence of their running more quickly into the putrefactive ſtate. It has been adviſed, that whatever may be the nature of the crops, they ſhould be ploughed under by means of a ſkim-coulter plough, as conſtituting the only means of turning them in, in ſo complete a manner as wholly to conceal them. And that, in caſe of ſowing the land with broad caſt turnips, the work ſhould be performed at leaſt three weeks before the ſeed is put into the ſoil, and that it ſhould be afterwards only very ſlightly harrowed in. See *Turning in Green* CROPS.

GREEN *Earth*, in *Mineralogy*, *Baldogee*, Sauſſ.; *Chlorite baldogée*, Brong.; *Argilla veronenſis*, Wern.; *Grünerde*, Wern.; *Talc chlorite zographique*, Haüy; *Verde di Verona*, *Verde di Brentonico*, Ital.; Veroneſe earth, an earthy ſubſtance belonging to the argillaceous genus. Its colour is indicated by its name, but there are ſeveral ſhades of it, the principal of which are verdigris, and celadon green, paſſing ſometimes into leek and mountain green, frequently with an admixture of grey; it has alſo been obſerved of a more or leſs pure olive green.

It occurs maſſive and diſſeminated, in rounded and angular fragments, and in globular concretions; likewiſe in grains mixed with ſand, and as coating on agate balls, in the hollows of amygdaloid, (toad-ſtone,) &c. Internally it is dull, but on the rifts a fat-like luſtre is ſometimes obſervable.

Fracture fine-earthy, or more or leſs flat conchoidal, approaching to ſlaty. Diviſible into indeterminately angular, blunt-edged, opaque fragments.

It feels rather greaſy, is always more or leſs ſoft, mild, and eaſily frangible; ſtreak rather ſhining; adheſion to the tongue inconſiderable. Specific gravity about $2\frac{1}{2}$.

The chemical characters of green-earth, derived from Klaproth's analyſis of three varieties, *viz.* thoſe from Monte Baldo, in the Veroneſe, from Cyprus, and from Eaſt Pruſſia, are the following:

The green-earth from Monte Baldo, when heated to redneſs, loſes ſix per cent. of its weight, while its hardneſs is conſiderably increaſed. The fragments thus ſubjected to the fire become externally of a yellowiſh-brown colour, internally greyiſh-black and gliſtening. That of Cyprus, after ignition, loſes eight parts of its weight; and its colour is converted into dirty browniſh-yellow. Expoſed to the fire of the porcelain furnace in the charcoal crucible, it fuſes to a ſomewhat porous greeniſh glaſs, externally of a dirty-green colour, internally of that of emerald; in the clay crucible it is converted into a greeniſh-grey ſlag. The green-earth of New Eaſt Pruſſia, when freed from the admixed ſand by elutrition, and ignited, changes its green colour into light leather-brown; the conglomerated particles are converted into a hard maſs, and thus loſe nine per cent. of their weight. The acids do not act upon green-earth, and they leave its colour unaltered.

The reſults of the analyſes of the above three varieties were:

Green-earth of Monte Baldo, in the Veroneſe.		Green-earth of Cyprus.	
Silica - -	53		51.50
Oxyd of iron -	28		20.50
Magneſia -	2		1.50
Kali - -	10		18.
Water - -	6		8.
Loſs - -	1		.50
Klapr. Beitr. vol. 4.	100	ibid.	100

Green-earth of New Eaſt Pruſſia.

Silica - - - - - -	51.
Alumina - - - - -	12.
Magneſia - - - - -	3.50
Lime - - - - - -	2.50
Oxyd of iron - - - - -	17.
Natron, with a trace of kali - -	4.50
Water - - - - - -	9.
Loſs - - - - - -	50
ibid.	100

The Pruſſian green-earth, by thus differing from the two others, particularly with regard to the alumina as a conſtituent part, appears to approach the nature of chlorite.

Green-earth occurs principally in amygdaloid, alſo as incruſtation on the nodules of zeolite, &c. contained in the vacuities; ſometimes as coating the ſides of theſe vacuities, which are often partly filled with the earth. It is alſo, though leſs frequently, found in porphyry and baſalt, as nodules in the newer ſandſtone, and even in the rocks belonging to the new fletz-trap-formation, ſuch as at Aſchau in Bohemia, where calcareous tuff is ſeen alternating with narrow layers of a conglomerate, made up of grains of calcareous ſpar, and blunt-edged fragments of the tuff to which the green earth ſerves as the cementing ſubſtance. But in the ſame place green-earth forms a fletz-layer of about a foot in thickneſs, whoſe baſe conſiſts of wacke-like clay and calcareous tuff; the roof of indurated marle. The green-earth of New Eaſt Pruſſia, conſiſting of earthy particles mixed with a coarſe ſand, forms a conſiderable bed in the neighbourhood of the river Memel, between Loſſoſſna and Salloweye.

Among the *localities*, beſides thoſe of Monte Baldo in the Veroneſe, Cyprus, Pruſſia, and Bohemia, already pointed out, the following may be mentioned: Altenburg and Planitz, in Saxony; Oberſtein, in the Palatinate; Kovaeſi, in Hungary; Pontaudemer, in Normandy; Scotland, Iceland, the Ferroe-iſlands, and wherever true amygdaloid occurs.

This earth is *uſed* as a pigment, particularly for water-colour painting; and, being very durable, and not too expenſive, alſo for houſe painting, &c.

The green-earth of Cyprus, according to Mariti, is ſold at 4½ piaſters for a meaſure of 100 cakes. It is carried from the pit in large baſkets made of the palm-tree; three of theſe baſkets generally contain the above mentioned quantity. A great deal was exported to Holland; often by way of ballaſt.

That of Bohemia, above mentioned, is ſold, according as its colour is deeper and its grain finer, from two to four florins the cwt. Part of it is alſo burnt there in ſmall kilns, and ſold as a red pigment.

By the Italians green earth is called Verde di *Brentonico*, from the vicinity of Monte Bolca to a place of that name.

Green *Fallow*, in *Agriculture*, a term often applied to ſuch arable land as is rendered clean and free from weeds, by means of green crops, without having recourſe to the proceſs of naked or ſummer fallowing. This conſtitutes one of the numerous improvements in modern huſbandry. See Fallowing *of Land*.

Green *Finch*, in *Ornithology*. See Loxia *Chloris*. See alſo Tanagra *Gyrola*, and Fringilla *butyracea*.

Green *Fiſh*. See *Cod*-Fishery.

Green *Food*, in *Agriculture*, that ſort of food which is employed in its green or ſucculent condition, in the feeding, foddering, and ſupporting of various kinds of live ſtock. This is a ſort of food that has, within theſe late years, been much more extenſively employed than was formerly the caſe; yet its advantages are probably in general not ſo fully underſtood as they ought to be. Its importance and utility will, however, ſoon appear by the making of a few experiments in a proper manner.

Green *Glaſs*. See Glass.

Green *Hew*, or *green-hue*, in our *Old Writers*, the ſame with *vert* in foreſts, &c.

Green *Hides*, are thoſe not yet tanned, or dreſſed, but ſuch as are taken off from the carcaſes. See Hide and Currying.

Green *Iron Earth*. See Iron.

Green *Iſland*, in *Geography*, a ſmall iſland among the Philippines, near the S. coaſt of the iſland of St. Luçon. N. lat. 13° 30′. E. long. 121° 2′.—Alſo, a ſmall iſland in the Eaſt Indian ſea. S. lat. 6° 5′. E. long. 123° 30′. Alſo, one of the ſmaller Bahama iſlands. N. lat. 21° 38′. W. long. 57°.—Alſo, one of the leſſer Virgin iſlands, called likewiſe "Serpent iſland," ſituated near the E. end of Porto Rico.—Alſo, a low woody iſland near the N. E. coaſt of New Holland; 12 miles E. N. E. of Cape Grafton. S. lat. 16° 48′. W. long. 214° 5′.—Alſo, an iſland in Hudſon's bay. N. lat. 61° 2′. W. long. 72° 40′.—Alſo, an iſland in the Atlantic, near the coaſt of Main. N. lat. 44° 41′. W. long. 67° 23′.—Alſo, a ſmall iſland near the E. coaſt of Antigua. N. lat 17° 13′. W. long. 61° 21′.—Alſo, a ſmall iſland in the Weſt Indies, about a mile N.E. from the iſland of St. Thomas.

Green *Iſlands*, a cluſter of ſmall iſlands in the Pacific ocean, diſcovered by Schouten and Le Maire. N. lat. 4° 53′. E. long. 154° 50′.—Alſo, a range of ſmall iſlands in that part of the Eaſt Indian ſea, called the "ſea of Mindero," near the E. coaſt of Palawan. N. lat. 9° 33′. E. long. 119° 6′.—Alſo, a group of low iſlands in Prince William's ſound, ſituated within the S.W. channel, between Montagu's iſland and Knight's iſland. Capt. Cook, in his third voyage, 1778, obſerved that they were entirely free from ſnow, and covered with wood and verdure, and therefore called them by this name. The channel between Montagu iſland and the Green iſlands is between two and three leagues broad, and from 34 to 17 fathoms deep.

Green *Iſland Harbour*, a bay on the W. coaſt of the iſland of Jamaica. N. lat. 18° 24′. W. long. 78° 17′.

Green *Key*, or Puerco, a ſmall iſland among the Bahamas. N. lat. 23° 56′. W. long. 77° 50′.

Green *Lead Ore*. See Lead.

Green *Mountains*, in *Geography*, a range of mountains in America, extending N. N. E. to S. S. W. and dividing the waters which run eaſterly into Connecticut river from thoſe which fall weſterly into lake Champlain, lake George, and Hudſon's river. The aſcent from the eaſt to the top of the Green mountain in Vermont is much more eaſy than that from the weſt, till you get to Onion river, where the mountain terminates. The vegetables that naturally grow on this mountain are hemlock, pine, ſpruce, and other evergreens, which always exhibit a green appearance; and hence its name. The chain of mountains extends through Maſſachuſetts and Connecticut, and terminates in New Haven. Kellington peak, the higheſt of theſe mountains, is about 3454 feet above the level of the ocean. Morſe.

Green *Point*, a cape on the W. coaſt of Africa. S. lat. 11° 53′.—Alſo, a cape on the coaſt of Weſt Florida, in Penſacola bay. N. lat. 30° 31′. W. long. 87° 4′.

Green *Sauce*, in *Agriculture*, a term ſometimes provincially applied to the common ſorrel.

Green *Scouring*, a diſeaſe to which ſheep, calves, and cattle are frequently expoſed, and which is with difficulty removed. See Scour.

Green-*Shank*, in *Ornithology*, the Scolopax *glottis* of Linnæus; which ſee.

Green *Sickneſs*. See Chlorosis.

Green *Side*, in *Agriculture*, a term often provincially applied to graſs-land, turf, or ſward.

Green *Silver*, the name of an ancient cuſtom within the manor of Writtle, in the county of Eſſex; which is, that every tenant, whoſe fore-door opens to Greenbury, ſhall pay a half-penny yearly to the lord, by the name of *green ſilver*. Blount.

Green *Sod*, in *Agriculture*, a term provincially applied to graſs-ground, turf, or ſward.

Green-*Stone*, in *Mineralogy*, according to the more general acceptation of the word, is a rock compoſed of hornblende and feldſpar, and belonging to what is termed by Werner the trap formation. (See Trap.) Mica and quartz are likewiſe ſeen to conſtitute ingredients of this rock, but they are not conſidered as eſſentially belonging to it. The *Grœnſten* of Cronſted is, upon the whole, the ſame as our green-ſtone; but in ſome caſes too great latitude has been given to that name.

This rock, with a view to the periods of its formation, is divided into primitive, tranſition, and fletz green-ſtone.

The *primitive* green-ſtone is generally diſtinguiſhable from the others by its highly cryſtalline ſtructure. The hornblende, in which a tendency to cryſtallization is almoſt always obſervable, generally conſtitutes the predominant ingredient; but ſometimes this is only apparently ſo, the feldſpar being not ſeldom ſtained by it in ſuch a manner, that it bears the greateſt reſemblance to ſmall laminæ of hornblende. In this caſe the blow-pipe diſcovers the illuſion by melting the hornblende; when the feldſpar recovers its uſual whitiſh colour, and is converted into a white glaſs.

Werner ſubdivides primitive green-ſtone into four varieties: 1. *Common green-ſtone,* in which the two ingredients, mixed in different proportions, form a granular maſs. 2. *Porphyritic green-ſtone,* being the common variety, including large cryſtals of feldſpar. 3. *Green-ſtone porphyry,* in which "the granular baſis, which is with difficulty diſtinguiſhable, includes cryſtals of feldſpar:" and 4. *Green porphyry,* in which "the granular nature of the baſis is no longer viſible to the naked eye; it appears uniform and ſimple; has a blackiſh green or piſtachio green colour, and includes cryſtals of compact feldſpar." (Jameſon.) To theſe are to be referred the porſido nero, and porſido verde antico of Italian antiquaries, of which we ſhall ſay more hereafter. The third and fourth of theſe varieties might, we think, be ſafely united; at leaſt the definition given of them does not indicate any difference, except in the ſhade of green.

This old green-ſtone appears ſometimes ſtratified. Gneiſs is the rock in which the different varieties firſt appear; the next rock in which they occur is mica-ſlate, but the beds of green-ſtone in either of them are ſcanty and inconſiderable; they are obſerved more numerous and of greater extent in clay ſlate in Scotland. According to Mr. Jameſon, the clay-ſlate and mica-ſlate, that form a great portion of the country extending from Loch Lomond, by Callander, Comrie, and Dunkeld, contain numerous beds of green-ſtone; and there, we are informed by this geognoſian, as in all other countries, the clay ſlate contains more numerous and larger beds than the mica ſlate.

There is a vaſt number of varieties of primitive green-ſtone in Bohemia; thus it is found in the Saatz diſtrict of that country, where it reſts chiefly on gneiſs. It occurs there alſo with quartz as a conſtituent part. The varieties mentioned by Reuſs, as being found there within a narrow compaſs, are, 1. A ſmall grained mixture of velvet black hornblende, which exhibits a tendency to a priſmatic cryſtalline form, with yellowiſh white feldſpar, and greyiſh-white and ſmoke grey quartz. The hornblende is the predominant part; the quartz is here and there entirely wanting; the mixture pretty uniformly granular. 2. A variety in which the hornblende is ſeen in groups, diſtinct from thoſe of the feldſpar and quartz; ſo that the whole forms an aſſemblage of black and yellowiſh-white ſpots. 3. A variety in which the hornblende is ſo prevalent, that feldſpar and quartz can with difficulty be diſtinguiſhed by the magnifying glaſs, which diſcovers theſe ingredients collected into ſmall ſpots and ſtripes; it contains alſo here and there ſome ſcales of mica. 4. Var. in which the hornblende is ſeen partly maſſive, in ſpots, ſtripes uniformly blended with the feldſpar and quartz; partly in ſmall circular cryſtals that are divergingly aggregated, or croſs each other in all directions; feldſpar tile and browniſh-red; quartz only here and there in ſmoke grey grains. 5. Var. in which the hornblende ſhows a ſtrong tendency to cryſtallization, and is much accumulated in ſome places; though, generally ſpeaking, its proportion to the mixture of yellowiſh-white and reddiſh-grey feldſpar and greyiſh-white quartz, is but ſmall: it contains larger and more numerous ſcales of ſilvery and yellowiſh-white mica. 6. Var. in which the texture becomes more thick-flaky; the ſmoke-grey quartz becomes predominant, the yellowiſh-white feldſpar diſappears almoſt entirely, and the hornblende is only thickly diſſeminated. 7. Var. in which the yellowiſh-white and reddiſh-grey feldſpar predominates over the hornblende, which is ſeen partly maſſive and in fine granular concretions, partly in inſulated and diſperſed minute ſix-ſided priſms, imbedded in the feldſpar; while the quartz is entirely wanting. It is remarkable that in this diſtrict the primitive green-ſtone is ſeen, by ſlow gradation, to paſs over into perfect gneiſs. The more it approaches the latter, the more the granular texture becomes indiſtinct; the rock adopts a thick ſlaty texture, the hornblende is ſeen more and more to diminiſh, while the mica increaſes both in quantity and ſize, until perfect gneiſs ſtands confeſſed as the conſtituent rock.

This rock is common alſo in many other parts of Europe; but the accounts we poſſeſs of the green-ſtone of ſeveral countries is too imperfect to enable us to determine how much of it may be conſidered as primitive.

The *tranſition green-ſtone* is not eaſily diſcriminated in hand-ſpecimens. It is characterized by Mr. Jameſon as being "a fine granular mixture of hornblende and feldſpar; and ſometimes the mixture is ſo intimate, that the conſtituent parts are not to be diſtinguiſhed. Quartz ſometimes traverſes it in the form of veins, or is diſſeminated through it; a character which diſtinguiſhes it from fletz green-ſtone, which rarely contains quartz. Sometimes it occurs in globular diſtinct concretions, and theſe again conſiſt of curved lamellar concretions, forming the globular rock (kugelfels) of Voigtland. Sometimes it is penetrated with reddiſh brown oxyd of iron, which, combined with the dark-brown hornblende, gives the rock a liver-brown colour; hence it is denominated in Voigtland, where it occurs, leber-fels, or liver rock. Beds of it occur in the upper part of Dumfriesſhire, in the Hartz, Bohemia, &c."

Fletz-green-ſtone. Prof. Jameſon, in his "Mineralogical Deſcription of Dumfriesſhire," has given a ſhort account of the occurrence of green-ſtone in the independent coal-formation; and Mr. Flürl has diſcovered beds of amygdaloid in the firſt or oldeſt fletz-lime-ſtone; whence the former author conſiders himſelf entitled to introduce what he terms the *fletz-trap,* which is diſtinct from the ſtill newer formation called the *neweſt fletz-trap* by Werner. In the independent coal formation it occurs in beds from one foot to many fathoms in thickneſs; it contains imbedded olivine and augite, and is traverſed by numerous veins of calc-ſpar; it often alſo contains druſy cavities, which are lined with calc-ſpar, quartz, barytes, cubicite and prehnite; and the cavities are ſometimes filled with water.

The green-ſtone of Werner's *neweſt fletz-trap formation* is, upon the whole, diſtinguiſhable from the older formation, by its ſtructure being of a leſs cryſtalline appearance, and by its diſtinct concretions approaching more to the coarſe granular. "Its colour uſually inclines more or leſs to green. Certain varieties are reddiſh, and theſe are denominated ſienitic green-ſtone. When freſh and rather large granular, it uſually exhibits a ſimple ſtructure; when, on the contrary, it is diſintegrated, and ſmaller granular, it occurs in globular, and theſe again in curved lamellar diſtinct concretions. Certain varieties approach to wacke, and theſe are uſually veſicular, and form a kind of amygdaloid. It is ſometimes very diſtinctly ſtratified, and frequently occurs in veins." Jameſon.

The *uſes* to which the common green-ſtone is applied are not manifold. As it frequently contains a conſiderable portion of iron, and is ſufficiently fuſible, it ſerves for a flux in the iron work in Smoland. Of the porphyritic varieties of the primitive green-ſtone uſed for ornament, the following deſerve to be mentioned:

Antique black porphyries (porfido nero antico). There are two or three varieties differing, with regard to the intenſity of the colour, from greeniſh-black to velvet-black; and likewiſe with regard to the ſize of the whitiſh feldſpar-cryſtals: in one of them the cryſtals are very ſmall, and this is more frequently ſeen among the remains of antiquity than the other.

Mr. Graffenauer, in his mineralogy of Alſace, mentions a black porvhyry as occurring at Framont; and alſo as rounded blocks in the river Ill.

In the black *Corſican* porphyry, the feldſpar-cryſtals have a ſlight tint of green, like thoſe of the antique green porphyry. Ferber makes mention of a *Sardinian* black porphyry, and Sauſſure of one found in the neighbourhood of *Geneva*, which, beſides ſmall priſmatic cryſtals of feldſpar, includes rounded grains of tranſparent colourleſs quartz. The latter addition is likewiſe obſerved in a variety of a blackiſh *Siberian* porphyry, which is ſometimes wrought for ornamental purpoſes.

Antique green porphyry (porfido verde antico). This is the *ophites* of the ancients; a name derived from ſome ſuppoſed reſemblance of this rock, when poliſhed, to the ſkin of a ſerpent; whence, in modern times, antiquaries have referred the porphyry in queſtion to the magneſian ſtone called ſerpentine, a mixture of which, with primitive limeſtone, conſtitutes the rock called *verde antico.* When once conſidered as the ſame with the real ſerpentine, the name *verde antico,* of courſe, alſo was equally applied to the green porphyry; a circumſtance which has been productive of great confuſion. There are now but few monuments of ancient art executed in this porphyry to be met with.

There are ſome varieties of green porphyry, much reſembling the antique, ſtill found in ſeveral parts of Europe. There is a quarry of it on Monte Viſo, in Piedmont; which, beſides the feldſpar, contains reddiſh grains, ſuppoſed to be garnets.

The *green Corſican porphyry,* found in the diſtrict of Niotto, in Corſica, has a deep bottle-green baſe, and fine white feldſpar cryſtals; another, which contains ſome dark red garnets, occurs in the diſtrict of Golo in the ſame iſland.

Sauſſure deſcribes the *green porphyry of Geneva,* reſembling the black porphyry above-mentioned, in the figure and colour of the feldſpar and quartz, but differing in its baſe, which is light green and, in fragments, tranſlucid at the edges. Both this and the black take an excellent poliſh.

The *green porphyry of the Voſges* has a dark green baſe, and contains numerous middle-ſized feldſpar-cryſtals of a pale green colour. It is found at La Chevetrey, on the heights of Freſle en Comté, and made uſe of for ornamental purpoſes. In another variety, found not far from this quarry, the feldſpar-cryſtals are ſo preſſed againſt each other, that they are ill-formed, and conceal almoſt the whole of the baſe. They are manufactured into ſlabs for tables, chimney-pieces, &c. and ſometimes paſs by the improper name of green granite.

There is abundance of the green porphyry in the Pyrenees, where it is known by the old appellation of *ophite.*

Green-*ſtone ſlate,* a compound rock, which may be conſidered as a variety of the preceding, from which it differs in having a diſtinct ſlaty ſtructure; the feldſpar, moreover, being generally more abundant than the hornblende. It ranks with the primitive trap, but, not occurring in rocks older than clay-ſlate, is conſidered as the neweſt of the firſt claſs of the trap formation. It occurs in conſiderable beds, and in Sweden whole mountains are ſaid to conſiſt of it. Several mining diſtricts are ſituated in this rock, ſuch as thoſe of Gerſdorf, in Saxony, of Radolſtadt, in Sileſia, and of Adelfors, in Sweden.

Green *Sward,* in *Agriculture,* a name applied to the graſs, turf, or ſward, by which land is covered while in the ſtate of paſture or under the ſcythe. Such land as has been long in this ſtate, is moſtly covered with a cloſe compact ſward; while in the contrary caſe, it is moſtly light, open, and thin. See Sward.

Green *Turtle Bay,* in *Geography,* a ſmall iſland among the Bahamas. N. lat. 26 40. W. long. 77° 59′.

Green *Wax* is uſed where eſtreats are delivered to the ſheriffs out of the exchequer, under the ſeal of that court, made in green wax, to be levied in the ſeveral counties.

Green *Weed.* See Broom.

Green *Winter.* See Winter *Green.*

GREENAE, in *Geography,* a town of Denmark, in North Jutland; 28 miles N. E. of Aarhuus.

GREENBURGH, a townſhip of Weſt Cheſter, in the ſtate of New York, containing 1581 inhabitants.

GREENBUSH, a townſhip of Renſſelaer county, New York, containing 3472 inhabitants.

GREENCLOTH, a board, or court of juſtice, held in the compting-houſe of the king's houſhold, for the taking cognizance of all matters of government and juſtice within the king's court royal; and for correcting all the ſervants therein, that ſhall any way offend.

To this court alſo belonged the authority of maintaining the peace for twelve miles round the king's court, wherever it ſhall be, excepting at London.

The judge of this court was the lord ſteward, aſſiſted by the treaſurer, comptroller, cofferer, clerks of the greencloth, &c. It took its name, *greencloth,* from a greencloth ſpread over the board where they ſat, whereon were the arms of the compting-houſe. The clerks of this court were officers who attended there, and had buſineſs aſſigned them by the board. All bills of comptrolments, relating to the office, were ſummed up, and allowed by the clerks comptrollers, and audited by the clerks of the greencloth. They alſo appointed the king's, queen's and houſhold's diet, and kept all records, ledgers, and papers, relating thereto; made up bills, parcels, and debentures for ſalaries, &c. and proviſions and neceſſaries for the officers of the pantry, buttery, cellar, &c. They alſo waited upon foreign princes, when entertained by his majeſty. This court has been aboliſhed.

GREENE, Maurice, Dr. in *Biography,* was the ſon of the Rev. Thomas Greene, vicar of St. Olave Jewry, in London, and nephew of John Greene, ſerjeant at law. He was brought up in the choir of St. Paul, and when his voice broke was bound apprentice to Brind, the organiſt of that cathedral. He was early noticed as an elegant organ player and compoſer for the church, and obtained the place of organiſt of St. Dunſtan in the Weſt, before he was twenty years of age. In 1717, on the death of Daniel Purcell, he was likewiſe elected organiſt of St. Andrew's, Holborn; but the next year, his maſter Brind dying, Greene was appointed his ſucceſſor by the dean and chapter of St. Paul's; upon which event, he quitted both the places he had previouſly obtained. In 1726, on the death of Dr. Crofts, he was appointed organiſt and compoſer to the Chapel Royal; and on the death of Eccles, 1735, maſter of his majeſty's band. In 1730, he obtained the degree of doctor in muſic at Cambridge, and was appointed public muſic profeſſor in the ſame univerſity, in the room of Dr. Tudway. Greene was an intelligent man, a conſtant attendant at the opera, and an acute obſerver of the improvements in compoſition and performance, which Handel and the Italian ſingers employed in his dramas, had introduced into this country. His melody is therefore more elegant, and harmony more pure, than thoſe of his predeceſſors, though leſs nervous and original. Greene had the misfortune to live in the age and neighbourhood of a muſical giant, with whom he was utterly unable to contend, but by cabal and alliance with his enemies. Handel was but too prone to treat inferior artiſts with contempt; what provocation he had received from Greene, after their firſt acquaintance, when our countryman had a due ſenſe of his great powers, we know not; but for many years of his life, he never ſpoke of him without ſome injurious epithet. Greene's figure was below the common ſize, and he had the misfortune to be very much deformed; yet his addreſs and exterior manners were thoſe of a man of the world, mild, attentive, and well-bred. Hiſtory has little to do with the infirmities of artiſts; who being *men*, in ſpite of uncommon gifts and inſpirations, are ſubject to human frailties, which enthuſiaſm, praiſe, and the love of fame, more frequently augment than diminiſh.

Greene had the honour, early in life, to teach the ducheſs of Newcaſtle, which, joined to his profeſſional merit, and the propriety of his conduct, was the foundation of his favour with the prime miniſter, and the notice of the firſt people about the court. In 1730, when the duke of Newcaſtle was inſtalled chancellor of the univerſity of Cambridge, he was appointed to ſet the ode, and then not only obtained his doctor's degree, but, on the death of Dr. Tudway, he was honoured with the title of profeſſor of muſic in that univerſity. As an exerciſe for his degree, he ſet Pope's ode for St. Cecilia's day; having firſt had intereſt ſufficient to prevail on the author to make new arrangements in the poem to render it more fit for muſic, and even to add an entire new ſtanza, between the ſecond and third, which had never appeared in any of the printed editions.

Greene had ſenſe and knowledge ſufficient, in his younger days, to admire and reſpect the abilities of the two great muſical champions, Handel and Bononcini, whoſe diſputed talents occaſioned as much diſcord in the capital as the factions of Whig and Tory. At the ſame time as he was impreſſed with the higheſt reverence for Handel's great ſtyle of playing the organ, and the force of his genius for compoſition, he could not help liſtening with pleaſure to Bononcini's performance on the violoncello, and to the grace and good taſte of ſome of his opera ſongs; at which, perhaps, Handel took umbrage—for during theſe feuds, he broke off his acquaintance, and ever afterwards, regarding him as an enemy, never mentioned his name but with contempt. This treatment naturally rendered Greene a partizan on the ſide of Bononcini, and in 1728 he defended him, as long as he was able, from the charge of plagiariſm, with reſpect to a cantata which had been introduced at the academy of ancient muſic as Bononcini's, and which was afterwards diſcovered to be the compoſition of Lotti, at Venice. See BONONCINI.

Greene's merit and connections were ſuch, that he ſoon arrived at the moſt honourable appointments in his profeſſion: for beſides being organiſt of St. Paul's, in 1727, on the death of Dr. Croft, he was appointed organiſt and compoſer of the Chapel Royal; and in 1735 he ſucceeded Eccles as compoſer to his majeſty, and maſter of his band, in which ſtation he ſet all the odes of the laureate, Colley Cibber, as long as he lived.

The compoſitions of Dr. Greene were very numerous, particularly for the church. Early in his career he ſet a *Te Deum*, and part of the *Song of Deborah*, which were never printed; but the anthems and ſervices which he produced for St. Paul's and the King's Chapel, he collected and publiſhed in two vols. folio; and of theſe the merit is ſo various as to leave them open to much diſcrimination and fair criticiſm. Among the faults to be aſcribed to this compoſer, none are ſo flagrant as the light diviſions in which his ſolo anthems abound, and the repetition of paſſages a note higher or a note lower in what the Italians call *roſalia*, which are always dull, tireſome, and indications of a ſterile fancy. The opening of his ſecond ſolo anthem, vol. i. p. 26, is very ſolemn and pathetic, and the organ-part judicious and pleaſing; but, page 45, *Santa Roſalia* tells her beads ſix times, while one very ſhort paſſage is ſinging. “Lord how long wilt thou be angry,” *alla Paleſtrina*, for five voices, though none of the ſubjects are new, ſeems to us the beſt full anthem of his compoſition. The ſtyle is clear, the anſwers are regular, and the modulation ſuch as diſcovers a familiar acquaintance with the beſt ancient writers for the church. Of the full anthem: “O ſing unto the Lord,” for five voices, the fugue in the firſt movement is well worked, and has a good effect in performance; but the reſt of the anthem is not equal in its ſubjects, or their treatment. “Lord how are they increaſed that trouble me,” ſeems one of the moſt pleaſing of Dr. Greene's ſolo anthems. The laſt anthem in the firſt volume, for two voices, has many pleaſing paſſages, and rather more variety of ſubject than moſt of the others.

The firſt movement in the ſecond volume ſeems calculated to diſplay, in the performers, the power of making a ſhake upon ſhort notice. A ſhake, judiciouſly applied, is a brilliant embelliſhment in a ſinger; but when laviſhed, improperly, is pert and unmeaning; nor is it ever more ſo than upon the firſt note of a movement. There are no fewer than ſeventeen or eighteen ſhakes diſtributed among the performers in the courſe of one page, which are more than a modern opera ſinger of judgment, taſte, and expreſſion, would uſe in a month, were his ſhake ever ſo good; the reſt of the anthem is on common ſubjects, which are commonly treated.

The two-part anthem, “Thou, O God, art praiſed,” has repeatedly a paſſage on the word *praiſed*, which has to our ear the diſagreeable effect of two fifths; and there is a point at “unto thee ſhall my vow be performed,” for which he was manifeſtly obliged to the ſecond movement of Handel's fourth organ concerto. The reſt of the anthem conſiſts of agreeable paſſages of the times, but nothing like originality appears in any one idea.

“The King ſhall rejoice,” for three voices, is agreeable common-place. Perhaps that is hardly enough to ſay of the ſecond movement: “O Lord grant me a long life.”

“Let my complaint,” a full anthem, à 5, is very ſolemn and ſolid compoſition.

The anthem for Chriſtmas day has an air of chearfulneſs, ſuitable to the occaſion, which runs through the whole compoſition. “Hear my prayer, O God,” has more merit of gravity and expreſſion than moſt of the anthems in this volume. “O ſing unto God,” is agreeable muſic, but too ſecular in its melody, and return to the ſubject. “Have mercy upon me;” the two firſt movements of this anthem are ſober and affecting; but the ſecond and third have too many vulgar and worn-out diviſions; the laſt chorus, however, is more eccleſiaſtical, and leſs common in melody and modulation. The ſolo anthem: "Hear, O Lord," for a baſe voice, is grave and pathetic, on the model of Handel's beſt oratorio ſongs. The ſame may be ſaid of the next, for two voices: "I will ſeek unto God." "O God of my righteouſneſs," is ſuperior in the duet movement, ſolo verſe, and chorus, to any thing in the preceding part of this volume; this anthem riſes ſomewhat above mediocrity. "O give thanks," is wholly built with Corelli's and Handel's materials, though ſomewhat differently diſpoſed; particularly page 86, where the whole harmony moves together, one note lower, three times, after a crotchet reſt, to this baſe: E, B ※3d, E; D, A ※3d, D; C, G, C. "The Lord is my ſhepherd," has too many light ſong-paſſages in it, notwithſtanding the white and ſquare notes which give it a venerable look on paper. "O how amiable are thy dwellings," is a very agreeable anthem, though the paſſages were not new at the time it was compoſed. The movement with an organ accompaniment, in the anthem: "My ſoul truly waiteth," is well conducted, and not common; the reſt of the anthem has merit, particularly the chorus of the laſt movement. "The Lord, even the moſt mighty God," for a baſe voice, is ſet with great gravity and propriety; few anthems, indeed, for that ſpecies of voice, are more agreeable; the points, however, in the chorus, are very common. The anthem in eight parts, *à due cori:* "How long wilt thou forget me," is very well written, *à capella*, and good muſic. Indeed, the firſt movement of this anthem manifeſts greater abilities than any of his productions that we have ſeen, who is in general very correct in his harmony; but as to invention and deſign, he ſeldom ſoars above mediocrity. "O Lord give thine ear unto my prayer," for two voices, is very pleaſing muſic, particularly the firſt movement. The laſt anthem of this volume is made up of common play-houſe paſſages; the firſt movement is heavy and monotonous; the andante tireſome, by the repetitions of an old harpſichord-leſſon paſſage in the baſe; the chorus juſtifies Mr. Maſon's cenſure of the author, (collect. of the words of anthems) for his too long and frequent diviſions; theſe are too vulgar and riotous for the church, and, indeed, would have no merit of novelty any where. The *vivace*, page 151, upon which the laſt chorus is built, has more of the dancing minuet, or Vauxhall ſong, in it, than belong to that ſpecies of gravity and dignity which befits devotion. We think we could neither play nor hear this movement in a church, without feeling aſhamed of its impropriety.

There is conſiderable merit of various kinds in the Collection of Catches, Canons, and two-part Songs, publiſhed by Dr. Greene; the compoſition is clear, correct, and maſterly; the melodies, for the times when they were produced, are elegant, and deſigns intelligent and ingenious. It was ſarcaſtically ſaid, during the life of this compoſer, that his ſecular muſic ſmelt of the church, and his anthems of the theatre. The truth is, he produced but little ſecular muſic. His ſong of "Go roſe," was long in general favour, and ſome of his eaſy ballads, as "Buſy, curious, thirſty fly;" "Dear Chloe while thus beyond meaſure," &c. were the delight of ballad-mongers fifty years ago. The collection of harpſichord leſſons, which he publiſhed late in his life, though they diſcovered no great powers of invention, or hand, had its day of favour, as a boarding-ſchool book; for being neither ſo elaborate as thoſe of Handel, nor ſo difficult as the leſſons of Scarlatti, or the ſonatas of Alberti, they gave but little trouble, either to the maſter or ſcholar. Indeed, as all the paſſages are ſo familiar and temporary, they ſeem to have been occaſionally produced for idle pupils at different times, with whom facility was the firſt recommendation.

Dr. Greene, during the laſt years of his life, began to collect the ſervices and anthems of our old church compoſers, from the ſingle parts uſed in the ſeveral cathedrals of the kingdom, in order to correct and publiſh them in ſcore; a plan which he did not live to accompliſh; but bequeathing his papers to Dr. Boyce, it was afterwards executed in a very ſplendid and ample manner. Dr. Greene died in 1755, and was ſucceeded, as compoſer to the Chapel Royal and maſter of his majeſty's band, by his worthy pupil Dr. Boyce.

GREENE, in *Geography*, a county of Waſhington diſtrict in Teneſſee, containing 7610 inhabitants, of whom 471 are ſlaves. Greenville college has been eſtabliſhed by law in this county. (See GREENVILLE.)—Alſo, a county in the upper diſtrict of Georgia, bounded W. by the upper part of Oconee river, E. by Wilkes county, and S. by that of Waſhington, containing 10761 inhabitants, including 3657 ſlaves. The chief town is Greenſborough.—Alſo, a county in the ſtate of Ohio, bounded N. on the Indian ocean, S. on Roſs and Warren, E. on Roſs and Franklin, and W. on Montgomery county. Its extent from N. to S. is 58, and from E. to W. 21 miles. By the cenſus of 1803 it contains 446 white males of 21 years and upwards.—Alſo, a townſhip in Chenango county, New York, on the E. ſide of Chenango river, containing 655 inhabitants.

GREENFIELD, a handſome flouriſhing poſt-town in Hampſhire county, Maſſachuſetts, about 104 miles W. by N. from Boſton. This townſhip lies on the W. banks of the Connecticut river; it was incorporated in 1753, and contains 1254 inhabitants.—Alſo, a poſt-town in Saratoga county, New York, containing 3073 inhabitants.—Alſo, a town in Hillſborough county, New Hampſhire, containing 934 inhabitants.

GREENHILL, JOHN, in *Biography*, a painter of much promiſe, but whoſe diſſolute morals cut ſhort his thread of life, at the early age of 20. He was born at Saliſbury in 1649, and became a pupil of Lely, whoſe manner of courſe he imitated, and with much ſucceſs.

GREENHOUSE, in *Gardening*, a houſe of ſhelter in a garden; contrived for preſerving the more tender and curious exotic plants, which will not bear the winter's cold abroad in our climate.

Greenhouſes, as they are now built, ſerve not only as conſervatories, but likewiſe as ornaments of gardens; being uſually large and beautiful ſtructures, in form of galleries, wherein the plants are handſomely ranged in caſes for the purpoſe.

The greenhouſe is a ſort of building, fronted and covered with glazed frames, deſtined for the purpoſe of preſerving various ſorts of exotic ſhrubs, &c. through the winter ſeaſon: the aid of artificial heat is not here neceſſary, except in very intenſe cold weather. It is adviſeable, in conſtructing ſuch houſes, to erect flues to uſe occaſionally, which may prove ſerviceable, not only in ſevere froſts, but alſo in moiſt foggy weather, where a moderate fire will now and then dry up the damps, which would otherwiſe prove pernicious to many of the tender kinds of plants.

It differs from the conſervatory chiefly in this circumſtance, that the plants, trees, or ſhrubs, are in pots or tubs, and placed upon ſtands, frames, or ſtages, during the winter, to be removed to proper ſituations in the open air, in the hot ſummer ſeaſon; while in that there are beds, borders,

ders, and clumps, laid out in the ground plan, and made up with the beſt earthy materials, to the depth of three or four feet, in which the ſhrubs, trees, &c. are regularly planted ; the whole of the roof being removed during the ſummer to admit freſh air, and replaced on the approach of the autumn, to remain until the following ſummer renders it unneceſſary.

The green-houſes are at preſent moſtly contrived to ſtand in the pleaſure-ground, near to the houſe, if poſſible. They ſhould be upon a ſomewhat elevated ſpot, full to the ſouth, and where the ſun has acceſs from its riſing to its ſetting : theſe buildings are commonly of brick or ſtone, having the fronts and tops almoſt wholly of glaſs-work ; and ranging lengthways eaſt and weſt. They are generally conſtructed upon ſome ornamental plan. As to the general dimenſions in reſpect to length, width, and height, they may be from ten to fifty feet, or more in length, according to the number of plants to be contained ; and in width, from ten or fifteen to twenty feet ; but for middling-houſes, fifteen or eighteen feet is a ſufficient width ; and in height in the clear, nearly in proportion to the width.

The walls on the backs and ends, particularly the former, ſhould be carried up two bricks thick ; and if more than fifteen feet high, two bricks and a half thick ; at one end of the back wall on the outſide, it is eligible to erect a furnace, for burning fires occaſionally, communicating with flues within, ranging in two or three returns along the back wall, having one flue running along the front and end walls, raiſed wholly above the floor of the houſe.

The fronts of the buildings ſhould have as much glaſs as poſſible, and wide glaſs doors ſhould be made in the middle, both for ornament and entrance, and for moving in and out the plants. It would alſo be convenient to have a ſmaller entrance door at one end : the width of the windows for the glaſs ſaſhes may be five or ſix feet ; and the piers between the ſaſhes may be either of timber, ſix, eight, or ten inches wide, according to their height, or if of brick or ſtone-work, two feet wide at leaſt, ſloping both ſides of each pier inward, that by taking off the angles, a free admiſſion may be given to the rays of the ſun. For the ſame reaſon, the bottoms of the ſaſhes ſhould reach within a foot of the floor of the houſe, and their tops almoſt as high as the roof ; and if brick or ſtone piers two feet wide, ſhutters may be hung on the inſide to fall back againſt each pier. The roof may be either wholly or only half glaſs-work, next the front ; the other half ſlated, eſpecially if the upright or front piers are of timber ; and the ſhutters to cover the top glaſſes may be ſo contrived as to ſlide under the ſlated roof : where the piers are of brick or ſtone, it is common to have the roof entirely ſlated or tiled ; but ſlating is the moſt ornamental for a half or whole roof ; and the cieling within ſhould be white ; which, as well as the whole inſide wall, muſt be well plaſtered and white-waſhed, ſo as to render it clean and neat.

But in green-houſes of modern conſtruction, in order to have as much glaſs as poſſible in front, the piers between the ſaſhes are commonly of timber only, from ſix to eight or ten inches thick, according to the height, ſo as to admit as great a portion of light and heat of the ſun as poſſible, and the roofs wholly of glazed frame-work.

The green-houſes for large collections of plants have ſometimes two wings of ſmaller dimenſions, added to the main buildings, at each end, in a right line, ſeparated ſometimes from it by a glaſs partition, with ſliding ſaſhes for communication, and the front almoſt wholly of glaſs-work, and half or whole glaſs roofs. Thus, by theſe additional wings, the houſes conſiſt of three diviſions, whereby the different qualities and temperatures of the various plants can be more eligibly ſuited. The middle, or main diviſion, may be for all the principal and more hardy, woody, or ſhrubby kinds, which require protection only from froſt ; one of the wings appropriated for the ſucculent tribe, and the other to the more tender kinds that require occaſional heat in winter, but which can live without the heat of a ſtove or hot-houſe.

On whatever plans green-houſes are conſtructed, the whole of the inſide walls ſhould be neatly finiſhed off with plaſter and white-waſh, and the wood-work painted white ; the bottom being painted with large ſquare paving tiles, or ſome other ſimilar material.

In the green-houſe there ſhould be ſtands, frames, or treſſels, which may be moved in and out, upon which rows of planks may be fixed, ſo as to place the pots or tubs of plants, in regular rows, one above another ; by which their heads may be ſo ſituated as not to interfere with each other : the loweſt rows of plants next the windows being placed above four feet from them, that there may be convenient breadth left to walk in front ; and the rows of plants ſhould riſe gradually from the firſt, in ſuch a manner, that the heads of the ſecond row be entirely advanced above the firſt, the ſtems only being hid ; and at the back of the houſe a ſpace allowed of at leaſt five feet, for the conveniency of watering the plants, and to admit a current of air round them, that the damps occaſioned by their perſpiration, may be the better diſſipated ; which by being pent in too cloſely often occaſion a mouldineſs upon the tender ſhoots and leaves, and, when the houſe is cloſe ſhut up, this ſtagnating, rancid vapour is often very deſtructive ; for which reaſon they ſhould never be crowded too cloſe to each other, nor ſhould ſucculent plants ever be placed among them.

In *Plate Gardening*, (*Green-houſe*) there is a ground plan and elevation of an improved green-houſe in which *fig.* 1. ſhews the front elevation, *fig.* 2. the ground plan, and *fig.* 3. a ſection of the ſame.

And at *fig.* 4. is another houſe of this kind upon another plan.

GREEN-HOUSE *Plants*, in *Gardening*, are ſuch as require the protection of this ſort of building during the winter or other ſeaſon ; the following are the principal of the different ſorts that demand this kind of treatment.

Succulent Kind.

Agave, agave or American aloe ; compriſing common great American agave, with entire green leaves, and a branching flower-ſtalk ;—common agave with ſtriped leaves ;—Virginian agave, with narrower pale-green leaves.

Aloe, African aloe ; containing mitre-ſhaped aloe-tree, or ſword aloe ;—aloe ferox ;—fan aloe ;—ſoccotrine aloe ;—ſoap aloe ;—partridge-breaſt aloe ;—tongue aloe ;—warted-tongue aloe ;—pearl-tongue aloe ;—cobweb-aloe ;—hedge-hog aloe ;—cuſhion aloe ;—ſpiral aloe ;—pentangular ſpiral aloe ;—triangular ſpiral aloe ;—iris uvaria aloe.

Anthericum, ſpider-wort ; containing ſhrubby ſtalked, onion-leaved anthericum ;—aloe-leaved anthericum ;—mock aſphodel anthericum.

Cacalia, foreign colt's-foot ; compriſing cacalia ficoides ;—Kleinia or Indian cacalia ;—anteuphorbium cacalia ;—papillary cacalia.

Cactus, melon-thiſtle ; containing cactus opuntia, or common Indian fig.

Cotyledon, navel-wort ; containing round-leaved, long-leaved, hemiſpherical-leaved navel-wort.

Craſſula, leſſer orpine ; containing ſeveral ſpecies.

Euphorbia, euphorbium; containing moſt of the ſorts.

Meſembryanthemum, fig marigold; containing many curious ſpecies.

Sempervivum, live-ever, or houſe-leek; containing tree-houſe-leek;—variegated tree-houſe-leek;—leſſer canary tree-houſe-leek.

Herbaceous Kind.

Antholyza, Ethiopian corn-flag; containing ringent ſcarlet antholyza;—Ethiopian crimſon antholyza;—cunonia, or large ſpathed ſcarlet-flowered.

Antirrhinum, ſnap-dragon; containing variegated ſnap-dragon;—Gibraltar ſpotted flowered linaria;—Dalmatian toad flax.

Ariſtolochia, birth-wort; containing evergreen ariſtolochia;—piſtolochia, or ſmall birth-wort.

Bryonia, bryony; containing African tuberous-rooted bryony.

Calla, calla; containing ſweet calla, or Ethiopian arum.

Campanula, bell-flower; containing American bell-flower.

Canarina, canarina; containing canary bell-flower.

Canna, Indian flowering reed; containing common Indian flowering reed, and varieties;—glaucous Indian reed.

Crinum, aſphodel lily; containing African aſphodel lily;—broad-leaved aſphodel lily.

Cyclamen, cyclamen; containing Perſian cyclamen, and ſeveral varieties.

Erodium, erodium; containing pentandrous geranium or crane's bill;—thick-leaved erodium;—upright dwarf erodium.

Erythrina, coral-tree; containing herbaceous erythrina.

Ixia, ixia; containing African woolly-headed ixia;—bulbiferous ixia;—flexuous ixia;—corymbous ſpotted-flowered ixia.

Leonurus, lion's-tail; containing African ſcarlet leonurus;—ſtriped-leaved leonurus.

Ornithogalum, ſtar of Bethlehem; containing Cape ornithogalum.

Tropæolum, Indian creſs; containing double Indian creſs, or naſturtium.

Shrubby Kind.

Andromeda, andromeda; containing tree andromeda, or Carolina ſorrel.

Anthoſpermum, amber-tree; containing Ethiopian ſmooth amber-tree;—ciliated amber-tree.

Anthyllis, Jupiter's beard, or barba Jovis;—common barba jovis, or ſilver buſh;—Spaniſh ternate-leaved barba jovis;—dwarf Portugal barba jovis;—erinacea, or prickly anthyllis.

Arctotis, arctotis; containing rough-leaved arctotis;—narrow-leaved arctotis;—ſea rag-wort leaved arctotis;—plantain-leaved arctotis.

Artemiſia, mug-wort; containing tree wormwood.

Aſclepias, ſwallow-wort; containing ſhrub aſclepias.

Aſparagus; compriſing white prickly aſparagus;—declinated briſtly-leaved aſparagus;—acute-leaved aſparagus;—retrorfacted great prickly aſparagus.

Aſter, ſtar-wort; containing ſhrubby African aſter.

Aſtragalus, milk-vetch, &c.; compriſing the tragacanth, or goat's-thorn, and ſeveral varieties.

Atropa, deadly night-ſhade; containing ſhrubby deadly night-ſhade of Spain.

Baccharis, ploughman's ſpikenard; containing ivy-leaved baccharis; —oleander-leaved baccharis; —halimus-leaved baccharis.

Boſea, yerva-mora; or ſhrubby golden-rod tree.

Brunia, brunia; containing knob-flowered, or imbricated-leaved, woolly-heath leaved abrotenoides, or thyme-leaved radiated brunia.

Bubon, Macedonian parſley; containing ſhrubby galbaniferous bubon;—ſhrubby gummiferous bubon.

Buddlea, buddlea; compriſing American long-ſpiked, occidental American, globular-headed buddlea.

Buphthalmum, ox-eye; containing ſhrubby Jamaica ox-eye;—maritime, or ſea ox-eye.

Bupleurum, hare's ear; containing ſhrubby Æthiopian hare's ear;—ſhrubby difforme-leaved Cape hare's-ear.

Calendula, marigold; containing ſhrubby Cape marigold;—ſhrubby graſs-leaved Æthiopian marigold.

Capparis, caper-buſh; containing ſpinous capparis, or true caper ſhrub.

Caſſine, caſſine; containing Cape phillyrea;—Mauweema, or Hottentot cherry.

Ceanothus, ceanothus; containing African ceanothus.

Celaſtrus, ſtaff-tree; containing pyracantha-leaved celaſtrus;—box-leaved;—myrtle-leaved celaſtrus.

Ceratonia, carob-tree; compriſing common carob-tree, or St. John's beard.

Chamærops, chamærops; containing dwarf palm.

Chryſanthemum, chryſanthemum; containing ſhrubby canary chryſanthemum;—ſhrubby floſcular chryſanthemum.

Chryſocoma, goldy-locks; containing ſhrubby coma aurea, or greater African goldy-locks;—ſhrubby nodding goldy-locks.

Ciſtus, ciſtus; containing bay-leaved ciſtus;—ſea purſlane-leaved ciſtus;—and ſeveral other ſpecies.

Citrus, citron-tree; containing lemon-tree, and orange, with all the varieties of each.

Cliffortia, cliffortia; containing flea-leaved cliffortia.

Cluylia, alaternoide cluylia; containing purſlane-leaved cluylia;—elateria or Indian cluylia.

Colutea, colutea; containing ſhrubby Æthiopian ſcarlet colutea.

Convolvulus, convolvulus; compriſing evergreen canary convolvulus;—ſilvery convolvulus.

Coronilla, coronilla; containing valentine coronilla;—glaucous coronilla;—ſilvery coronilla.

Dais, dais; containing catinus-leaved dais.

Digitalis, fox glove; containing ſhrubby canary fox-glove.

Dioſma, African ſpiræa; containing oppoſite-leaved, hairy-leaved, red dioſma, &c.

Ebenus, ebony; containing ebony of Crete.

Geniſta, broom; containing ſhrubby canary broom.

Geranium, geranium; containing all the ſhrubby kinds.

Gordonia, gordonia; containing loblolly bay.

Gorteria, gorteria; containing ſhrubby prickly-leaved gorteria.

Grewia, grewia; containing occidental grewia.

Halleria, halleria; containing African-fly honeyſuckle.

Heliotropium, turn-ſole; containing ſhrubby Peruvian heliotropium.

Hermania, hermania; containing althæa-leaved, alder-leaved, lavender-leaved, gooſeberry-leaved hermania.

Hypericum, St. John's wort; containing warted-leaved Minorca St. John's wort;—Carolina St. John's wort;—China monogynous St. John's wort.

Jaſminum, jaſmine; containing Catalonian jaſmine;—Azorian jaſmine;—yellow Indian jaſmine.

Iberis, candy-tuft;—evergreen tree candy-tuft;—ever-green ſtriped-leaved candy-tuft;—ever-flowering tree candy-tuft.

Juſticia, Malabar nut-tree.

Lantana, American viburnum ; containing African lantana, or flax-leaved jaſmine ;—ſage-leaved lantana.

Laurus, bay-tree ; containing Carolina blue-berried bay ;—red-berried bay-tree ;—Indian bay-tree ;—cinnamon-tree ;—camphire-tree ;—deciduous bay-tree.

Lobelia, lobelia ; containing ſhrubby, pine-leaved, blue lobelia.

Lycium, box-thorn ; containing African box-thorn ;—Barbary box-thorn.

Malva, mallow ; containing African ſhrub-mallow medicago ; containing ſhrubby hoary medicago, or moon trefoil.

Melia, melia ; containing the bead-tree.

Mentha, mint ; containing tree-mint.

Moria, moria ; containing canaliculated-leaved moria ;—ruſh-leaved moria.

Myrica, gale, ſweet-willow, and *candle-berry myrtle ;* containing oak-leaved myrica ;—Æthiopian heart-leaved myrica.

Myrtus, myrtle-tree ; containing common myrtle, which comprehends many varieties.

Nerium, oleander, or *roſe-bay* ; compriſing common oleander, with red flowers, ſcarlet flowers, white flowers, double flowers, ſtriped-leaved.

Olea, olive tree ; containing European olive tree ;—Cape or African olive tree.

Onionis, reſt harrow ; ſhrubby Spaniſh onionis.

Oſteoſpermum, oſteoſpermum ; containing hard-ſeeded chryſanthemum.

Othonna, ragwort ; containing pectinated-leaved othonna ;—ſouthernwood-leaved othonna.

Paſſerina, ſparrow-wort ; ſhrubby African paſſerina.

Pelargonium, African geranium ; containing many ſhrubby ſpecies.

Phlomis, Jeruſalem ſage ; containing yellow phlomis, and varieties ;—purple phlomis.

Phyſalis, phyſalis ; containing alkekengi, or winter cherry ;—ſomniferous winter cherry ;—flexuous winter cherry.

Piſtacia, Piſtachia nut, and *maſtic tree ;* two or three varieties.

Polygala, milk-wort ; containing ſhrubby myrtle-leaved polygala.

Portulaca, purſlane ; containing ſhrubby Cape purſlane tree.

Poterium, burnet ; containing ſhrubby prickly burnet.

Praſium, ſhrubby hedge nettle.

Protea, ſilver-tree ; containing common ſilvery protea, or changing tree ;—coniferous protea.

Pumia, pomegranate tree ; containing dwarf pomegranate.

Rhus, ſumach ; containing African hoary ſumach, and varieties ;—African narrow-leaved ſumach, and varieties ;—ſhining-leaved African ſumach.

Royena, royena ; containing African bladder-nut.

Rumex, dock ; containing ſorrel tree.

Ruſcus, knee-holly ; containing Alexandrian laurel ;—tongue-upon-tongue laurel.

Salvia, ſage ; containing ſhrubby African golden-flowered ſage ;—ſhrubby African blue flowered ſage ;—Canary ſage ;—Mexican ſage, or ſhrubby Mexican clary.

Scabioſa, ſcabious ; containing ſhrubby ſcabious.

Senecio, groundſel ; containing ſhrubby African groundſel.

Sideritis, iron-wort ; containing Canary iron-wort ;—Cretan iron-wort.

Solanum, night-ſhade ; containing amomum Plinii ;—baſtard capſicum, or winter cherry ;—African jagged-leaved ſolanum, or pomum amoris ;—American twin-fruited ſolanum ;—thorny, downy night-ſhade.

Tanacetum, tanſey ; containing ſhrubby Æthiopian tanſey ;—under-ſhrubby ſamphire-leaved tanſey ;—tree tanſey.

Tarchonanthus, tarchonanthus ; containing ſhrubby African fleabane.

Tetragonia, tetragonia ; containing ſhrubby tetragonia.

Teucrium, germander ; compriſing Spaniſh tree-germander ;—broad-leaved tree-germander.

Vitex, chaſte-tree ; containing evergreen chaſte-tree.

Ulex, furze or *whin ;* containing African berry-bearing furze.

Xeranthemum, xeranthemum ; containing broad-leaved xeranthemum ;—narrow-leaved xeranthemum ;—trailing xeranthemum.

Yucca, Adam's needle ; containing common Adam's needle ;—thready-leaved Adam's needle ;—aloe-leaved yucca ;—dragon tree-leaved yucca.

Zygophyllum, bean caper ; containing ſeſſile-leaved bean caper ;—purſlane-leaved bean caper.

Under-ſhrubby Kind.

Dracocephalum, dracocephalum ; containing Canary dracocephalum, or balm of Gilead.

Gnaphalium, gnaphalium ; containing oriental gnaphalium, and varieties ;—ſweet-ſcented gnaphalium.

Inula, inula.

Keggelaria, keggelaria ; containing African keggelaria.

Lavateria, lavateria ; containing Cape lavateria.

Lavendula, lavender ; containing cat-leaved Canary lavender.

Lotus, bird's-foot trefoil ; containing Cretan ſilvery lotus ;—lotus Jacobæus ;—upright lotus.

Mediola, mediola ; containing climbing African mediola.

Origanum, origany ; containing dittany of Crete ;—dittany of mount Sipylus ;—Cretan marjoram ;—origany of Smyrna.

Periploca, Virginian ſilk ; containing African hoary-climbing periploca, and varieties.

Phylica, baſtard alaternus ; containing box-leaved phylica ;—heath-leaved phylica.

Phyllis, baſtard hare's ear ; or ſimpla nobla.

Polium, or *mountain poly ;* containing marum, or Syrian maſtich.

Rhamnus, buckthorn ; containing broad-leaved Indian rhamnus ;—zizyphus, or jujube.

Selago, ſelago ; containing corymb ſelago.

Smilax, rough bind-weed ; containing Chineſe rough bind-weed, or China-root ;—laurel-leaved rough bind-weed, and ſeveral varieties of each.

Stæbe, ſtæbe ; containing baſtard elichryſum.

It may be obſerved, that theſe ſorts of plants muſt conſtantly be kept in pots, and ſome large kinds in tubs, for moving into ſhelter in winter, and into the open air in ſummer ; as, being all exotics from various warm parts of the world, they are of tender growth in this climate, and conſequently not able to live in the open air in the winter months.

And the pots and tubs for containing them muſt be of different ſizes, according to the ſize and nature of the plants, which, as they advance in growth, ſhould have large pots, &c. provided for them accordingly ; and when they become wholly too large for the pots, they muſt be ſhifted into tubs hooped with iron, with two iron handles to each at the top-part.

It is neceſſary in potting or planting the different ſorts, care ſhould be taken that the pots or tubs have holes at bottom for the diſcharge of redundant moiſture, each hole being covered with a piece of tile or oyſter-ſhell before the mould is put in, to prevent their being ſtopped up, and the earth from being waſhed out below.

The beſt modes of propagating the different ſorts, the nature of the earth in which they ſucceed beſt, and the ſeaſon moſt proper for raiſing them, are fully explained under the culture of the reſpective kinds, and may be ſeen under their proper heads.

General Method of Management of Green-houſe Plants.—As moſt plants of this ſort are capable of bearing the open air from the latter end of May till October; but the reſt of the year demand the protection of the green-houſe, they, of courſe, require to be ſet out into it as ſoon as the weather begins to be ſuitable, in the ſpring and ſummer months; eſpecially for ſuch as all the ſeveral varieties of myrtles, geraniums, oleanders, ciſtuſes, phlomiſes, ſhrubby aſter, tree-wormwood, tree-candy-tuft, yellow Indian and Spaniſh jaſmines, Indian bay, &c &c. And this ſhould be done in the laſt week in May, or firſt in June, according as the ſeaſon proves more or leſs favourable for all the other ſorts: but it ſhould not be attempted till the ſeaſon is become perfectly ſettled, and there is a fair proſpect of ſummer being arrived, as there are often very cold nights and frequently froſty mornings in May, and even in the beginning of June, which, if the plants were fully expoſed, would pinch the ends of their young ſhoots and leaves, and greatly injure them. A mild warm day ſhould be choſen for this work; and if a warm rain, it will be of much advantage, as it waſhes the leaves and branches from the duſt they have contracted, and greatly refreſhes the plants that are thus expoſed to it.

Method of Setting out the Plants.—This is done in the more hardy ſorts in thin pots about the middle of May.

When firſt brought out, it is proper to place them in ſome ſheltered ſunny place, for a fortnight, till they are inured to the open air; then to ſet them in any open expoſure, where they are to remain for the ſummer. And as ſoon as they are brought out, they ſhould be cleared from all dead leaves, and all dead wood; and the earth on the ſurface of the pots be ſtirred, taking a little of the old out, and adding ſome freſh mould in its ſtead, which will prove very beneficial; then give moderate watering, not only to the mould, but alſo over the heads of the plants, to clear them effectually from all dirt and filth which they have contracted in the green-houſe during the winter.

In putting them out, they may be placed according to the fancy of the proprietor; ſome of the handſomeſt plants being occaſionally placed to adorn ſpacious fore-courts, or arranged on each ſide of large walks contiguous to the main habitation; and others near ornamental garden-buildings; they are alſo ſometimes diſpoſed in groups, or ſmall clumps in the moſt conſpicuous places, in different parts of the pleaſure-ground; exhibiting different ſorts in each group, in order to cauſe the greater variety and effect in ſuch ſituations.

As ſoon as they have been thus placed out, their chief culture is, to ſupply themplentifully with water during the ſummer ſeaſon, in hot dry weather: all the woody or ſhrubby kinds in particular; likewiſe the herbaceous kinds that are not very ſucculent, require it three times a week at leaſt: and in a very hot dry time once every day. The ſucculent kinds muſt alſo have a moderate ſupply of water two or three times a week in dry weather; the proper time for watering all the ſorts at this ſeaſon is, either in a morning before nine o'clock, or in the afternoon about four or five; for, if performed in the middle of the day in ſummer weather, the ſun would exhale a great part of the moiſture before it effected its intended operation on the fibres of the plants: this buſineſs ſhould be duly attended to in dry weather. As the mould roots, and fibres of the plants are circumſcribed within the narrow limits of a pot or tub, the earth, as well as the fibres, dries very faſt in ſummer, and neceſſarily requires frequent refreſhments of water, to preſerve that due and conſtant degree of moiſture which is requiſite for the ſupport of healthy vegetation in the different plants.

Even moderate rains ſhould not prevent watering occaſionally, eſpecially ſuch plants as have ſpreading heads, which prevent the rains, unleſs very heavy or conſtant, from falling in ſufficient quantities on the earth of the pots, to moiſten it properly. And in hot weather, if ſome mowings of ſhort graſs are ſpread on the ſurface of the orange-tree tubs and others, it will greatly preſerve the moiſture. During this ſeaſon, it will alſo be a good practice to looſen the ſurface of the earth now and then in ſuch pots and tubs as have a tendency to bind or become ſtiff by time.

Manner of taking in the plants.—About the beginning of the autumn, as towards the latter end of September, the more tender kinds of theſe exotic plants muſt be removed into the houſe; the ſucculent tribe, in particular, ſhould be removed to ſhelter at the firſt approach of exceſſive wet and cold nights. The oranges, lemons, and all the other ſpecies ſhould be moved into ſhelter in due time, either in the end of September or early in October; for, if they are permitted to remain in the open air till attacked by ſharp weather, it changes the beautiful verdure of their leaves to a ruſty yellow hue, which they do not recover during winter; therefore, about the latter end of September, or beginning of October at lateſt, the principal plants ſhould be brought in; the ſucculent and others of a more tender temperature, as early in the former month as the cold weather begins to come on; and continue moving in all the others as the cold increaſes; and by the middle of October have the whole collection in the houſe. As the time approaches for moving in the different ſorts, clear them perfectly well from decayed leaves, &c. all the pots being well cleaned, looſening the ſurface of the earth in each pot, and adding a little freſh mould. As the different ſorts are brought occaſionally into the green-houſe, they may be placed promiſcuouſly till the whole are in, and then be arranged regularly, as they are to remain for the winter; leaving all the windows quite open till that time. When the whole is brought in, they ſhould be diſpoſed in regular order, ſo as to appear to the beſt advantage, both in reſpect to their general arrangement and variety, and ſo as each may have an equal portion of ſun and air; the talleſt plants being arranged in the back, the others in their ſeveral ranks, according to their degrees of height, gradually down to the loweſt in front; and as there is a vaſt variety both in ſize, ſhape, and colour, of the foliage, they ſhould be diſpoſed ſo as to ſet off each other and give a pleaſing variety to the whole; and if poſſible, they ſhould ſtand clear of one another; by which each plant will be ſeparately conſpicuous, and the whole exhibit a greater air of freedom and variety, as well as admit an equal portion of ſun, and a more free circulation of air among them.

When the plants have been thus collected in, their principal culture is the ſupplying them with freſh air at all opportunities in mild weather, and giving moderate waterings occaſionally, picking off decayed leaves, cutting out caſual decayed ſhoots, and making occaſional moderate fires in ſevere weather, alſo, ſometimes to diſpel great damps and noxious fogs from them.

With reſpect to giving air, it ſhould be admitted every mild, calm day, by opening the windows more or leſs, according to the temperature of the weather. When the plants are firſt houſed, they ſhould have as much free air as the nature of the ſeaſon will admit, by opening the windows every mild day to their full extent ; and if the air is quite temperate, they may remain open in the nights for the firſt week ; but in cold nights they ſhould be conſtantly ſhut ; this work of admitting air muſt be conſtantly attended to all the winter ; for, without a due portion of this eſſential article in mild weather, the plants ſoon loſe their fine verdure and aſſume a ſickly yellowiſh colour, become diſeaſed, and the young ſhoots, in many ſorts, grow mouldy and rot off, and the leaves of the plants drop ; therefore, never omit every mild day, when not very damp or foggy, to open ſome or all of the windows little or much, according as the air is more or leſs temperate ; the proper time during winter for this, is from about eight, nine, or ten in a morning, till three, four, or five in the evening, according to the mildneſs of the day ; but as the days lengthen and the warm weather increaſes, give more air in proportion, earlier and later in the day as may be judged proper, being careful always to ſhut all cloſe in due time every evening, as ſoon as the ſharp air approaches. In foggy weather, it is adviſable to keep the windows quite cloſe ; for the great damps occaſioned by fogs are very pernicious to theſe plants whilſt they are confined in the houſe ; alſo, when boiſterous or cold cutting winds blow towards the front of the green-houſe, the whole ſhould be kept ſhut ; or only, if thought neceſſary, ſome of the upper ſaſhes drawn down a little way at top, above the reach of the wind ruſhing immediately upon the plants ; likewiſe, in all froſty weather, the houſe ſhould be kept cloſe, except the froſt is moderate, and the middle of the day ſunny and warm, when ſome of the windows may be opened a little, but ſhut cloſe again if the ſun is clouded, and at any rate before the air changes cold : in ſevere weather, the ſhutters, &c. ſhould be ſhut every night, alſo, occaſionally when the froſt is extremely rigorous and no ſun ; and likewiſe, in ſuch weather, the aſſiſtance of fire-heat as hereafter directed may be neceſſary. As the ſpring approaches, and the weather grows warmer, enlarge the portion of air accordingly, admitting it alſo both earlier in a morning and later in the evening as the days lengthen ; for then the plants will aſſume a growing ſtate, and a conſiderable portion of air is requiſite every mild day, both to ſtrengthen the new ſhoots and inure the plants by degrees to the air againſt the time for removing them fully into it again for the ſummer ſeaſon.

And watering will alſo be neceſſary to moſt of the ſorts, but muſt be afforded them as ſparingly as poſſible during the winter months, and ſcarcely any ſhould be given when the houſe is obliged to be ſhut cloſe through the ſeverity of the weather : there are no certain rules to be given for the application of this ; ſome plants require only a little water once a week, or ten or twelve days in mild weather, ſuch as the orange and lemon trees, myrtles, oleanders, ſhrubby-geraniums, and other woody kinds ; all that is neceſſary being juſt to preſerve the earth very moderately moiſt ; the pots and tubs muſt therefore be examined with proper attention, and water given to ſuch only as are in want. The herbaceous kinds ſhould be rather more ſparingly watered than the ſhrubby ſorts ; and all the ſucculent tribe have water but ſeldom, ſome not oftener than once a fortnight or three weeks, and that always but very ſparingly at each time ; and ſome that are very ſucculent require but very little from November till March ; indeed all the ſucculents ſhould only have it now and then at this ſeaſon, when the earth in the pots becomes very dry and hard.

In executing the buſineſs of watering in general, care ſhould be particularly taken to do it with great moderation at the time the plants are in the green-houſe, as when you once over-wet the earth at this ſeaſon, it will continue in that ſtate for a long time, and by chilling the tender fibres of the roots of the plants, often cauſe the loſs of the leaves of many of them, and even the death of ſome kinds. In a ſunny day, from about eleven o'clock to two, is the moſt proper time for having this ſort of work done.

Soft water, if poſſible, ſhould be uſed, or at leaſt ſuch as had been expoſed to the air two or three days, as freſh ſpring water is much too cold : and during froſty weather great attention is requiſite to keep all the windows cloſe, night and day, unleſs when very moderate, as juſt obſerved, and the middle of the day is ſunny and warm ; when ſome part of the houſe may be opened a little for two or three hours, having particular regard to ſhutting all cloſe in due time in the afternoon, before the air changes to become ſharply cold : but in very ſevere froſts it muſt be kept cloſe night and day, and the ſhutters or other covers of canvaſs or mats be alſo uſed every night ; alſo, occaſionally in the day time, when the weather is intenſely ſevere, and no ſun appears, and there are no flues for fires to keep out the froſt. The ſhutters, or other ſhelters, beſides the glaſſes, ſhould however be uſed as little as poſſible in the day-time, except in caſes of particular neceſſity, as every opportunity ought to be taken for the admiſſion of light and freſh air, as much as the temperature of the weather will poſſibly admit, as moſt of the plants only want protection from froſt and the common ſhelter of the houſe, which, with ſhutting the ſaſhes cloſe every night, will be ſufficient for the purpoſe.

In caſes where there are flues for fires, it will be adviſeable to make moderate ones at ſuch times as the froſt cannot be otherwiſe kept out, eſpecially on nights ; but this muſt by no means be continued longer than is neceſſary to guard againſt very ſevere froſts and the danger of the plants.

In very cold, foggy, damp weather, a moderate fire now and then in the flues alſo proves very beneficial in expelling the damp unwholeſome vapours, ſo pernicious to all plants of this nature. Whilſt the plants are in the houſe, all decayed leaves, &c. ſhould likewiſe be conſtantly picked off, being neceſſary both to preſerve the beauty and health of the plants. The decayed leaves of the ſucculent kinds ſhould be cut off cloſe with a ſharp knife ; the plants in general ſhould likewiſe be occaſionally cleaned from any filth they may contract in the houſe, ſuch as duſt, cobwebs, &c.

General Method of Culture of the Plants.—Theſe ſorts of plants generally want ſhifting into larger pots and freſh earth as they advance in growth ; ſuch as are faſt growers, as ſome of the ſhrubby geraniums, &c. annually, or every other year ; and ſome plants in large pots, &c. once in two or three years, and others not ſo often, eſpecially ſome large-grown American aloes, orange and lemon-trees, and thoſe in large tubs, having a conſiderable ſubſtance of earth about the roots. Sometimes theſe and other ſimilar kinds, when not convenient to ſhift them, have the top earth, and a little down round the ſides, looſened to ſome moderate depth in the ſpring, removing the looſened ſoil, and filling the ſpace up with freſh compoſt. But as the plants in general increaſe conſiderably in proportion to their nature of growth, ſhifting into larger pots or tubs, with ſome freſh earth, ſhould not be omitted occaſionally as it may ſeem neceſſary, as it proves beneficial to moſt of the ſorts. They may moſt of them be ſhifted with the ball of earth about their roots entire ; but others, that are weak and ſickly, require ſhifting into entire freſh earth prepared for the purpoſe.

The moſt proper time for ſhifting all the ſorts is in April, ar before they are removed into the open air for the ſummer; but it may be occaſionally done in autumn, as in Auguſt or the beginning of September, in time to ſtrike freſh root before winter. In the work of ſhifting, each plant ſhould be drawn out of its pot or tub with the ball of earth about its roots entire, then all the dry matted fibres round the outſide of the ball pared off and cleared away, alſo, ſome of the old earth at the ſides, bottoms, and tops: then having the new pots and freſh earth ready, the holes at the bottoms of the pots ſhould be covered with pieces of tiles or oyſter-ſhells, and ſome of the freſh earth put in; placing the plant in the pot, and filling up the vacancy all round with more freſh compoſt, bringing it an inch over the top of the ball, giving a good watering to ſettle the earth cloſe in every part: after this, it is neceſſary to place the plants to have ſhade from the mid-day ſun for a week or fortnight, and ſometimes longer.

All ſuch plants as are become of a weak ſickly nature ſhould, at ſhifting, have all the earth taken clean from about their roots, having them waſhed, and then planted into entire freſh earth properly prepared for them.

And the larger ſorts of plants, ſuch as the orange-trees, lemons, citrons, American aloes, and others of ſimilar growth, ſhould be ſhifted, when large, from pots into tubs hooped with iron, having two iron handles at top, as obſerved above, for the convenience of lifting them in and out of the green-houſe, as they ſometimes grow to ſo large a ſize as to require two and ſometimes three or four men to move them.

But all ſuch plants as are not ſhifted annually ſhould, in ſpring, have the earth in the tops of the pots or tubs looſened to a little depth, alſo, a little way down round the ſides, taking the looſened earth out; and in its ſtead adding a quantity of freſh mould, giving it directly a little water to ſettle it cloſe. This ſhould never be omitted when neceſſary. At any time when the ſurface of the earth is obſerved to be ſtiff, whether in the ſhifted or unſhifted plants, it is of much ſervice to ſtir it an inch in depth occaſionally, and add a little freſh compoſt when neceſſary to the plants.

And the mould or compoſt into which the plants are to be ſhifted is of conſiderable importance. The beſt is obtained from commons where ſheep and cattle paſture, particularly in low places, where the fineſt graſs grows and the ſoil is deepeſt. A foot of the top ſoil with the turf ſhould be taken off, and, if a ſandy or hazel loam, it will do alone; but if a ſtrong loam, ſome ſand and black peaty, boggy, or mooriſh ſoil ſhould be added. Such ſoils ſhould be laid in a heap ſix winter months or more, and frequently turned over. Some plants, as aloes, meſembryanthemums, ixias, and exotic liliaceous plants in general, require a ſoil which is a degree lighter, and which does not retain the water, but lets it paſs readily. A little coal-aſhes at the bottom of each pot is uſeful in this view as well as others.

Moſt of the ericas, or heaths, and other beautiful plants from the Cape of Good Hope, from America, and Botany Bay, delight and flouriſh in this ſort of earth, which comes neareſt to their native ſoil: thus, the heaths like a black peat or mooriſh ſoil; and the others, that which is made a degree ſtronger, with loamy earth intermixed with it.

It is neceſſary to keep the heads and every part clean from duſt and other filth, by occaſionally waſhing with water all the ſorts, which in moſt is done by waterings over their heads; but in others, when very foul, by waſhing their leaves with a ſponge and water, eſpecially in winter. This is often neceſſary to the oranges and lemons, and other large-leafed kinds of plants that have been mentioned.

Where the heads of any of the ſhrubby kinds are become very irregular or ſhabby, the branches may be pruned ſhorter or longer, as neceſſary, in the early ſpring months.

And where any of the principal exotics aſſume a declining ſtate, ſuch as oranges, lemons, &c. or have thin, ſtraggling, weakly heads, or are apt to drop their leaves, it is proper either to ſhift them wholly, or apply ſome freſh earth to their roots, and then prune the heads moderately cloſe in the early ſpring, plunging them in a bark-pit under glaſſes. The heat of the bark-bed ſo greatly revives their growth, that they break forth into many ſtrong new ſhoots, and form handſome renewed full heads in the ſummer ſeaſon.

While in the green-houſe, ſome plants drop all their leaves, either by the effects of cold or over-watering, or ſometimes by being kept too long in too dry a ſtate, as frequently occurs in myrtles and geraniums, and ſometimes oranges, lemons, and others; in which caſe it is proper in the ſpring to prune the heads, ſhortening the long ſtrong ſhoots and branches, and to ſhift them with balls into freſh earth, or, if not ſhifted, to looſen the earth in the tops and ſides of the pots, drawing out the looſened mould, and ſupplying the place with freſh. They afterwards ſoon puſh forth into young ſhoots and leaves, and renew their heads with verdure. Sometimes myrtles, geraniums, &c. in this ſtate, when headed, may, on being brought forth in the ſummer, be drawn out of the pots, and plunged in the ground in a ſheltered ſituation, and watered in dry weather; when they will ſend their roots into the full earth and break forth ſtrongly at top into young wood and foliage, and form full heads, being then re-potted with balls of earth to the roots.

But the heads of green-houſe plants ſhould never be clipped with garden-ſhears, nor, by any mode of pruning, trimmed into any formal figure, as ſometimes practiſed; but every ſort be let aſſume its own natural growth, only juſt uſing the knife to regulate any very irregular or rambling ſhoot or branch, or to thin out ſome where too much crowded, and to cut out the dead wood they may contain in any part of them.

GREENLAND, in *Geography*, comprehends a peninſula generally allowed to be attached to North America, and a number of detached iſlands, ſituated in high northern latitudes; the former is called *Weſt* or *Old* Greenland, and the latter *Eaſt* or *New* Greenland, and more commonly Spitzbergen.

Weſt or Old Greenland, is now generally believed to be a peninſula, connected in its north-weſtern parts, hitherto unexplored, with America. The reaſons alleged for ſuppoſing that the N. W. ſide is contiguous to America, and actually attached to it are the following: Davis's ſtrait, or Baffin's bay, it is ſaid, becomes narrower and narrower towards 78° N. lat.; the coaſt alſo, which in other places is very high towards the ſea, gradually lowers northward; and the tide, which at Statenhook, and even as far as Cockin's ſound, in the 65th degree, riſes 18 feet at the new and full moon, decreaſes ſo much in the north above Diſko, that in the 70th degree it does not riſe much above eight feet, and probably loſes itſelf entirely at laſt. Hence captain Baffin gave up all hopes of finding a paſſage into the South ſeas through Davis's ſtraits, and conſequently concluded, that Greenland joined with America. The Greenlanders report, though much dependance cannot be laid upon their information, that the ſtrait at laſt becomes ſo narrow, that they can approach the other ſide ſo nearly, as to be able to call to the inhabitants, and ſtrike a fiſh from both ſides at once: but they affirm, that a ſtrong current runs from the north into the ſtrait, which prevents their coming to one another.

The name Greenland was given to the eaſt ſide of this territory many hundred years ago by the Norwegians and Icelanders, who are ſaid to have firſt diſcovered it, becauſe its appearance was *greener* than that of Iceland. But this eaſt ſide, ſometimes called *Old* or *Loſt* Greenland, is now almoſt totally unknown, becauſe ſhips cannot navigate this coaſt, on account of the great quantities of floating ice. Weſt Greenland lies between the ſtraits of Davis and Frobiſher, and Iceland, and is bounded on the W. by Baffin's bay, on the S. by Davis's ſtrait, and on the E. by the northern part of the Atlantic ocean; but its northern boundaries are unknown. It reaches from the ſouthernmoſt point of Cape Farewell, and Statenhook, in the 59th degree, on the right ſide north-eaſtward, towards Spitzbergen, to the 80th degree; and on the left ſide oppoſite to North America, N. W. and N. till about the 78th degree; the coaſts having been ſo far diſcovered. Moſt of the Greenlanders live from Statenhook to the 62d degree, or, as the inhabitants ſay, in the ſouth; but as no Europeans live there, theſe parts are imperfectly known. The interior of this dreary country is extremely mountainous, and ſome of the mountains are ſo high that they may be diſcerned at the diſtance of 40 or 60 leagues. This is particularly the caſe with that which is the higheſt mountain in the country, called "Hiorte-tak," or ſtag's-horn. It has three branches or points, the moſt lofty of which ſerves as a ſea-mark to navigators, and alſo as a weather-gage, for when a ſtorm is approaching from the ſouth, the ſummit of this mountain is enveloped in a ſmall miſty cloud. The hills and rocks of this country are covered with perpetual ſnow; though the low lands on the ſea-coaſt are clothed with verdure in the ſummer ſeaſon. The ice and ſnow, like the glaciers of Switzerland, fill the elevated plains, and even many vallies. The coaſt is indented with many bays and creeks that enter far into the land: and it is encompaſſed with innumerable large and ſmall iſlands, and both viſible and imperceptible rocks. The ſhore, however, is in many places inacceſſible on account of the floating mountains of ice. This country is ſaid to have been diſcovered by ſome emigrants from Iceland: the diſtance, according to the beſt maps, being about 8° of longitude, in lat. 66°, or nearly 200 geographical miles, though ſome maps reduce it to 5°, or not more than 130 geographical miles. The diſcovery was accidentally made by Eric Raude, or the red-headed, who being exiled from Iceland on account of the murder of one of its chiefs, found this country; and, coaſting along the S. W. border, wintered at an agreeable iſland near a ſound, which he called Eric's ſound. Having in the following year examined the main land, he returned in the third year to Iceland: and in order to induce the inhabitants of Iceland to accompany him he called it Greenland, expreſſing its verdant appearance, and repreſented it as abounding with paſture, wood, and fiſh. The effect of his repreſentation was ſuch, that in the ſucceeding year he was followed by twenty-five ſhips full of coloniſts, who had furniſhed themſelves richly with houſehold goods and cattle of all ſorts: however, only fourteen of theſe ſhips arrived ſafe: but in proceſs of time more colonies flocked to Greenland, both on the eaſt and weſt ſide, from Norway as well as Iceland. Torfæus, a native of Iceland, in his "Groenlandia Antiqua," dates the diſcovery of Greenland in the year 982. But it has been inferred from a bull iſſued by pope Gregory IV. in 835, and which commits the converſion of the northern nations, and in expreſs words, of the Icelanders and Greenlanders, to the firſt northern apoſtle Anſgarius, (if this bull be indeed authentic,) that Greenland muſt have been diſcovered and planted about the year 830, by the Icelanders and Norwegians. Leif, the ſon of Eric Raude, is ſaid to have made a voyage to Norway, A. D. 999, to give the king, Olaus Tryggeſon, an account of the new colony in Greenland; and this king, having juſt renounced heatheniſm, converted Leif, and perſuaded him to be baptized, and to take with him to Greenland a prieſt, for the converſion of the inhabitants. Upon his return his father was induced to embrace Chriſtianity, and the reſt of the colony followed his example. In the year 1122 they choſe Arnold, a Norwegian, for their biſhop; and he fixed his epiſcopal reſidence at Gardar. In the year 1261, they, and the Icelanders, ſubjected themſelves voluntarily under the Norwegian ſceptre; and from that time they were governed by a king's deputy from Norway, according to the laws of Iceland; and when an archbiſhopric was erected at Drontheim in Norway, the Greenland biſhops became ſuffragans to this metropolitan. The intercourſe between this colony in Greenland and Norway continued, with little interruption, till the beginning of the 15th century; the laſt of 17 biſhops being appointed in the year 1406. During this period the Greenland trade is ſaid to have been very conſiderable; and it is very probable that they exported a large quantity of fleſh, butter, cheeſe, fiſh, train, and pelts, chiefly by means of foreign ſhips; for though the Norwegian ſettlers in Greenland, upon their firſt eſtabliſhment, ſailed in their own veſſels from Iceland and Norway to this country, they afterwards very much neglected navigation. After the period above-mentioned Greenland ſeems to have been little regarded, and its intercourſe with other countries almoſt wholly ceaſed. In order to account for this ſudden change of condition, it ſhould be conſidered, that the firſt ſettlers were very much haraſſed by the natives, who were a barbarous and ſavage people, and who reſembled, in their cuſtoms, garb, and appearance, the Eſquimaux found about Hudſon's bay. Theſe people were denominated "Skrællings," or "Korralit," an appellation aſſumed by the Eſquimaux. The Daniſh Chronicle, a work written in verſe, and, indeed, of doubtful authority, though cited by Torfæus, informs us, that certain Armenians were firſt driven hither by a ſtorm, and that from hence they peopled Norway and America, and that many tribes were found in Greenland, who were governed by different chiefs. The Skrællings, it is ſuppoſed, and not without ſome degree of probability, firſt came to Greenland in the 14th century, not from the eaſt out of Europe, but from the weſt out of North America. But their origin is traced to the N. E. regions of Great Tartary, between the Ice-ſea (mare glaciale) and Mungolia. They firſt came into Tartary, after the great diſperſion of the nations, and were driven on further and further by imperious or more potent nations that followed them, till at laſt they were compelled to withdraw into the remoteſt corner of Tartary near Kamſkatka, and from hence they migrated to America; extending themſelves round the S. E. part of Hudſon's bay, or through Canada as far as the North ſea: and here, it is ſuppoſed, they were firſt found by the Norwegians in the 11th century. Dreading and wiſhing to avoid the moleſtation which they ſuffered from the other Indians, theſe fugitives retreated northwards, till, probably, in the 14th century, they either croſſed Davis's ſtraits in their boats, from Cape Walſingham, in the 66th degree, to the South-bay in Greenland, which can be ſcarcely 60 leagues wide; or elſe they went higher up by Baffin's bay, and ſo came down on the parts where the Norwegians formerly had their habitations, firſt on the weſt ſide, and then by degrees round to the eaſt. Theſe Skrællings are ſuppoſed to have exterminated the Iceland and Norwegian ſettlers who inhabited the weſtern diſtrict, in the 14th century; after they had been previouſly diminiſhed in number, or very much enfeebled by a peſtilence, which raged about the year 1350. On this occaſion the Norwegians were driven from the weſt to the eaſt ſide, ſo that the weſtern parts of Greenland were wholly occupied by theſe Skrællings. Some of them blended themſelves with their conquerors, and others of them receded farther northwards into the inlets between the mountains. The ancient ſettlement contained ſeveral churches and monaſteries, from which it would ſeem that the colony extended over about 200 miles in the ſouth-eaſtern extremity. On the weſt ſome ruins of churches have been alſo diſcovered. In the eaſtern diſtrict, as we have reaſon to imagine, there are ſome remains of the ancient colony, though no intercourſe can be maintained between the inhabitants of both ſides of the country, on account of high mountains, perpetually covered with ſnow, which ſeparate the two parts of Greenland; and the navigation from one to the other is impeded by the mountains of ice, that are driven ſouthward from Spitzbergen, or Eaſt Greenland. From authentic records we can derive little information that is ſatisfactory, or upon which we can rely. From ſome of the moſt credible we learn, that Greenland was divided into two diſtricts, called "Weſt Bygd," and "Eaſt Bygd;" the former contained four pariſhes, and 100 villages; but the latter was more flouriſhing, as it is nearer to Iceland, and was ſooner ſettled, and alſo more frequented by Norwegian navigators. The colony that firſt ſettled in the eaſt, of which we have already given an account, is ſaid to have comprehended, in ancient times, 12 extenſive pariſhes, 120 villages, a biſhop's ſee, and two monaſteries. The preſent inhabitants of the weſtern diſtrict are ſeparated from thoſe of the eaſt by impaſſable deſerts and mountains, ſo that they know little of one another; excepting that the eaſtern Greenlanders are thought by thoſe of the weſt to be a cruel and barbarous nation, that deſtroy and eat all ſtrangers that fall into their hands. For about a century after the ceſſation of intercourſe between the Greenlanders and other nations, they were very much neglected; all the attempts made by the kings of Denmark to explore the eaſtern diſtrict having miſcarried. At length, in the year 1578, Frederic II. ſent the famous navigator, Magnus Henningſen, who, having encountered much danger from ſtorms and ice, and gained ſight of land, was obliged to return, probably on account of ſome unfounded apprehenſions which deterred him from proceeding farther. About two years before this event, *viz.* in 1576, queen Elizabeth ſent out Martin Frobiſher to find a N. W. paſſage to China; he diſcovered land, which he named "meta incognita," and particularly the ſtraits which bear his name; and traded with the Indians. On his return he brought with him a black ſtone, from which gold was extracted. In the year 1578 he was ſent out again with a view of eſtabliſhing a colony in Greenland, but he returned, after a ſtormy paſſage and ſeveral diſaſters, with as much of the mineral earth or ore as he could procure, and the deſign was never proſecuted. Frobiſher was followed, in the year 1585, by John Davis, who ſailed as high as N. lat. 64° 15′, *i. e.* to Ball's river, where he landed and traded with the natives. Then, and in the two following years, he diſcovered the coaſts of America as high as the 70th degree, and gave the ſtraits his own name. In the year 1605, Chriſtian IV., king of Denmark, ſent the Daniſh admiral Godſke Lindenow, accompanied by John Knight, an Engliſh mariner, to reconnoitre the coaſts of Greenland: the inhabitants on the weſt ſide were found to be much wilder than thoſe on the eaſt ſide, nor did they at all reſemble one another in their language, dreſs, and manners. Voyages of a ſimilar nature were repeated, but no permanent advantage reſulted from them.

At length, in the year 1721, a pious clergyman of Norway, Hans Egede, having long lamented the wretched condition of the Greenlanders, through the want of religious inſtruction, as well as a variety of worldly comforts, and having projected, from the year 1708, ſchemes for their relief, without effect, determined to relinquiſh his church preferment, and to make a voyage to Greenland, with a view of accompliſhing his benevolent intentions. After having collected a capital of about 2000*l.*, by various ſubſcriptions, and obtained from the king an appointment of miſſionary, with the yearly ſalary of 60*l.*, beſides a preſent of 40*l.* towards his equipment, Mr. Egede placed himſelf at the head of a colony of 40 perſons, and ſailed for Greenland. Theſe adventurers, having paſſed Statenhook, encountered many dangers from ſtorms and ice, happily landed at Ball's river, N. lat. 64°, on an iſland near Kangek, which they called after the name of the ſhip in which they had ſailed, "Haabats-Oe," *i. e.* Hope iſland. They were hoſpitably received by the natives, and Mr. Egede took great pains, by his condeſcending attention, and by the aſſiduity with which he communicated to them religious inſtruction, to conciliate their friendly attachment. He alſo took great pains to acquaint himſelf with the language of the country, and to diſcover the beſt places for hunting and fiſhing, ſo as moſt effectually to ſerve the convenience of the colony. He made repeated attempts for exploring the eaſtern ſide of the country, and for diſcovering Frobiſher's ſtraits, but the wind and ice rendered his efforts unſucceſsful. As a miſſionary, he diſcharged the truſt which he had undertaken with ſingular fidelity, diligence, and zeal, and having continued in this inhoſpitable region till the year 1736, he returned to Denmark with a debilitated conſtitution. He was ſoon after appointed ſuperintendent of the miſſion in Greenland, with a ſalary of 100*l.* per annum, and was ordered to found a ſeminary of ſtudents and orphans, whom he was to inſtruct in the Greenland language, and who were to ſupply a ſucceſſion of miſſionaries and catechiſts. He ſpent his latter years in a receſs with his daughter, on the iſland of Falſter, and there cloſed his life of ſervice and honour, November 5th, 1758, in the 73d year of his age. To him and to his ſon, Paul Egede, we are indebted for the moſt ample and authentic account of modern Greenland. The example of Mr. Egede has been ſince followed by ſeveral miſſionaries, particularly from among the Moravians, whoſe principal ſettlements were at Kangek, New Herrnhuth, and Lichtenfels. From Mr. Egede we learn that the moſt practicable method of reaching the eaſtern part of Greenland will be to coaſt north about in ſmall veſſels, between the great flakes of ice and the ſhore; the Greenlanders having always declared, that the currents, which ruſh from the bays and inlets, and run ſouth-weſtward along the ſhore, hinder the ice from adhering to the land, ſo that there is always a channel open, through which veſſels of ſmall burden may paſs, eſpecially if lodges were built at convenient diſtances on the ſhore, for the accommodation and direction of the adventurers. The part of the country that is now viſited by the Danes and Norwegians, lies between the 64th and 68th degrees of N. latitude, and ſo far the climate is found to be temperate. We are told, however, that the country is inhabited as far as 76°; but the Daniſh and Moravian ſettlements are chiefly in the ſouth-weſt, though at one time there appears to have been a factory as far north as 73°.

In the ſummer, from the end of May to the middle of September, the weather is warm and comfortable, when the wind blows from the eaſt: though violent ſtorms then occur, and the fogs on the ſea-coaſt are inſalubrious. The land near the ſhore exhibits a pleaſing verdure, but the inland mountains are perpetually covered with ice and ſnow. Beyond the 68th degree of latitude the cold is very intenſe, ſo that the rocks often burſt by the froſt; and towards the end of Auguſt, the whole coaſt is covered with ice, which never thaws till April or May, and ſometimes not till the latter end of June. The prodigious maſſes of ice that ſurround the whole coaſt exhibit an appearance, in calm weather, no leſs dazzling than dreadful, by the reflection of the ſun-beams in its variety of colours; but when the wind blows and the waves are lifted up in mountain billows, theſe maſſes of ice daſhing againſt one another occaſion ſhocks that make the obſerver tremble. Thunder and lightning ſeldom occur in Greenland, but the Aurora Borealis has frequent and brilliant appearances. At the time of new and full moon, the tide riſes and falls upon this coaſt about three fathoms, and the ſprings and fountains on ſhore riſe and fall with the flux and reflux of the ocean.

The ſoil of Greenland reſembles that of other mountainous countries, the hills being barren, and the vallies and low grounds, eſpecially near the ſea, rich and fruitful. It is, for the moſt part, unfertile clay or ſand. But whatever is ſaid of the fertility of Greenland is applicable only to that part which lies between the 60th and 65th degrees of latitude. The moſt northern parts are totally deſtitute of herbs and plants. This country is ſaid to have formerly produced a great number of cattle, and to have exported conſiderable quantities of butter and cheeſe to Norway. Some parts of the country yielded excellent wheat, and the oaks that grew in it were ſo large as to furniſh acorns as big as apples. In its preſent ſtate, however, though ſome oaks remain, and the traces of ploughed land are perceivable, Greenland is deſtitute both of corn and cattle; but its paſture is good, and if the ſoil were properly cultivated, it would probably yield grain. It produces excellent turnips and coleworts. The ſides of the mountains near the bays are clothed with wild thyme, of powerful fragrance. The country abounds alſo with many other plants, and among its fruits we may reckon juniper-berries, blueberries, bilberries, and bramble-berries.

The animals which are moſt abundant, are rein-deer, dogs reſembling wolves, (ſee DOG,) arctic foxes, and white or polar bears. Hares of different colours are common, but they are ſmaller than thoſe of Denmark and Norway. The walrus, and five kinds of ſeals, frequent the ſhores. Here are found alſo ravens in great numbers, eagles of a very large ſize, falcons, and other birds of prey, and likewiſe a linnet, which warbles very melodiouſly. Whales, ſword-fiſh, porpoiſes, &c., abound on the coaſts; and alſo halybut, turbot, cod, haddock, &c. The ſpecies of inſects exceed 90. The more dubious animals, which are ſaid to inhabit theſe ſeas, are the mermaids, ſea-ſerpents, and krakens. The polar bears, ſeals, and manati, ſays Pennant, (Arctic Zoology,) were originally natives of theſe countries. The other quadrupeds found their way here from either Hudſon's bay or Labrador, on the iſlands of ice. The arctic fox found the ſame kind of conveyance from Greenland to Iceland as it did with the rein-deer to Spitzbergen. To the laſt was wafted, probably from Labrador, the common weaſel, the red or common fox, and the mouſe, which miſſed Greenland, but ſtocked Iceland; and the common bat, which was originally tempeſt driven to the latter from Norway; the wolverene and varying hare never reached farther than Greenland. This, ſays Pennant, ſeems the progreſs of quadrupeds in the frigid zone, as high as land is found.

Greenland is thought to contain many mines of metal. To the ſouthward of the Daniſh colony are ſome appearances of a mine of copper; Mr. Egede once received a lump of ore from one of the natives, and here he found calamine of a yellow colour. Crantz obſerves, that the higheſt mountains of this country are on the weſt ſide, and the rocks are full of clefts, commonly perpendicular, and ſeldom wider than half a yard, filled with ſpar, quartz, talc, and garnets. The rocks are generally rather vertical or ſomewhat inclined, conſiſting of granite, with ſome ſand-ſtone and lapis olaris. Crantz alſo mentions micaceous ſchiſtus, coarſe marble, and ſerpentine; with aſbeſtos and amianthus, cryſtals, and black ſchorl. It is ſaid that fluate of argill, a new ſubſtance, has been recently found in Greenland; and this is perhaps the ſoft tranſparent ſtone of Crantz. The lapis olaris is of ſingular utility in Greenland, and the north of America, as it is uſed for lamps and culinary utenſils.

The preſent inhabitants of the weſtern coaſt of Greenland, and who are the deſcendants of the ancient Skrællings, whom we have already mentioned, and who exterminated the Iceland colony, very much reſemble the American Samoieds and Laplanders in their perſons, complexions, and way of life. They are without doubt a branch of the Eſquimaux of Labrador, who fled that country, and peopled Greenland. They are ſhort, brawny, and inclined to corpulency; with broad faces, flat noſes, thick lips, black hair and eyes, and a yellowiſh tawny complexion. They are for the moſt part vigorous and healthy, but very ſhort-lived, few reaching the grand climacteric, and many dying in their infancy, and in the prime of their youth. The ſharpneſs of the wind, and the glare of the ſnow, render them ſubject to a diſorder of the eyes. They are alſo afflicted with the leproſy; and thoſe who inhabit the northern parts are miſerably tormented with dyſenteries, rheums and pulmonary diſorders, boils, and epilepſy. The ſmall-pox in 1734 made dreadful havock among theſe people, who have no aid from medicine, and who depend merely on their "Angekoks," or conjurers. The Greenlanders, with regard to their conſtitutional temperament and diſpoſition, are cold, phlegmatic, indolent, and dull of apprehenſion; but quiet, orderly, and good-humoured. They live peaceably together; and have every thing in common, without ſtrife and animoſity; and to ſtrangers they are civil and hoſpitable. They never waſh themſelves with water, but lick their paws like the cat, and then rub their faces with them. They eat after their dogs without waſhing their diſhes; devour the lice which devour them; and even lick the ſweat, which they ſcrape off from their faces with their knives. The women waſh themſelves with their own urine, under a notion that it makes their hair to grow; and in the winter-time immediately expoſe themſelves to the air, that the liquor may freeze upon their ſkin.

In their general habit and manner they are intolerably filthy. In times of ſcarcity they ſubſiſt on pieces of old ſkin, reeds, ſea-weed, and a root called "tugloronet," dreſſed with train oil and fat. The dung of rein-deer taken from the inteſtines, the entrails of partridges, and all ſorts of offals, are counted dainties among theſe ſavages; and of the ſcrapings of ſeal-ſkins they make delicate pancakes. The Daniſh proviſions were at firſt taſted by them with diſguſt and abhorrence; but they are now become fond of bread and butter, though they ſtill retain an averſion to tobacco and ſpirituous liquors. The Greenlanders in common content themſelves with one wife, who is condemned to drudgery, and liable to be divorced at the pleaſure of the huſband. Perſons of ſuperior rank and qualities are, however, indulged with a plurality of wives. Their young women are generally chaſte and baſhful; nevertheleſs, at ſome of their feaſts the men retire with the wives of their neighbours for licentious amours. Their ſuperſtitious cuſtoms are innumerable; *e.g.* when a woman is in labour, the goſſips hold a chamber-pot over her head, as a charm to haſten the delivery; and when a child is a year old, the mother licks and ſlabbers it all over, to render it, as ſhe imagines, more ſtrong and hardy. Their cloaths are made of the ſkins of rein-deer, ſeals, and birds. The men wear their hair ſhort, commonly hanging down from the crown of their head on every ſide, and ſquared off at their foreheads. Some cut it off as high as their poll. But it would be a reproach to a woman to cut off her hair, which is never done except in caſes of the deepeſt mourning, or if they reſolve never to marry. All the Greenlanders ſpeak the ſame language, though different dialects prevail in different parts of the country. Some few words are probably the relics of the old Norwegian; but theſe excepted, their language ſeems to have no affinity in etymology, declenſion, or ſignification, with any of the Northern, Tartarian, or Indian languages, as far as they are known to us; but we muſt except the language of the Eſquimaux in Labrador, who ſeem, as we have already ſaid, to be one people with the Greenlanders. Their great number of polyſyllables, and of repeatedly combined words, make their language very intricate. Nevertheleſs, it abounds ſo much with words, that the Greenlanders, like the Chineſe Tartars, have a proper word for every object or art that requires the leaſt diſtinction. Beſides, their words are varied and declined with ſuch different modifications, yet according to a fixed rule with few exceptions, and are attended with prefixes and ſuffixes, far more than the Hebrew, that the language is not only graceful, but plain and unequivocal. Moreover, they join many words together, as we have already ſaid, like the North Americans, ſo that they can expreſs themſelves very conciſely and yet ſignificantly. Some of our letters are wanting in their language, and they never begin a word with B, D, F, G, L, R, or Z. They ſeldom join many conſonants together, and never at the beginning of a ſyllable. The accent, upon which much depends, muſt be laid upon the proper ſyllable, commonly the laſt; and the Greenlanders, eſpecially the women, accompany many words, not only with a particular accent, but with a certain ſignificant aſpect, which is neceſſary to be regarded in order to aſcertain their meaning. They have but few adjectives, and theſe are moſtly participles; they are placed after the ſubſtantive, which always begins the ſentence. Subſtantives, as well as verbs, have ſingular, dual, and plural numbers, but no genders, and they want no article. The dual and plural are formed according to the different termination of the word, with few exceptions. The declenſions are eaſy; the genitive has at the end a *b*, or if a vowel follows, an *m*, either by addition or change; and the reſt of the caſes have a prepoſition affixed to them. The pronouns are not placed before the word, but one or two of its letters are attached to it at the end, and in different ways according to the different numbers. They have only five prepoſitions, which are not ſet before the nouns, as in other languages, but at the end, and again are varied in declining. The verbs have been divided into five conjugations, according to their terminations. They have three tenſes, the preſent, preterperfect, and future; and they have ſix moods, the indicative, imperative, permiſſive, conjunctive, and infinitive. The Greenlanders have no verbs deponent nor paſſive, but the latter are formed from the active by ſome adjunction. They have ſeveral claſſes of adverbs, like other nations; but their numerals are few, ſo that they can ſcarcely count five; but in order to arrive at 20, they count the fingers of both hands and the toes of both feet. If they want to proceed farther, they begin again with their fingers and toes. They tack their conjunctions to the end of a word, as the Latins do their *que*; and they do not want interjections. Their ſyntax is ſimple and natural; the capital word ſtands in the front, and the reſt follow in order according to their importance. Their ſtyle or mode of ſpeaking is not at all hyperbolical, pompous, or bombaſt, like that of the orientals, but ſimple and natural; yet they are fond of ſimilitudes and metaphors. Their poetry has neither rhyme nor meaſure; but it conſiſts of ſhort periods; which, however, are ſung to a certain time and cadence.

The Greenlanders have no traditions of the moſt memorable events of their anceſtors in heroic ſongs, as other nations have, who poſſeſs no written records. All they can ſay of their progenitors is, that they were brave ſeal-catchers, and that they killed the old Norwegians. Yet in their ſatirical ſongs, to which they are much addicted, they are more acute. They are well verſed in genealogy, and can often trace their pedigree as far back as ten of their progenitors, together with all the collateral branches. Their imperfect arithmetic we have already noticed. Of writing they have no conception. On their firſt acquaintance with Europeans, they were frightened by ſpeaking paper. In chronology, they reckon their years by winters, and their days by nights. They are not learned enough to fix the equinoxes, but they can gueſs at the winter ſolſtice, within a few days by the ſun-beams upon the rocks; and then they celebrate their new year by a ſun-feaſt. From hence they reckon three full moons to the ſpring, and then they move from their winter houſes into tents. In the fourth moon, *i. e.* in April, they know that the ſmall birds make their appearance, and the ravens lay eggs. In the fifth their angmarſet, and the ſeals with their young ones give joy to their coaſts by their revolutionary viſit. In the ſixth the eider-fowls breed. When they loſe the moon in the bright ſummer nights, they carry on their calendar partly by the growth of eider-fowls, and ſize and ſhape of the ſeals, and partly by the ſhining of the ſun on the dial of the rocks and mountains; ſo that they exactly tell when the ſeals, fiſhes, and birds will arrive in flocks and ſhoals here and there, and when it is time to repair to the winter-houſes, in which they generally ſhelter themſelves ſoon after Michaelmas. They divide the day according to the ebb and flood, and the night by the riſing and ſetting of certain ſtars. They think the globe of the earth ſtands upon poſts, which are ſo rotten with age, that they often crack; and that they would have ſunk long ago, if they had not been kept in conſtant repair by the Angekoks, who ſometimes bring back a piece of rotten wood as an evidence of their important ſervice. Their aſtronomy makes the firmament to reſt on a lofty pointed hill in the north, and on that centre it performs its revolutions. But this ſpecimen is ſufficient. When it thunders, two women are ſtretching and flapping a dried ſeal-ſkin, and the thunder is occaſioned by that rattle. The myſtery of the Aurora Borealis is unravelled by the ſouls of the dead friſking at a dance or a foot-ball. The rains are the overflowings of the celeſtial reſervoirs; and if the banks ſhould break, the ſky would fall down. Such is their meteorology! In medicine and ſurgery they are no leſs ignorant than in the other ſciences.

When a Greenlander is in the conflicts of death, they array him in his beſt cloaths and boots, and bend his legs up to his hips, probably that his grave may be the ſhorter. After death, they ſilently bewail him for a ſhort hour, and next prepare for his burial. The corpſe, being wrapped and ſewed up in the man's beſt ſeal or deer-ſkin, is laid in the burying place, covered with a ſkin, and alſo with ſome green ſods, and finally with heaps of great broad ſtones to keep off the birds and foxes. Near the burying ſpot they depoſit the kajak and darts of the departed, and the tools he daily uſed; or if the deceaſed was a woman, her knife and ſewing implements, that they might not be defiled by them, or ſorrow too much on their account, or becauſe they ſhould want them in another world. After the interment, thoſe who attended the proceſſion, betake themſelves to the houſe of mourning: then the men ſit ſilent for ſome time with their elbows leaning upon their knees, and their heads between their hands; while the women lie proſtrate upon their faces on the ground, and ſoftly weep and ſob. Then the neareſt relation pronounces an eulogy, reciting the good qualities of the deceaſed, and at every period deploring his loſs with loud crying and weeping. After this mournful ditty, the women continue their lamentations in a tremendous howl. This kind of mourning is continued for a week or a fortnight. The howling is after intervals renewed, and prolonged for ſome weeks, and in ſome caſes for a whole year.

As for the religion, or rather the ſuperſtition of the ancient Greenlanders, they are reported to be ſuch groſs idolaters as to worſhip the ſun, and ſacrifice to the devil, that he might forward, or at leaſt not hinder, their hunting and fiſhing. The firſt miſſionaries, however, conceived that the Greenlanders had no kind of religion or idolatrous worſhip; and that there was not any obſervable trace of their entertaining any conception of a Divine Being. Others, however, have thought, with greater reaſon, that a faint idea of the Divine Being lay concealed in the minds of theſe people, becauſe they directly aſſented without any objection to the doctrine of God and his attributes. Among the Greenlanders, different opinions are entertained concerning the ſoul of man; ſome ſuppoſing that it is material or corporeal, and others that it is a ſpiritual eſſence, different from the body, and all material ſubſtances, and capable of ſurviving after death. They ſeem to have ſome confuſed and indiſtinct notions of a future ſtate; of the place which is to be the final abode of good men; and of the nature of their reward. The moſt ſtupid Greenlanders, it is ſaid, conceive a horror at the thoughts of the entire annihilation of the ſoul. They place their hell in the ſubterraneous regions, which are devoid of light and heat, and filled with perpetual terror and anxiety. The Greenlanders ſpeak of other ſuperior and inferior ſpirits, beſides the ſoul of man, which bear ſome reſemblance to the major and minor gods of the ancient heathens. Of the firſt rank there are only two; a good ſpirit and a bad one. Beſides the great ſpirits to an audience with whom an Angekok only can be admitted, there are other leſſer ſpirits in all the elements.

The Greenlanders believe in apparitions, of the ghoſts of the deceaſed. The “Angekoks” are their ſorcerers or diviners, to whom peculiar privileges and honours belong. Although the Greenlanders have neither religion nor government, they are free from many of the groſſer vices, which may be found among perſons much more enlightened than themſelves.

The traffic of the Greenlanders is very ſimple and conciſe, and is carried on altogether by barter. They very rarely cheat, or take the advantage of one another, much leſs ſteal, which they reckon infamous; but they glory in over-reaching, or robbing an European, becauſe they think it is a proof of their ſuperior wit and ingenuity. Their traffic is carried on partly among themſelves, and partly with factors and ſeamen. Wherever there is a great aſſembly, or rendezvous of Greenlanders, as at a dancing match, or the ſun-feaſt in winter, there are always ſome that expoſe their wares to view, and announce publicly what goods they want in exchange. As thoſe in the ſouth have no whales, and thoſe in the north no wood, many boats of the Greenlanders coaſt every ſummer out of the ſouth, and even from the eaſt ſide of the land, and proceed from two to four hundred leagues, as far as Diſko, with their kajaks and women's boats, and the tackle and implements belonging to them, and barter wood for the horns of the unicorn fiſh, teeth, bones, whalebones, and whale's ſinews, and part of theſe they truck on their return home. In theſe voyages they take with them their whole family and ſubſtance; and ſometimes form a new ſettlement in the courſe of their voyage. The Greenlanders vend their fox and ſeal-ſkins, and eſpecially their blubber, to agents or factors, and receive in return iron points for their darts, knives, lock-ſaws, gimblets, chiſſels, and ſewing needles; alſo, ſtriped linen and cotton, kerſeys, woollen ſtockings and caps, handkerchiefs, cheſts or boxes, wooden diſhes, pewter plates, copper kettles, looking-glaſſes, combs, ribbons, and all ſorts of toys for children. They are fondeſt of buying ſnuff, alſo guns, powder, and ſhot; tobacco, which they uſe only as ſnuff, ſerves inſtead of ſmall money with them. Indeed, they expect a little tobacco for every ſervice they perform.

The aſſembly for dancing, and the ſun-feaſt above-mentioned, are not religious acts or ceremonies, but mere ſports and amuſements. The ſun-feaſt is kept at the winter ſolſtice, to rejoice at the return of the ſun, and the renewal of good hunting and fiſhing weather. For this purpoſe they aſſemble all over the country in large parties, and treat one another in the beſt manner they are able. When they have gorged themſelves with food, they riſe up to play and to dance. The means of intoxication they do not poſſeſs, and drink only water. Their only muſical inſtrument is the drum, which is beaten to common muſical time. The muſic and dancing are accompanied with a ſong in honour of ſeal-catching, and ſuch kinds of exploits; the performer extols the noble deeds of his anceſtors, and expreſſes his joy at the return of the ſun in the hemiſphere. Every ſtanza of his ode is accompanied by the auditory. The following is a ſpecimen of a complete cantata; the ſecond and fourth lines expreſſing the chorus:

“ The welcome ſun returns again,
Amna ajah, ajah, ah-hu!
And brings us weather fine and fair,
Amna ajah, ajah, ah-hu!”

Such dancing meetings are appointed at other ſeaſons of the year, when they have leiſure to attend them. It is ſomewhat ſingular, and deſerves mention, that they decide their quarrels by ſinging and dancing, and they call this a “Singing Combat.” A Greenlander, who conceives himſelf injured, compoſes a ſatirical poem, and repeats it ſo often with ſinging and dancing, till his domeſtics, and particularly the women, are able to remember it. He then publiſhes a challenge that he will fight a duel with his antagoniſt, not with a ſword but with a ſong.

The reſpondent appears in the appointed place; when the accuſer begins to pronounce his ſatire to the beat of the drum, and his party join with repeating “Amna ajah,” which occaſions laughter among the attendants.

The defendant then retorts in the ſame manner, and the laugh changes ſides; the plaintiff again renews the ſame kind of aſſault. The whole body of attendants conſtitute the jury, and confer the laurel on the victor, and afterwards the two contending parties are the beſt friends.

The Greenlanders are employed through the whole year in fiſhing or hunting. At ſea they purſue whales, morſes, ſeals, fiſh for food, and ſea-fowl. On ſhore they hunt the rein-deer in different parts of the country. And they have methods peculiar to themſelves, and correſponding implements, for accompliſhing their objects both by ſea and land; which we ſhall not here deſcribe. The Greenland canoe, or “kaiak,” like that in Nova Zembla and Hudſon's bay, is about three fathoms in length, pointed at both ends, and ¾ of a yard in breadth. It is conſtructed of thin rafts faſtened together with the ſinews of animals, and covered with dreſſed ſeal-ſkin, both above and below, ſo that only a circular hole is left in the middle, large enough to admit the body of one man. Into this the Greenlander thruſts himſelf up to the waiſt, and faſtens the ſkin ſo tight about him that no water can enter. Thus ſecured, and armed with a paddle broad at both ends, he ventures out to ſea in the moſt ſtormy weather to catch ſeals and ſea-fowl; and if he is overſet, he can eaſily raiſe himſelf by means of his paddle. The “kone-boat” is made of the ſame materials, but more durable; and ſo large, that it will contain 50 perſons with all their tackle, baggage, and proviſions. It is fitted with a maſt, which carries a triangular ſail made of the membranes and entrails of ſeals, and is managed without the help of braces and bowlines. Theſe kones are flat-bottomed, and ſometimes 60 feet in length. They are left to the conduct of the women, who are obliged to do all the drudgery, including even the building and repairing of their houſes, while the men are wholly employed in preparing their hunting implements and fiſhing-tackle.

Greenland is a country very thinly inhabited. In winter they live in houſes and in ſummer in tents. The houſes are conſtructed of ſtones, on a ſteep rock, with layers of earth and ſods between them. On theſe walls they reſt the beam, or connected beams, for the length of the houſe, being from 4 to 12 fathom; and over theſe they lay the rafters, with ſmall wood between them; the whole is covered with bilberry-buſhes, and then with turf, with fine earth on the top. Their houſes have neither door nor chimney; the uſe of both being ſupplied by a vaulted paſſage made of ſtone and earth, entering through the middle of the houſe. The walls are hung on the inſide with old worn tent and boat ſkins, faſtened with nails made of the ribs of ſeals; and the roof is covered with them on the outſide. In theſe huts, ſo conſtructed, they are guarded from wind, damp, and cold. The floor is divided into ſeveral apartments, ſeparated by ſkins, according to the number of families for which it is deſigned. On theſe floors they ſleep on pelts; and they commonly ſit in them all day long, the women cooking and ſewing, and the men carving their tackle and tools. On the front wall of the houſe are ſeveral ſquare windows, about two feet in ſize, made of ſeal's guts and halibut's maws, and ſewed ſo neat and tight, that the wind and ſnow are kept out, and the light let in. Theſe huts are well warmed with fires, and lighted by means of lamps filled with train oil, and furniſhed with moſs inſtead of a wick, which burns ſo bright that the houſe is both lighted and warmed by it. Over the lamp is ſuſpended a baſtard-marble kettle, in which they boil all their meat; and over this again is a wooden rack, on which they lay their wet cloaths and boots to dry. On the outſide of their dwelling-houſe they have their little ſtore-houſes, in which they lay up their little ſtock of fleſh, fiſh, train oil, and dried herrings; and cloſe by their ſtore-houſes they lay their boats, with their bottoms upwards, under which they hang their hunting and fiſhing tackle and their ſkins Their ſummer tents are made with poles, put together in a conical form, covered on the inſide with reindeer ſkins, and on the outſides with ſeal-ſkins, doubled, or ſo dreſſed that the rain cannot penetrate them. Crantz's Hiſtory of Greenland, vol. i.

GREENLAND, *Eaſt*, or *Spitſbergen*, was formerly conſidered as part of the continent of Weſt Greenland, but it is now known to be a collection or group of iſlands, varying in their extent, and lying between 76° 46′ N. lat. the latitude of the South Cape, and 80° 30′, the northernmoſt point of the Seven iſlands, and between 9° and 23° E. long. Sir Hugh Willoughby, who firſt diſcovered land in this high northern latitude, A. D. 1553, called it *Groenland;* conceiving it to be part of the weſtern continent. It was afterwards viſited, A. D. 1595, by William Barentz and John Cornelius, two Dutchmen, who claimed the honour of the firſt diſcovery, and called the country “Spitſbergen,” or ſharp mountains from the numerous ſharp pointed and rocky mountains which they obſerved in it; and in order to aſcertain their own claims, they pretended that this was not the country diſcovered by ſir Hugh Willoughby, which in the maps and charts delineated by the Hollanders was denominated “Willoughby land,” though no ſuch land ever exiſted. It is moreover ſaid, that before the voyage of theſe Dutchmen, an Engliſh navigator, whoſe name was Stephen Burrows, had coaſted along a deſolate country from 78° to 80° 11′ N. lat. which muſt have been Spitſbergen. This country was alſo viſited at different times by navigators, who were employed in exploring a paſſage to the Eaſt Indies by the north-pole; a project which was ſuggeſted and ſtrongly recommended by Robert Thorne, a merchant of Briſtol, as early as the year 1527. Bourne, in his “Regiment of the Sea,” written about the year 1577, mentions this as one of the five ways to Cathay, and ſeems to admit the practicability of it from a miſtaken notion of the mildneſs of the climate near the pole, owing to the conſtant preſence of the ſun during the ſummer. In 1607, a voyage was propoſed by ſome London merchants, for the diſcovery of a paſſage by the north pole to Japan and China, and it was undertaken by Henry Hudſon, who fell in with land to the weſtward in 73° N. lat.; and ſoon after he fell in with Spitſbergen, where he met with much ice; and this navigator advanced to the latitude of 80° 23′; but he was prevented from proceeding farther by the ice. In 1609, Jonas Poole was appointed by the Muſcovy company on the ſame ſervice; and he with much difficulty made the ſouth part of Spitſbergen, afterwards ſailing along and ſounding the coaſt, giving names to ſeveral places, and making many very accurate obſervations. Having twice attempted in vain to get beyond 79° 50′, he was obliged to relinquiſh his object and to return home. A ſecond attempt in the following year was equally unſucceſsful. In the year 1614, another voyage was undertaken, in which Baffin and Fotherby were employed; and Fotherby made a ſecond attempt in the following year; but their progreſs was obſtructed by the ice. This country and the adjoining ſeas have ſince been frequently reſorted to by ſhips employed in the whale fiſhery; but its ſituation was never accurately aſcertained till captain Phipps (now lord Mulgrave) undertook a voyage by order of his majeſty George III. in the year 1773. He found that the land, which was formerly ſuppoſed to extend as far as 82° N. lat., terminated with the “Seven iſlands,” the moſt northerly point of which does not exceed 80° 30′ N. lat. He obſerved other lands lying eaſtward at a conſiderable diſtance; but Spitſbergen was found to be encompaſſed by water and in no part of it to be contiguous to the continent of Aſia. He explored, with a degree of reſolution and perſeverance that did honour to himſelf and his aſſociates in this expedition, the northern and weſtern coaſts, though he was prevented by the ice from advancing ſo far northwards as he wiſhed; and he aſcertained by accurate obſervation the longitudes and latitudes of ſeveral points, capes, and bays, which he viſited. On his approach to the land he picked up a piece of drift wood, which was found to be fir, and not worm-eaten; and upon ſtanding cloſe in with the land, the coaſt appeared to be neither habitable nor acceſſible; it was formed by high, barren, black rocks, without the leaſt marks of vegetation; in many places bare and pointed, in other parts covered with ſnow, appearing even above the clouds; the vallies between the high hills were filled with ſnow or ice. "This proſpect," he ſays, in his "Journal," printed in 1774, "would have ſuggeſted the idea of perpetual winter, had not the mildneſs of the weather, the ſmooth water, bright ſun-ſhine, and conſtant day-light, given a chearfulneſs and novelty to the whole of this ſtriking and romantic ſcene." The current on this coaſt was found, both by the common and Bouguer's log, to run north half a knot an hour. The height of one mountain, above the level of the ſea, was found by meaſurement with the megameter, to be 15,035 feet, but by M. de Luc's calculation from obſervations with the barometer it was found to be 1588½.

Among the harbours in which captain Phipps anchored, we may mention a ſmall bay to the ſouthward of Magdalena Hook and Hamburgher's bay; the former in N. lat. 79° 34′, the ſame as Fotherby obſerved it to be in 1614: the high-water in this bay full and change at half an hour paſt one, or with a S.S.W. moon, which agrees exactly with Baffin's obſervation in 1613, the flood coming from the ſouthward. Another anchoring place was Vogel Sang, N. lat. 79° 50′. E. long. 10° 2′ 30″; the north eaſternmoſt point being the Cloven cliff, 79° 53′. E. long. 9° 59′ 30″, a bare rock ſo called from the reſemblance of its top to a cloven hoof, which appearance it has always exhibited, having been ſo named by ſome of the firſt Dutch navigators who frequented theſe ſeas. It is alſo nearly perpendicular, ſo that it is never diſguiſed by ſnow, and on theſe accounts it is one of the moſt remarkable points on the coaſt. The ſouthernmoſt land is an high bluff point, called by the Dutch Vogel Sang. This ſound, though open to the northward, is not liable to any inconvenience from that circumſtance, the main body of ice lying ſo near as to prevent any great ſea; nor are ſhips in any danger from the looſe ice ſetting in, as this road communicates with ſeveral others formed by different iſlands, between all which there are ſafe paſſages. To all the ſounds and harbours formed by this knot of iſlands the old Engliſh navigators had given the general name of Fair Haven, of which Fotherby took a *plat* in 1614. In this ſituation Hackluyt's Head-land was found to be in N. lat. 79° 47′. E. long. 9° 11′ 30″. The tide roſe about four feet, and flowed at half an hour after one, full and change. The harbour of Smeerenberg, diſtant about 11 miles, N. lat. 79° 44′. E. long 9° 50′ 45″, has good anchorage in 13 fathom, ſandy bottom, not far from the ſhore; and it is well ſheltered from all winds. The iſland cloſe to the place where our navigators lay is called Amſterdam iſland, the weſternmoſt point of which is Hackluyt's Head-land; here the Dutch formerly uſed to boil their whale-oil, and the remains of ſome conveniences erected by them for that purpoſe are ſtill viſible. They once attempted to make an eſtabliſhment, and left ſome people to winter here, who all periſhed. Nevertheleſs, as they ſeem to have died not through the intenſity of the cold, but in conſequence of being attacked by the ſcurvy, and as others, both Engliſh and Ruſſian ſailors, have wintered here, a colony might be ſettled in this country, if ſuch an eſtabliſhment were likely to anſwer any good purpoſe. The Dutch ſhips ſtill reſort to this place for the latter ſeaſon of the whale fiſhery. The ſtone found in this country was chiefly a kind of marble, which diſſolved eaſily in the marine acid. But our navigators perceived no marks of minerals of any kind, nor the leaſt appearance of preſent, or remains of former volcanos. Neither did they meet with inſects or any ſpecies of reptiles; not even the common earthworm. They ſaw no ſprings, or rivers; the water, which was found in great plenty, being altogether produced by the melting of the ſnow from the mountains. During their ſtay in theſe latitudes, they had no thunder or lightning. The ſky was in general loaded with hard white clouds; ſo that neither the ſun nor the horizon was wholly free from them even in the cleareſt weather. They could always perceive when they approached the ice, long before they ſaw it, by a light appearance near the horizon, which the pilots called the "blink of the ice." (See BLINK.) One of the moſt remarkable phenomena which this country exhibited was the "iceberg." (See ICEBERG.) Of the animals and plants of Spitzbergen, captain Phipps has given an account in the appendix to his Journal. The animals are the arctic walrus, the common ſeal, the arctic fox, the polar bear, the rein-deer, the common whale, the fin fiſh; and the birds the eider-duck, the puffin, the alca alle, the fulmar, the colymbus grylle and troile, the northern diver, the larus riſſa, arctic gull, and larus eburneus, the greater tern, the greater brambling, the ſea-ſnail, the coal-fiſh, the prawn, the cancer-boreas, or ſingular ſpecies of crab, and cancer nujax, not before deſcribed, and alſo cancer ampulla, and cancer pulex; ſeveral ſpecies of vermes, and ſhell-fiſh. Among the plants are a ſmall ſpecies of agroſtis, ſeveral ſpecies of ſaxifraga, of bryum, of cochlearia, and of lichen.

GREENLAND, a town of America, in Rockingham county, New Hampſhire, near the ſea, five miles ſoutherly from Portſmouth, incorporated in 1713, and containing 548 inhabitants.

GREENLAND *Fiſhery*. See *Whale* FISHERY.

GREENLAND *Company*. A joint ſtock of 40,000*l*. was by ſtatute to be raiſed by ſubſcribers, who were incorporated for fourteen years from the firſt of October 1693, and the company to uſe the trade of catching whales, &c. into and from Greenland, and the Greenland ſeas; they may make bye-laws for government, and of the perſons employed in their ſhips, &c. (Stat. 4 and 5 W. III. cap. 17.) This company was farther encouraged by parliament in 1696; but partly by unſkilful management, and partly by real loſſes, it was under a neceſſity of entirely breaking up, before the expiration of the term aſſigned to it, ending in 1707. But any perſon who will adventure to Greenland for whale-fiſhing, ſhall have all privileges granted to the Greenland company, by 1 Anne, cap. 16. and thus the trade was again laid open. Any ſubjects may import whale-fins, oil, &c. of fiſh caught in the Greenland ſeas, without paying any cuſtoms, &c. ſtat. 10 Geo. I. cap. 16. And ſhips employed in the Greenland fiſhery are to be of ſuch burden, provided with boats, ſo many men, fiſhing-lines, harping-irons, &c. and be licenſed to proceed; and on their return ſhall be paid 20*s*. per ton bounty, for whale-fins, &c. imported. 6 Geo. II. cap. 33. See *Whale*-FISHERY.

GREENLAW, in *Geography*, a town of Scotland, which, though the county-town of Berwickſhire, is an inconſiderable place, pleaſantly ſituated in a plain, bathed by the Blackader or Blackadder. The acclivities of the neighbouring eminences are tolerably cultivated. In its vicinity, about midway between Greenlaw and Kelſo, on a riſing ground, is Herne caſtle, which commands a view of the greateſt part of the Merſe and Roxburghſhire, and was celebrated during the contentions on the border. It was a noted place of defence, often beſieged by the Engliſh, and demoliſhed by Cromwell. It is diſtant 37 miles S.E. from Edinburgh, and contains 1270 inhabitants.

GREENOCK, the principal ſea-port town on the firth of Clyde, ſituated on the ſouth bank of the river, about 24 miles below the city of Glaſgow. The town of Greenock is pretty well ſituated for commercial purpoſes, but in other reſpects it is neither pleaſant nor ſo circumſtanced as to afford the proſpect of any great increaſe either of extent or population. Indeed the great number of young men, who, from habits of imitation as in other ſea port towns, early attach themſelves to a ſeafaring life, muſt preſent of itſelf a great obſtacle to the latter. The town of Greenock is held under and is entirely ſurrounded by the lands of ſir John Stewart of Blackhall, bart., who is feudal ſuperior, and no purchaſe or acquiſition of ground, either for the purpoſes of extenſion or improvement, can be had from any other perſon. This muſt of itſelf render extenſion a matter of more difficulty than where there are many landed proprietors, the lands of ſome of whom, from the common caſualties and viciſſitudes of human affairs, muſt be occaſionally in the market.

The harbour of Greenock is divided into two compartments, and is entirely ſurrounded by well-built and commodious quays of freeſtone. The entrance is narrow, and in the centre oppoſite to the end of the mid quay, which ſerves as the diviſion of the harbours. The eaſtern harbour is ſhallow, and is therefore moſtly frequented by coaſting veſſels, herring buſſes, fiſhing boats, and other ſmall craft. The weſt harbour, being conſiderably deeper, is the general reſort of Weſt Indiamen, American traders, and other veſſels of greater burthen. In the weſt harbour is a very capital dry or graving dock, with flood gates to exclude the water, and capable of containing two large ſhips at the ſame time. It has been long in contemplation to improve the harbour of Greenock by the erection of wet docks, ſimilar to thoſe of London, Liverpool, Hull, and Leith, but probably from the difficulty of engaging the joint conſent of the numerous intereſts concerned, and other cauſes, no ſteps have been hitherto taken for carrying this ſcheme into effect. The principal deficiency of the harbour of Greenock, excluſive of the ſhips bottoms taking the ground every ebb tide, ariſes from want of water, there being never more than ſeventeen or eighteen feet in the harbour, even at ſpring tides. Hence large veſſels are obliged to diſcharge part of their cargoes into lighters in the roads before they can come into the harbour at all. This is of leſs conſequence where the cargo is to be brought to Glaſgow, if the weather be mild, but it is very inconvenient and expenſive when the cargo is to be landed, and when the weather is boiſterous. The whole riſe of the tide at Greenock is only about twelve feet, whereas at Liverpool it is thirty-ſix and at Briſtol forty-two. This alſo forms an additional diſadvantage to the harbour of Greenock, and preſents a very great obſtacle to every plan of artificial improvement. With all theſe diſadvantages, however, it has many advantages over the neighbouring harbour of port Glaſgow, ſituated about three miles farther up the river. The chief obſtacle to veſſels of great burthen making any of theſe ports, is an immenſe bank of ſand, accumulated for many ages in this *embouchure* of the Clyde by the current of the river, and which is ſenſibly though ſlowly increaſing. Indeed nearly oppoſite to port Glaſgow, this bank is entirely uncovered for miles at low water. Notwithſtanding theſe natural diſadvantages, the favourable ſituation of the Clyde for maritime intercourſe with every part of the weſtern hemiſphere and the ſouth of Europe, the great coaſting trade with the weſtern parts of England and Wales, and with Ireland, and the extenſive herring fiſhery, has raiſed Greenock to a high rank among the commercial ports of Britain, and has been productive of the acquiſition of ſplendid fortunes to many of the principal inhabitants. As Greenock is not the ſeat of any ſtaple manufactory, this carrying trade is her chief, and indeed may be fairly called her only ſupport. During the American war, when the carrying trade was entirely ſuſpended in ſome channels, and greatly impeded in all the others, a number of ſhip-owners fitted out their veſſels as privateers, but in general theſe ſpeculations were not productive of gain to the adventurers, and in ſome inſtances with ſerious loſs. In the recent wars no attempts at privateering have been made.

The town of Greenock is governed by two magiſtrates, elected annually, and a council; beſides whom, the baron baillie, nominated by the ſuperior, alſo poſſeſſes a juriſdiction. The ſheriff court of the county of Renfrew is held at Paiſley, to which the inhabitants of Greenock are amenable, the ſame as the reſt of the county.

In the external appearance of Greenock there is little elegance or ſplendour to be ſeen. In the centre of the town there is a ſmall ſquare, immediately fronting the mid-quay, which divides the harbour. In this ſquare is a very handſome church of modern architecture. The other buildings are the inns, of which the chief, recently built upon a tontine ſcheme, like that of Glaſgow, is a very ſpacious, and even ſplendid houſe. There is alſo a ſmall neat theatre, the private property of Mr. Stephen Kemble, the manager, and ſome dancing-halls for the occaſional recreation of the inhabitants and ſtrangers, of whom, from the maritime ſituation, there is, at certain ſeaſons, particularly at the arrivals of the Weſt India fleets, a conſiderable influx.

The ſcenery of the Clyde around Greenock is pictureſque and ſublime. The river is about ſeven miles broad to the oppoſite ſhore, where the village of Helenſburg is erected upon the property of ſir James Colquhoun of Luſs, bart. This village is built in a very pleaſant ſituation, upon a fine bay, formed by two projecting promontories, *viz.* by the hill of Ardmore, on the eaſt, and by Roſeneath, the property, and one of the ſplendid reſidences of the duke of Argyle, on the weſt. Beyond this, to the weſtward, appear the lowering mountains of Argyleſhire, between which is the vaſt arm of the ſea, Lochlong, which is twenty-four miles in length, and in ſome places ſaid to be unfathomably deep. About two miles to the weſt is a ſmall village, called Gourock, ſituated on a very fine deep bay, well ſheltered by projecting head-lands, with a very good bottom for anchorage. It is the opinion of moſt profeſſional men, whether engineers or ſeamen, that this ſituation affords by far the greateſt number of natural advantages for a large and commodious ſea-port upon the Clyde; and it is almoſt ſingular that Greenock ſhould have riſen to its preſent commercial importance, whilſt Gourock, ſituated within leſs than two miles, and poſſeſſing every ſuperiority of phyſical advantage, ſhould have remained an inſignificant village. However this may have originated, too much capital has now been expended upon Greenock and Port Glaſgow, to leave the ſmalleſt room to ſuppoſe that they will be in any reſpect rivalled by a village which poſſeſſes nothing but natural ſituation to recommend it. On the road from Greenock to Gourock are many very fine villas, belonging to the opulent merchants of Greenock. At both Greenock and Gourock are extenſive rope-works, belonging to the ſame company of proprietors. A little below Gourock is the Clough light-houſe, a very high and well-built tower, lighted by reflectors, for the ſafety of veſſels coming up, or going down the channel during the night. Some miles below this is the iſland of Bute, belonging chiefly to the nobleman to whom it gives the title of marquis. Bute is about ſeven miles long, and generally level and fertile. Mount-ſtewart-caſtle, the reſidence of the noble proprietor, is ſituated near the middle of the iſland, on the ſouth ſide, and is a ſuperb and delightful place. Of the other proprietors, lord Bannatine, one of the Scottiſh judges, is the moſt conſpicuous. The chief, and, indeed, almoſt only town on the iſland, is Rothſay, from which his royal highneſs the prince of Wales derives one of his Scottiſh titles, is a handſome, clean, ſmall town, and has a conſiderable cotton mill and manufactory by it, belonging to a company of manufacturers in Glaſgow. There are alſo the ruins of an old caſtle, which appears to have been of great extent, and once belonged to the royal family of Scotland. The inhabitants of Rothſay are chiefly ſea-faring people, and employ themſelves much in the herring fiſhery during the ſeaſon. Large quantities of fine cod-fiſh are alſo caught off the coaſts of Bute, Arran, and Argyleſhire, with which the markets of the weſt of Scotland are ſupplied, generally at a rate not exceeding two-pence *per* pound of 22½ ounces. Contiguous to Bute is a ſmall iſland, called Inch Marnock, which is level and cultivated. It is the reſidence only of thoſe employed in its cultivation. The iſland of Arran is nearly thirty miles in length, and is very mountainous. The higheſt hill, called Goatfield, is ſeen from a great diſtance. The iſland of Arran is the property of the duke of Hamilton, who is earl of Arran, who has a fine houſe, called Brodick caſtle, on the iſland, where his family ſometimes reſide, eſpecially during the ſeaſon for ſhooting grouſe or black game. Arran uſed to be much noted for a ſmuggling trade, both in contraband articles brought by the ſeamen employed in the veſſels trading to the Clyde, and alſo in the diſtillation of whiſky. The vigilance of the revenue cruiſers in the Clyde has, in a great meaſure, checked the former, and that of the exciſe officers the latter. On Arran are found a number of fine ſtones, and it is ſometimes viſited by lapidaries, during the ſummer, for the purpoſe of ſearching for them, or of purchaſing thoſe occaſionally picked up by the natives. On the iſland are only two ſmall towns or villages, *viz.* Brodick and Lamlaſh, the latter of which, being defended from the ſouth winds by an iſland in the mouth of the bay, is reſorted to as a ſhelter in ſtormy weather by the ſhips and veſſels navigating the frith of Clyde.

Beſides thoſe already mentioned, there are a few ſmaller iſlands in the frith, *viz.* the Cumbraes, which are two ſmall iſlands lying pretty cloſe to the ſouthern ſhore, near the Renfrewſhire coaſt, oppoſite to the village of Largs, about 16 miles below Greenock. The larger iſland is about two miles long, and on it is a very neat village, called Milport, chiefly inhabited by fiſhermen and ſeamen's families. The leſſer iſland is a mere rock, where a few perſons reſide, who take charge of the light-houſe, and ſometimes perſons in a ſtate of inſanity are boarded here by their relatives, on account of the purity of the air, and the retirement of the ſituation. Farther down, and near the Ayrſhire coaſt, is the ſtupendous rock, or crag of Ailſa, from which the proprietor, the earl of Caſſius, derives his Britiſh title. Ailſa is a high abrupt and barren rock, totally uninhabited, and covered by myriads of ſea-fowl, in ſearch of which it is ſometimes viſited. Of the general trade of the Clyde notice has already been taken under the article Glasgow.

GREENORE Point, a cape of Ireland, in the county of Wexford, in the Iriſh ſea. N. lat. 52° 16′. W. long. 6° 18′ from Greenwich.

GREENSBORO, a poſt-town of America, in Weſt Cheſter county, New York; 264 miles from Waſhington.

GREENSBOROUGH, a poſt-town and chief town of Greene county in Georgia, 30 miles from Lexington: containing 25 houſes, a court-houſe, gaol, and Preſbyterian meeting-houſe. Lands are appropriated for the eſtabliſhment of an academy in this town.—Alſo, a neat townſhip in Orleans county, in Vermont, containing 280 inhabitants.

GREENSBURG, a poſt-town, and capital of Weſtmoreland county, in Pennſylvania, ſituated on a branch of Sewickly creek, which empties into Youghiogany river. It contains 100 dwelling houſes, a German Calviniſt church, a brick court houſe, a ſtone gaol, 270 miles W. by N. from Philadelphia.—Alſo, a poſt-town in Green county, Kentucky; 875 miles W. by S. from Waſhington.

GREENSVILLE, a county of Virginia, encompaſſed by Brunſwick, Southampton, and Suſſex counties, on the N. W. and E. and by N. Carolina on the S. It is about 24 miles long, and 20 broad, and contains 3611 free inhabitants, and 4116 ſlaves.

GREENVILLE, *Sir* Richard, in *Biography*, a gallant naval officer, ſon of ſir Roger, of an ancient family, in the weſt of England, was born about 1540. At the age of fixteen he obtained leave from queen Elizabeth, with others of his young countrymen, to ſerve in the imperial army in Hungary, againſt the Turks. Upon his return, he engaged with the troops employed for the reduction of Ireland, where he diſplayed ſo much courage and prudence, as to obtain the appointment of ſheriff of the city of Cork. He ſat in parliament in 1571, as knight of the ſhire for the county of Cornwall. He was afterwards high ſheriff of the county, and received the honour of knighthood. Notwithſtanding his civil employments, his attention was chiefly fixed upon plans of foreign diſcovery and ſettlement, propoſed by his relation ſir Walter Raleigh. When the patents were made out for the purpoſe, ſir Richard obtained the command of a ſquadron fitted out for the purpoſe, conſiſting of ſeven ſmall veſſels. With theſe he ſailed in the ſpring of 1585, and reaching the coaſt of Florida in June, he left there a colony of one hundred men, and then ſailed homewards. He made other voyages, but when the nation was threatened with the dangers of a Spaniſh invaſion, he was appointed one of a council of war, to concert means of defence, and received the queen's commands not to quit the county of Cornwall, which prevented him from executing his intentions of making another voyage to the American coaſt. In 1591 he was appointed vice-admiral of a ſquadron, fitted out for the purpoſe of intercepting a rich Spaniſh fleet from the Weſt Indies. This fleet, when it appeared, was convoyed by a very ſuperior force, and Greenville was urged to tack about, but he preferred, and no doubt his ſailors agreed with him, taking chance of breaking through the enemy's fleet, which almoſt immediately ſurrounded him. The Spaniſh admiral, with four other ſhips, began a cloſe attack at three in the afternoon; the engagement laſted till break of day next morning, during which the Spaniards, notwithſtanding their vaſt ſuperiority, were driven off fifteen times. At length the greater part of the Engliſh crew being either killed or wounded, and the ſhip reduced to a wreck, no hope of eſcape remained. The brave commander had been wounded at the beginning of the action, but he cauſed his wounds to be dreſſed on deck, and refuſed to go down into the hold, and in that ſtate he was ſhot through the body. He was now taken to the cabin, and while in the act of being dreſſed, the ſurgeon was killed by his ſide. The admiral ſtill determined to hold out, wiſhing rather to ſink the ſhip than ſurrender, but the offers of quarter from the Spaniards induced the men to yield. Sir Richard was taken on board the Spaniſh ſhip, and honourably treated, but he died of his wounds in leſs than three days. His laſt words ſhew the temper of the hero, better than any eulogium that could be formed for him; they were ſpoken in the Spaniſh language, "Here die I, Richard Greenville, with a joyful and quiet mind; for that I have ended my life as a true ſoldier ought to do, fighting for his country, queen, religion, and honour; my ſoul departing from this body, leaving behind the laſting fame, of having behaved as every valiant ſoldier is in duty bound to do." This noble minded man has been blamed for raſhneſs; but exceſs of bravery, if ſuch it may be denominated, in a Britiſh ſeaman meets with a ready pardon, and ſuch examples as Greenville and a Nelſon, though not always to be juſtified on the ſcore of prudence, have effected more advantages for this ſea-girt iſland, than can be well deſcribed. Biog. Brit.

Greenville, *Sir* Bevil, grandſon of the preceding, was born in the year 1596. He was educated at Exeter college, Oxford, under the celebrated D. Prideaux, where he acquired a large ſtock of knowledge, and an ardent attachment to the eſtabliſhed religion of his country. When he came to his eſtate he diſtinguiſhed himſelf as a moſt reſpectable country gentleman, and ſat, very often, in parliament, as knight of the ſhire for the county of Cornwall, and burgeſs of Launceſton. In 1638, he attended the king with a troop of horſe, raiſed at his own expence, in an expedition to Scotland. For this ſervice he received at the hands of his ſovereign the honour of knighthood. He diſtinguiſhed himſelf during the civil wars, and had a command in the battle of Stratton, gained by Hopton againſt the earl of Stamford, in May 1643. He was preſent, and made a conſiderable ſtand in other engagements, particularly in that which was fought at Lanſdown, near Bath, in which the parliament forces were commanded by ſir William Waller. In this action ſir Bevil, at the head of his Corniſhmen, received a fatal blow with a pole-ax. His body was afterwards found, ſurrounded by thoſe of his officers; and it was obſerved, to the honour of the gentlemen of England, that there were more officers and gentry, than common men, ſlain on the king's ſide. Sir Bevil was extremely lamented: his character was drawn by lord Clarendon: "That which would have clouded any victory, was the death of ſir Bevil Greenville. He was, indeed, an excellent perſon, whoſe activity, intereſt, and reputation was the foundation of what had been done in Cornwall, and his temper and affection ſo public, that no accident which happened could make any impreſſion on him; and his example kept others from taking any thing ill, or at leaſt ſeeming to do ſo: in a word, a brighter courage and gentler diſpoſition were never married together, to make the moſt cheerful and innocent converſation." A monument was erected to his memory on the ſpot on which he fell. Biog. Brit.

Greenville, in *Geography*, a county in Waſhington diſtrict, South Carolina; ſituated in the N.W. corner of the ſtate; containing 11,504 inhabitants, of whom 1439 are ſlaves. This county is mountainous and hilly; but it is well watered, and the climate is pleaſant and healthy.—Alſo, a poſt-town of South Carolina, and chief town of Cheraws diſtrict; ſituated on the W. ſide of Great Pedee river, in Darlington county. It contains about 30 houſes, a court-houſe, gaol, and academy; 55 miles E.N.E. from Camden.—Alſo, a poſt-town and capital of Pitt county, North Carolina, on the S. bank of Tar river, diſtant 23 miles from Waſhington, and containing about 50 houſes, a court-houſe, a gaol, and a ſeminary, called the Pitt academy.—Alſo, a poſt-town of Mecklenburg county, Kentucky; 766 miles W. by S. from Waſhington.—Alſo, a poſt-town in Jefferſon county, Miſſiſſippi territory; 1217 miles from Waſhington.—Alſo, a ſmall poſt-town in Green county, in the ſtate of Teneſſee, ſituated on the W. ſide of the north-eaſternmoſt branch of Nolachucky river, about ſix miles N. by E. of Greenville college; 653 miles S.W. of Philadelphia.—Alſo, a fort and ſettlement in the ſtate of Ohio, on the S. ſide of a north-weſtern branch of the Great Miami, ſix miles N.W. of fort Jefferſon, on the ſame branch, about 23 miles S.E. of fort Recovery. It has baſtions at each angle, and is capable of accommodating 2000 men.

Greenville *Bay*, or *La Bay*, a town and port of entry on the E. or windward ſide of the iſland of Grenada. It has about 60 dwelling-houſes, a church, and ſeveral rich ſtores of Indian and European goods, and plantation utenſils. Its ſituation is low and rather unhealthy.

Greenville *College*, a college in Green county, in Teneſſee, founded in 1794, by the firſt act of the firſt aſſembly of the ſouth-weſtern territory. It is ſituated between two ſmall northern branches of Nolachucky river, not far from *Greenville*, (which ſee) the county town. Its local ſituation conduces very much to its utility, as it is retired, healthy, cheap, and near public roads in every direction. It is under the management of 14 truſtees, and poſſeſſes a library of between one and two thouſand volumes, and philoſophical apparatus, and a convenient building.

GREENWICH, a market-town and pariſh in the hundred of Blackheath, and county of Kent, England, is ſituated on the banks of the Thames, adjoining to Deptford, and 5½ miles diſtant from London. There are traces of a royal reſidence at Greenwich ſo early as the reign of Edward I., A.D. 1300. Henry IV. dated his will in 1408 from this manor, which was granted by Henry V. to Thomas duke of Exeter, after whoſe death it was conferred on Humphrey duke of Glouceſter, uncle to Henry VI., who, in 1433, gave the duke licence to fortify and embattle his manor-houſe, and to make a park of 200 acres; under this grant the duke rebuilt the palace, and incloſed the park, in which he erected a moated tower. On the duke's death in 1447, the manor reverted to the crown; and was a favourite reſidence of Edward IV., who enlarged and finiſhed the palace. Henry VII. ſpent much of his time at Greenwich, where his two ſons, Henry and Edmund, were born. Henry VIII. made conſiderable additions to the buildings, and during his reign Greenwich became one of the principal ſcenes of that feſtivity for which his court was celebrated. Tournaments and revels were frequently held; and in 1513 the firſt maſquerade ever ſeen in England was here introduced. Edward VI. kept his Chriſtmas here in 1552, and died in this palace in July following. The queens, Mary and Elizabeth, were both born here, and the latter chriſtened with peculiar ſtate. She was particularly partial to this manſion, and made it her ſummer reſidence, paſſing the feſtive hours of that romantic period in various diverſions and ſplendid exhibitions. This palace was frequently viſited by James I. and Charles I.; was afterwards aſſigned by parliament to the Protector; and, after the reſtoration, again devolved, with the park and appendages, to the crown: when the king, finding the whole building in a ruinous ſtate, ordered it to be pulled down, and commenced a magnificent palace of free-ſtone on its ſcite, under the direction of Webb, the ſon-in-law of Inigo Jones, from whoſe papers the deſigns are ſaid to have been made. One wing, however, was all that was completed, at the expence of 36,000*l.*, in which the king occaſionally reſided; but no further progreſs was made in the building either in that or the ſucceeding reign. Soon after the acceſſion of William and Mary, a project was formed for providing an aſylum for aged and diſabled ſeamen;

men; and their majeſties having reſolved to carry it into execution, ſir Chriſtopher Wren recommended that the unfiniſhed palace at Greenwich ſhould be completed and enlarged for this purpoſe. His advice being adopted, he contributed his time and abilities in the ſuperintendance of the works for ſeveral years without any emolument. Such was the origin of Greenwich hoſpital, of which the foundation was laid June 3, 1696, and which has been gradually enlarged and improved, till it arrived at its preſent height of magnificence. The hoſpital is a ſplendid and extenſive ſtructure, principally built with Portland ſtone, and conſiſts of four diſtinct quadrangular piles of buildings, diſtinguiſhed by the names of the reſpective ſovereigns, in whoſe reigns they were founded or built. The grand front opens on a terrace, ſkirting the ſouthern bank of the Thames, and extends 865 feet in length, in the centre of which is a deſcent to the river, by a double flight of ſteps. The ground plan of the whole edifice forms nearly a ſquare; of which king Charles's building occupies the north-weſt angle; queen Anne's, the north-eaſt; king William's, the ſouth-weſt; and queen Mary's, the ſouth-eaſt. The interval between the two former buildings forms a ſquare 270 feet wide, in the middle of which is a ſtatue of George II., ſculptured by Ryſbrach, out of a ſingle block of white marble, which weighed eleven tons, and was taken from the French by admiral ſir George Rooke: this ſtatue was given to the hoſpital by ſir John Jennings, who was governor from 1720 to 1744. The ſpace between the two latter buildings which include the hall and chapel, with their elegant domes, and the two colonnades, forms a leſſer ſquare, apparently terminated by the ranger's lodge in the park. The two ſquares are interſected by a ſpacious avenue, leading from the town through the hoſpital. The buildings which immediately front the Thames have a general correſpondence in ſtyle and arrangement. The north and ſouth fronts of each exhibit the appearance of a double pavilion, conjoined above by the continuation of an Attic order, with a baluſtrade, which ſurmounts the whole, but is ſeparated below by an open portal: the centre of each pavilion diſplays an elegant pediment, ſupported by four Corinthian columns, and the ſides a double pilaſter of the ſame order. King Charles's building contains the apartments of the governor and lieutenant-governor, the council-room, and anti-chamber; with fourteen wards, wherein 300 penſioners may be accommodated. In the council-room are ſeveral portraits: in the anti-chamber two large ſea-pieces, given to the hoſpital by Philip Harman, eſq., repreſenting the exploits of his anceſtor captain Thomas Harman of the Tyger frigate, in the reign of Charles II.; and a ſeries of ſix ſmall pieces, deſcriptive of the loſs of the Luxemburgh galley, in the year 1727. Queen Anne's building contains ſeveral apartments for inferior officers, with twenty-four wards, for four hundred and thirty-ſeven penſioners. King William's building ſtands to the ſouth-weſt of the great ſquare, and compriſes the great hall, veſtibule, and dome, deſigned and erected by ſir Chriſtopher Wren, between the years 1698 and 1703. To the eaſt of theſe adjoins a colonnade, three hundred and forty-ſeven feet in length, ſupported by Doric columns, and pilaſters twenty feet in height. The great hall is one hundred and ſix feet in length, fifty-ſix in width, and fifty high: the cieling and ſides are covered with portraits and emblematical figures, executed by ſir James Thornhill, for which he was paid at the rate of 3*l.* per ſquare yard for the cieling, and 1*l.* for the ſides, amounting in the whole to 6685*l.* The weſt front of King William's building, which is of brick, was finiſhed about 1725 by ſir John Vanbrugh: the building contains eleven wards, wherein are five hundred and fifty-one beds. The foundation of the eaſtern colonnade, which is ſimilar to that on the weſt ſide, was laid in 1699; but the chapel, and the other parts of queen Mary's building which adjoin to it, were not finiſhed till 1752. It correſponds with king William's, and is furniſhed with one thouſand and ninety-two beds, in thirteen wards. The preſent chapel, one of the moſt elegant ſpecimens of Grecian architecture in this kingdom, was erected from the claſſical deſigns of the late James Stuart, eſq., better known, perhaps, by the appellation of "Athenian Stuart," which he acquired from the Attic elegance of his buildings, and his intereſting publication on the antiquities of Athens. The chapel is one hundred and eleven feet in length, and fifty-two in width, and is capable of accommodating one thouſand penſioners, nurſes, and boys, excluſive of the ſeats for the directors and other officers. The portal conſiſts of an architrave, frieze, and cornice, of ſtatuary marble: the folding-doors are of mahogany, highly enriched by carving. The interior is finiſhed in an elegant ſtyle; and is adorned with many appropriate paintings; the moſt diſtinguiſhed of which is the altar-piece, executed by Weſt, and repreſenting the preſervation of St. Paul, on the iſland of Melita; a ſubject peculiarly adapted to this eſtabliſhment. Without the walls of the hoſpital ſtands the Infirmary, erected in 1763, after a deſign by Stuart: it forms an oblong quadrangle, one hundred and ninety-eight feet long, and one hundred and ſeventy-five broad; and conſiſts of two ſtories for the reception reſpectively of thoſe whoſe caſes require ſurgical aid, and of thoſe who are in need only of medical aſſiſtance. It contains ſixty-four rooms, each is fitted up for the accommodation of four patients. It alſo includes a chapel, hall, kitchen, and apartments for the phyſician, ſurgeon, and apothecary; with hot and cold baths, and other neceſſary offices. The penſioners, who are the objects of this noble charity, muſt be ſeamen diſabled by age, or maimed, either in the king's ſervice, or in the merchant ſervice, if the wounds were received in defending or taking any ſhip, or in fight againſt a pirate; foreigners who have ſerved two years in the Britiſh navy, become entitled to the benefits of this inſtitution in the ſame manner as natives. The widows of ſeamen are provided for, having the excluſive privilege of being nurſes in the hoſpital. The number of penſioners is upwards of 2400, who are furniſhed with clothes, diet, and lodging, with a ſmall allowance of pocket-money. The nurſes are 144, each of whom receives eight pounds per annum as wages, with every neceſſary of life. The governors of the hoſpital are about 100, and conſiſt of all the great officers of ſtate, the archbiſhops, the lord chancellor, the judges, the maſter and five ſenior brethren of Trinity-houſe, the lord mayor, and three ſenior aldermen of London, with ſome of the principal officers of the hoſpital. The annual average expence of each penſioner, according to the report of the commiſſioners of naval enquiry, was eſtimated at 27*l.* 10*s.* 9*d.* *per* man; and of the nurſes, 29*l.* 15*s.* 0*d.* each; the total annual expence being 69.206*l.* 5*s.* The funds of the eſtabliſhment are principally derived from a duty of ſixpence *per* month, paid by every mariner, either in the king's or merchant's ſervice; the forfeited eſtates of the earl of Derwentwater; and various benefactions from different ſovereigns, from parliament, and from private perſons.

The old tower at Greenwich, built by duke Humphrey, temp. Henry VI. was pulled down in 1675, by order of Charles II., who founded on its ſcite the preſent Royal Obſervatory, for the purpoſe of aſcertaining the motions of the moon, and the places of the fixed ſtars, in order to facilitate the attempts to diſcover the longitude at ſea.

Mr. Flamſteed, the firſt aſtronomer royal, began his obſervations in September 1676, and did ample juſtice to his appointment, though walking in an almoſt untrodden path, and not having, till 1689, the advantage of a mural quadrant, and even then not ſuch as is now in uſe, but one contrived by himſelf. He died in December 1719, and was ſucceeded by Dr. Halley, who fixed a tranſit inſtrument, and had a new mural quadrant of eight feet radius, conſtructed by Graham. On the death of Dr. Halley, in 1742, Dr. Bradley was appointed: in his time very valuable additions were made to the inſtruments at the obſervatory. Dr. Bradley, dying in 1762, was ſucceeded by Mr. Bliſs, whoſe deceaſe, in 1764, made room for the advancement of Dr. Maſkelyne, the preſent aſtronomer royal, who has diſplayed eminent ability in his ſituation. Since his appointment, the obſervatory has been furniſhed with an excellent achromatic teleſcope, of forty-ſix inches, focal length, with a treble object glaſs, &c. by Dollond; and the whole aſtronomical apparatus has been greatly improved by Dollond, Nairne, and Arnold. The obſervations made by the aſtronomer royal have been, ſince 1767, publiſhed annually under the inſpection of the Royal Society, who have the power of viſiting the obſervatory every year, to ſee that the inſtruments are kept in proper order.

The *church* at Greenwich is dedicated to St. Alphage, archbiſhop of Canterbury, who is ſaid to have been killed by the Danes on its ſcite: it is one of the fifty new churches erected in the reign of queen Anne; the old church having become ſo ruinous by lapſe of time, that the roof fell in about midnight, November 28, 1710. At the end of the town is the duke of Norfolk's college, for the maintenance of 20 decayed houſekeepers. Here is alſo an hoſpital for 20 poor perſons, founded by Mr. Lambarde, author of the "Perambulation of Kent," and called queen Elizabeth's college. There was a convent of friars at Greenwich, founded about the time of Edward IV. For many years here was a conſiderable powder magazine, which, after repeated application to parliament by the inhabitants, was removed to Purfleet in Eſſex, in 1760.

The population of Greenwich, as returned under the late act, was 14,339: the number of houſes 2,121; many of theſe are handſome buildings; the ſtreets are irregular, and the whole town is interſected by the hoſpital and its precincts. Fairs for three days are held at Eaſter and Whitſuntide; and well ſupplied markets every Wedneſday and Saturday. Lyſons's Environs of London, vol. iv. Beauties of England and Wales, vol. vii.

Greenwich, a townſhip of America, in Hampſhire county, Maſſachuſetts, incorporated in 1754, and containing 1,460 inhabitants; 20 miles E. from Northampton.—Alſo, a townſhip in Glouceſter county, New Jerſey, on the E. bank of Delaware river, oppoſite to Fort Mifflin; 6 miles S. E. of Philadelphia.—Alſo, a townſhip in Suſſex county, New Jerſey, on the E. ſide of Delaware river, in a mountainous country, 31 miles S. W. of Newton; it contained, in 1790, 2,035 inhabitants.—Alſo, a town in Cumberland county, New Jerſey, on the N. W. bank of Cohanzy creek, about 3 miles from its mouth, in Delaware bay, containing about 80 houſes and a Friends' meeting-houſe; 66 miles S. by W. from Philadelphia.—Alſo, a maritime and poſt-town in Fairfield county, Connecticut, 40 miles E. of New York, and containing 3,147 inhabitants. —Alſo, a town in Waſhington county, New York, on the E. bank of Hudſon's river. At the ſaw-mills of this town much buſineſs is done.

Greenwich, *Eaſt*, a poſt-town, and the chief townſhip in Kent county, Rhode iſland, diſtant 16 miles S. from Providence, and containing 1,775 inhabitants. It includes a meeting-houſe and a handſome court-houſe; and though its commerce is much reduced, it derives advantage from its fiſheries, and ſends ſome veſſels to the Weſt Indies. It is ſituated on the N. W. part of Narraganſet bay. It is noted for it good cyder, and formerly raiſed tobacco for exportation.

GREENWOOD, a townſhip in Cumberland county, Pennſylvania, having 724 inhabitants.—Alſo, a townſhip in Mifflin county, in the ſame ſtate, containing 969 inhabitants.

Green woods, a large foreſt of ſtately pines in Litchfield county, Connecticut, covering part of that county, and clothed in a green bearded moſs, which gives to the whole a gloomy, wild, and whimſical appearance.

GREES, a river of Ireland, in the county of Kildare, which flows by the pretty town of Ballitore, and joins the Barrow; 6 miles S. from Athy.

GREESA, a town in Algiers; 30 miles E. S. E. of Tiffeſh.

GREGARIOUS Birds, are ſuch as do not live ſolitarily, but aſſociate in flights or coveys, a great many together in company.

Gregarious, in *Geology*, is applied to ſuch reliquia or extraneous foſſils, found imbedded in the ſtrata, as are congregated a great number of the ſame ſpecies together, which very commonly is the caſe, particularly in calcareous rocks.

GREGGIA, in *Botany*, ſo named by the late Dr. Solander, in compliment to Mr. John Greg, a gentleman long reſident in Dominica, the correſpondent of Ellis, Garden, and other naturaliſts of his day. He ſent many plants to Kew and other collections, and returned to England about the year 1784, dying ſome years afterwards, at his ſeat near Hampton Court.—Gærtn. t. 33. (Myrtus Gregii; Swartz. Ind. Occ. 896. Ait. Hort. Kew. vol. ii. 159. Mart. Mill. Dict. v. iii.) See Myrtus.

GREGOIE, or Grebou, in *Geography*, a ſmall iſland of Africa, in the river Jacquin, about a league from the ſea, on the Gold Coaſt, where the European nations have factories.

GREGORIAN Calendar. See Calendar.

Gregorian *Chant*. See Chant.

Gregorian *Code*. See Code.

Gregorian *Epocha*, is the epocha, or time, whence the Gregorian calendar or computation took place. The year 1810 is the 228th year of the Gregorian epocha.

Gregorian *Notes*, in *Eccleſiaſtical Muſic*. In the Romiſh miſſals, breviaries, antiphonaries, and graduals, only four lines are uſed in the notation of the chants; with two clefs, the baſe and tenor, or thoſe of F and C, which are removable; and two kinds of notes, the ſquare and the lozenge; the firſt for long ſyllables, and the ſecond for ſhort. In ſome modern French miſſals a third ſpecies of note is uſed, generally at a cloſe; this is ſquare with a tail added to it, and is of longer duration than either of the other two. However, the Italians ſeldom uſe any other than ſquare notes in their canto fermo, nor did the French, in their more ancient books.

Theſe characters are not ſuppoſed to have been invented by St. Gregory, nor were they in uſe till many ages after his time; but ſince their invention, having been appropriated chiefly to the purpoſe of writing eccleſiaſtical chants in the antiphonary of that pontiff, they obtained the appellation of Gregorian notes.

Gregorian *Year*. See Year.

GREGORIO *de Puerto Viejo*, in *Geography*, a diſtrict and town of South America, in the audience of Quito, and juriſdiction of Guayaquil.

GREGORIO, *St.* a town of Naples, in Principato Citra; 8 miles N. W. of Cangiano.

ST. GREGORIO *de Abo*, a town of New Mexico; 110 miles S. of Santa Fé.

GREGORIUS, in *Ichthyology*. See SALMO *lavarctus*.

GREGORY I. in *Biography*, pope, ſurnamed the Great, and alſo dignified with the title of Saint, was a native of Rome, and born about 544 or 5. He was deſcended from one of the moſt illuſtrious families in that city, and was educated in a manner ſuitable to his rank. His proficiency in literary purſuits anſwered the moſt ſanguine expectations of his friends; it was ſaid that none in Rome excelled him in grammar, rhetoric, and logic. Having left the uſual routine of ſchool learning, in the courſe of which he had imbibed ſentiments of deep piety, as well as the elementary principles of knowledge, he paid particular attention to the ſtudy of juriſprudence, which was neceſſary to perſons who filled thoſe ſtations, to which he was entitled by his birth. When he came under public notice, he diſcovered ſuch abilities, integrity, and prudence, in the exerciſe of the different ſenatorial employments, that the younger Juſtin, who was emperor, appointed him to the honourable poſt of governor of Rome. In this office he acquitted himſelf to the ſatiſfaction of the emperor, of the ſenate, and of the people. At the death of his father, he became poſſeſſed of immenſe wealth, and being, probably from ſome diſappointments, diſguſted with the world, he determined to embrace the religious life. He devoted the greater part of his property to the foundation of religious houſes, and to charitable purpoſes. He founded ſix monaſteries in Sicily, and one at Rome in his father's houſe, dedicated to St. Andrew, over which he conſtituted Valentius abbot, whom he had ſelected for that poſt from a country monaſtery, and to whoſe diſcipline he ſubmitted himſelf. From the time of his taking the vows, he abandoned himſelf to meditation, devotion, and the moſt rigorous abſtinence. He was, however, in the year 579 taken from his retreat, ordained deacon, and ſent nuncio from the pope to the imperial court: the object of this miſſion was to apply for relief in behalf of the inhabitants of Italy, againſt the ravages of the Lombards. So ably did he conduct the buſineſs, that the emperor was entirely ſatisfied, and Gregory became one of his principal favourites: he was equally beloved by the principal courtiers, and even by the biſhops, notwithſtanding the jealouſy which they uſually entertained of a pope's nuncio. While he was at Conſtantinople, he had a diſpute with the patriarch Eutychius, on the queſtion, Whether, after the reſurrection, the bodies of the righteous would or would not be palpable. The argument was carried on in the preſence of the emperor Tiberius; Gregory mantained the affirmative ſide of the queſtion, to which the emperor gave his decided ſanction, at the ſame time, he ordered the patriarch to acquieſce in the judgment, and condemned to the flames a treatiſe of that prelate in ſupport of the negative ſide of the queſtion. In 583 Gregory was recalled to Rome, and appointed ſecretary to pope Pelagius, until he obtained permiſſion to retire to his monaſtery. He was choſen abbot; and in that office exacted of his monks as ſtrict an obſervance of rigorous abſtinence and diſcipline, as he practiſed himſelf. After a ſhort exerciſe of the monaſtic virtues, he was dragged from the cloiſter to the papal throne, by the unanimous voice of the clergy, the ſenate, and the people. He alone reſiſted his own elevation: and his humble petition, that the emperor would be pleaſed to reject the choice of the Romans, could only ſerve to exalt his character in the eyes of the emperor and the public, and he not only confirmed the wiſhes of the people, but congratulated the Romans on the choice which they had made. When the mandate was proclaimed, Gregory ſolicited the aid of ſome friendly merchants to convey him in a baſket beyond the gates of Rome, and he concealed himſelf a few days in the mountains, and among the woods, where he believed, or affected to believe, that he ſhould be ſafe from diſcovery. Notwithſtanding this precaution, he was in a few days found in a cave, and brought back in triumph by the people, who would not abandon their charge, till they had taken him to the church of St. Peter, where he was inſtantly ordained. The pontificate of Gregory the Great, which laſted rather more than ſix years and a half, is reckoned one of the moſt flouriſhing periods of the church; his virtues, and even his failings, were happily ſuited to his ſtation, and to the temper of the times. His firſt ſtep was to ſatisfy the biſhops of the chief ſees, as to the orthodoxy of his faith. For this purpoſe, he wrote to the patriarchs of Conſtantinople, Alexandria, Antioch, and Jeruſalem, declaring that he received the firſt four councils as the four books of the holy goſpel; that he reverenced the fifth, and that he condemned the three chapters. In his rival, the patriarch of Conſtantinople, he condemned the Anti-chriſtian title of univerſal biſhop, which the ſucceſſor of St. Peter was too haughty to concede, and too feeble to aſſume; and the eccleſiaſtical juriſdiction of Gregory was confined to the triple character of biſhop of Rome, primate of Italy, and apoſtle of the Weſt. He frequently aſcended the pulpit, and kindled by his eloquence the congenial paſſions of his audience: the language of the prophecies of the Old Teſtament he interpreted and applied, and he took the opportunity of improving the preſent calamities of the people, by directing their hopes and anxieties to the inviſible world. His precepts and example defined the model of the Roman liturgy; the diſtribution of the pariſhes, the calendar of feſtivals, the order of proceſſion, the ſervice of the prieſts and deacons, the variety and change of ſacerdotal garments. Till almoſt the laſt period of his life, he officiated in the canon of the maſs, which continued above three hours at a time. Gregory was no friend to heretics: he ſpared no pains to arm the civil and eccleſiaſtical power againſt the Donatiſts in Africa, and all who favoured them. At firſt, he was defeated in his wiſhes to deſtroy the harmony that ſubſiſted between the Catholic and Donatiſt parties in that country: he contrived to introduce invidious diſtinctions, which by degrees renewed the animoſities by which they had been formerly diſtracted, and terminated in the ultimate triumph of the Catholic, which was the ſtrongeſt party. Notwithſtandiug the zeal of pope Gregory againſt the heretics, he was favourable to the Jews, and protected them againſt ſome violent Chriſtians. In certain letters, which he wrote to the biſhops who were for forcing them to embrace Chriſtianity, he condemned perſecution of all kinds in the ſtrongeſt terms, though he enforced it in the inſtance of Chriſtians, who ventured to differ from the Catholic creed. On his acceſſion to the papal throne, a general relaxation of diſcipline, as well as of piety and morals, prevailed in the clerical orders: he immediately ſet about the correction of theſe evils with the utmoſt diligence and perſeverance. While Gregory was enforcing reformation on the clergy, he ſet before them an example of the conduct which he preſcribed. He was ſtrictly attentive to the duties of piety: he was humble, mild, compaſſionate, hoſpitable, and diſintereſted, an enemy to all pomp, grandeur, and ſhow, frequently abridging himſelf of the neceſſaries of life to relieve the indigent, and was moſt indefatigable in inſtructing his flock, both by preaching and writing. With all his humility, however, Gregory was a moſt zealous aſſertor of the power and prerogatives which his predeceſſors had exerciſed, or at any time claimed. He would declare, and no one ſeemed to doubt the ſincerity of his aſſertion, that he would rather loſe his life, than ſuffer the ſee of St. Peter to forfeit any of the privileges which it had ever enjoyed, or the prime apoſtle to be any ways injured, or robbed of his rights. In the year 593, the emperor iſſued an edict, forbidding any ſoldiers to quit the army, under the pretence of embracing a monaſtic life, till the time of their ſervice was expired. The pope determined to remonſtrate againſt the decree, being perſuaded that the eccleſiaſtical road was more ſafe than any other to the attainment of a heavenly crown. For this and ſome other acts of interference, the emperor expreſſed his diſſatisfaction with the ſteps taken by the pope, in ſtrong and even abuſive terms, and they proved the means of fruſtrating his application for a redreſs of grievances occaſioned by the cruelty and avarice of the imperial officers. The king of the Lombards threatened to lay ſiege to Rome, in order that he might avenge himſelf of ſome circumſtance that had happened contrary to his dignity, but Gregory made friends with his favourites, who had themſelves embraced the Catholic faith, and by their interceſſions the prince was induced to draw off his troops. About this time the patriarch of Conſtantinople aſſumed the title of "Univerſal Patriarch," a meaſure which alarmed Gregory, who made every exertion to prevent him from making good his claims. All his entreaties were vain, the patriarch eſtabliſhed his title, and entailed it on his ſucceſſors. When Gregory was informed of this he renounced the patriarch's communion, and condemned his conduct on the occaſion as vain, ambitious, profane, impious, execrable, anti-chriſtian, blaſphemous, infernal, and diabolical. In the year 596, Agilulph, king of the Lombards, broke into the imperial territories, laying waſte the Roman dukedom of Campania, and carrying away the inhabitants into captivity. On this occaſion Gregory exerciſed the moſt unbounded charity, in relieving the poor, and redeeming great numbers of priſoners, not only applying the revenues of his ſee to thoſe benevolent purpoſes, but large ſums which he obtained by his application to the biſhops, and the great men who were his friends, both in the Eaſt and Weſt. Under his reign the Arians of Italy and Spain were reconciled to the Catholic church, and the conqueſt of Britain reflects leſs glory on the name of Cæſar than on that of Gregory I. Inſtead of ſix legions, forty monks were embarked for that diſtant iſland, and the pontiff lamented the auſtere duties which forbade him to partake the perils of their ſpiritual warfare. In leſs than two years he could announce to the archbiſhop of Alexandria, that they had baptized the king of Kent with ten thouſand of his Anglo-Saxons, and the Roman miſſionaries, like thoſe of the primitive church, were armed only with ſpiritual and ſupernatural powers. The credulity or the prudence of Gregory was always diſpoſed to confirm the truths of religion by viſions and pretended miracles, and he accordingly acquired a high reputation with his own and ſucceeding ages. The patriarch of Conſtantinople dying, he was ſucceeded by Cyriacus, whoſe faith was deemed orthodox by the pope, but who perſiſted in claiming the title "Univerſal Patriarch." Gregory ſtill reſiſted, and in the courſe of the correſpondence which he maintained with the patriarchs of Antioch and Alexandria to intereſt them on his ſide of the diſpute; the laſt mentioned prelate gave him the title of "Univerſal Pope," in hopes thereby of terminating the difference between the contending parties. Gregory, however, rejected the title with great indignation, and by way of contraſt to the patriarch's conduct, he adopted the appellation of "Servant of Servants," which his ſucceſſors have retained to this day, and affected to uſe it even when diſtinguiſhed by the moſt ſcandalous exerciſe of pride and deſpotiſm. In the year 1601, at the requeſt of Auguſtin, the pope ſent a freſh colony of monks into Britain, and with ſuch directions to that apoſtle of the Anglo-Saxons, as he has been denominated, as have proved the means of introducing the groſſeſt corruptions and ſuperſtitions into the ſyſtem of Chriſtianity eſtabliſhed through his miſſion. During this ſame year Serenus, biſhop of Marſeilles, ordered all the images throughout his dioceſe to be caſt out of the churches and deſtroyed: his conduct was not quite approved by Gregory, though he pretended to applaud Serenus's zeal, in not ſuffering any thing to be worſhipped that is made with hands. Nevertheleſs, he condemned his caſting them out of the churches and daſhing them to pieces, as the effect of an inconſiderate and indiſcreet zeal, obſerving, that "though images were not ſet up in the churches to be worſhipped, yet they ſerve to inſtruct the ignorant: and it is one thing to adore an image, and another to learn from an image what is to be adored." During the year 602 a revolution took place at Conſtantinople, in conſequence of the revolt of the army, at the inſtigation of Phocas, a centurion, who was proclaimed emperor, and obtained poſſeſſion of the imperial city and throne. The firſt object of the new ſovereign was to deſtroy the abdicated prince, with his ſix ſons and a number of his relations and friends, and then he got himſelf acknowledged lawful emperor in all parts of the empire. On this occaſion, Gregory expreſſed his utmoſt ſatisfaction and joy at the change that had taken place, without hinting that he felt any ſorrow at the means by which it had been accompliſhed. He immediately wrote letters to the new emperor, congratulating him on his acceſſion to the imperial crown, which he ſaid was effected by a particular providence, to deliver the people from the oppreſſions under which they had ſo long groaned, and he even commended, flattered, and extolled the tyrant, for his juſtice, clemency, and piety, in the moſt fulſome terms. His object in this abject behaviour was that he might, by means of the influence of the emperor, defeat the attempt of the patriarch to aſſume the title of "Univerſal Biſhop." This he plainly told to Leontia, the new empreſs, repreſenting to her what bleſſings they might expect from St. Peter in heaven, provided they obliged the patriarch to relinquiſh the title, which the pope conſidered derogatory to the honour, dignity, and intereſts of his ſee. In this object he ſucceeded, for Phocas enacted a law, by which he prohibited the biſhop of Conſtantinople from ſtyling himſelf oecumenical or general patriarch, declaring that this title belonged to none but the biſhop of ancient Rome. This was not the only inſtance in which Gregory condeſcended to flatter baſe and infamous characters: he ſhewed equal or even greater complaiſance to Brunchaut, queen of France, who is deſcribed by Bayle as the moſt wicked woman upon earth, but as capable of winning over the clergy to her intereſt, becauſe at the ſame time that ſhe committed the moſt enormous crimes, ſhe was exceſſively liberal to eccleſiaſtics, and founded temples and convents, not forgetting to ſue very devoutly for relics to the holy father. In all the letters which the pope wrote to her, he treated her with the moſt abject flattery, declaring that no nation in the world was ſo happy as the French, ſince it merited ſuch a queen, endowed with virtues and fine qualities of every kind. In the year 604, Gregory was attacked with a ſevere fit of the gout, a diſorder to which he had been accuſtomed, and which rendered him incapable of performing the duties of his high office. Ambaſſadors were ſent to him from the queen of the Lombards, announcing the birth and baptiſm of her ſon: he was unable to write an anſwer to her majeſty, with regard to ſome difficulties which ſhe wiſhed to have ſolved, but he returned by her ambaſſador, a complimentary note, containing commendations of her zeal for the Catholic faith, and with preſents to the new-born prince, of a croſs to wear at his neck, in which was encloſed a piece of the true croſs, as he was pleaſed to affirm, together with the goſpel, in a Perſian box. This was one of the laſt acts of the pope. He died in the month of March 604. Such were the tranſactions of Gregory I. who has, for his talents and merits, been ſurnamed the Great. There was, however, a ſtrange mixture of inconſiſtencies in his character. In ſome reſpects he diſcovered a ſound and penetrating judgment, but in others the moſt ſhameful and ſuperſtitious weakneſs. He was no friend to ſecular and polite learning: he has even been accuſed of having deſtroyed the noble monuments of the ancient magnificence of the Romans, leſt travellers and foreigners, who came to viſit Rome on religious motives, by paying undue attention to them, ſhould neglect the holy places. This accuſation does not ſtand on undeniable evidence. It is doubted by Gibbon and other well-informed hiſtorians. "The writings of Gregory," ſays Mr. Gibbon, "reveal the implacable averſion to the monuments of claſſic genius; and he points his ſevereſt cenſure againſt the profane learning of a biſhop, who taught the art of grammar, ſtudied the Latin poets, and pronounced with the ſame voice the praiſes of Jupiter and thoſe of Chriſt. But the evidence of his deſtructive rage is doubtful and recent; the temple of peace, and the theatre of Marcellus, have been demoliſhed by the ſlow operation of ages, and a formal proſcription would have multiplied the copies of Virgil and Livy in the countries which were ſubject to the eccleſiaſtical dictator." Gregory invented new offices for the ſervices of the church, and the ſacraments, in which he preſcribed a vaſt number of rites and ceremonies that were unknown before his time. He took great pains in reforming the pſalmody of the church, inſtituting an academy of choiriſters, whom he taught to chant, and for whoſe uſe he compoſed that muſic which goes by his name. He left more writings behind him than any other pope from the foundation of the ſee of Rome to the preſent period. Theſe conſiſt of twelve books of "Letters," amounting to upwards of eight hundred in number. "A comment on the book of Job," generally known by the name of "Gregory's Morals on Job." "A Paſtoral," or a treatiſe on the duties of a paſtor. This work was held in ſuch veneration by the Gallican church, that all the biſhops were obliged, by the canons of that church, to be thoroughly acquainted with it, and punctually to obſerve the rules contained in it. He was author alſo of "Homilies" on the prophet Ezekiel; and on the goſpels, and of four books of "Dialogues." His works have been printed over and over again, in almoſt all forms, and at a number of different places on the continent, as Lyons, Paris, Rouen, Baſil, Antwerp, Venice, and Rome. The beſt edition is that of Paris, in 1705, in four vols. folio. The charity and wealth of this pontiff have already been referred to: in the uſe of his abundant riches, he acted like a faithful ſteward of the church and poor. The voluminous accounts of his receipts and diſburſements were kept above three hundred years in the Lateran as the model of Chriſtian economy. On the four great feſtivals, he divided their quarterly allowance to the clergy, to his domeſtics, to the monaſteries, to the churches, the places of burial, the alms'-houſes, and the hoſpitals of Rome, and the reſt of the dioceſe. On the firſt day of every month he diſtributed to the poor, according to the ſeaſon, their ſtated portion of corn, &c.; and his treaſurers were continually ſummoned to ſatisfy in his name the extraordinary demands of indigence and merit. The diſtreſs of the ſick and helpleſs, of ſtrangers and pilgrims, was relieved by the bounty of each day and of every hour, nor would the pontiff indulge himſelf in a frugal repaſt till he had ſent the diſhes from his own table to ſome objects deſerving of his compaſſion. The miſery of the times had reduced the nobles and matrons of Rome to accept, without a bluſh, the benevolence of the church. Three thouſand virgins received their food and raiment from the hand of their benefactor, and many biſhops of Italy eſcaped from the barbarians to the hoſpitable abode of the Vatican. Gregory might juſtly be ſtyled the father of his country, and ſuch was the extreme ſenſibility of his conſcience, that, for the death of a beggar, who had periſhed in the ſtreets, he interdicted himſelf during ſeveral days from the exerciſe of ſacerdotal functions. Moreri. Gibbon. Lardner.

Eccleſiaſtical writers ſeem unanimous in allowing that it was the learned and active pope Gregory the Great, who collected the muſical fragments of ſuch ancient hymns and pſalms as the firſt fathers of the church had approved, and recommended to the primitive Chriſtians; and that he ſelected, methodized, and arranged them in the order which was long continued at Rome, and ſoon adopted by the chief part of the weſtern church.

The anonymous author of his life, publiſhed by Caniſius, ſpeaks of this tranſaction in the following words: "This pontiff compoſed, arranged, and conſtituted the *Antiphonarium* and chants uſed in the morning and evening ſervice." Fleury, in his Hiſt. Eccl. tom. vii. p. 150, gives a circumſtantial account of the *Scola Cantorum*, inſtituted by St. Gregory. It ſubſiſted 300 years after the death of that pontiff, which happened in 604, as we are informed by John Diaconus, author of his life. The original Antiphonarium of this pope was then ſubſiſting; and the whip with which he uſed to threaten to ſcourge the boys; as well as the bed on which he reclined in the latter part of his life, when he viſited the ſchool in order to hear them practiſe. Two colleges were appropriated to theſe ſtudies; one near the church of St. Peter, and one near that of St. John Lateran; both of which were endowed with lands.

It has been imagined that St. Gregory was rather a compiler than a compoſer of eccleſiaſtical chants, as muſic had been eſtabliſhed in the church long before his pontificate; and John Diaconus, in his life, (lib. i. cap. 6.) calls his collection "Antiphonarium Centonem," the ground-work of which was the ancient Greek chant, upon the principles of which it was formed. This is the opinion of the Abbé Lebœuf, (Traité Hiſtorique et Pratique ſur le Chant Eccleſiaſtique, chap. iii.) and of many others. The derivation is reſpectable; but if the Romans in the time of St. Ambroſe had *any* muſic, it muſt have been compoſed upon the Greek ſyſtem: all the arts at Rome, during the time of the emperors, were Greek, and chiefly cultivated by Greek artiſts; and we hear of no muſical ſyſtem in uſe among the Romans, or at leaſt none is mentioned by their writers on the art, but that of the Greeks.

GREGORY II., pope, was a native of Rome, and educated from childhood, in the Lateran palace, under pope Sergius, who appointed him his ſub-deacon, almoner, and librarian. He was afterwards raiſed to higher poſts in the church, and was ſelected by pope Conſtantine, as the moſt learned man of his time, to accompany him when he went to Conſtantinople, in the year 710. In that city Gregory diſtinguiſhed himſelf by anſwering certain difficulties propoſed to him by the emperor Juſtinian, and ſolving his doubts with regard to ſome queſtions in which, it ſhould ſeem, he was much intereſted, though what thoſe difficulties were we are not informed. Upon the death of Conſtantine, in 715, he was raiſed to the papal dignity, and almoſt immediately upon this event, the Lombards made an irruption into the imperial territories, and took by ſurpriſe the city of Cumæ. Gregory, in his quality of Holy-Father, endeavoured to prevail on them to reſtore it, firſt by threatenings of the vengeance of heaven if they ſhould prove ſo wicked as to retain it, and afterwards by the offer of a large ſum of money, and the particular protection of St. Peter, provided they withdrew their troops, and abſtained from all farther hoſtilities. Finding that they were equally deaf to the threatenings and promiſes of the pope, he applied for the aſſiſtance of the king of Naples, who, for a ſtipulated ſum, undertook to recover the place, and ſucceeded in the enterpriſe. In the year 717, the emperor Theodoſius, having reſigned the imperial dignity, and retired to a monaſtery, Leo, the Iſaurian, was, by the ſenate and army, raiſed to the throne, on which occaſion he wrote a letter to the pope, accompanied with a confeſſion of faith, and alſo with promiſes to maintain the Catholic doctrine, as defined by the ſix general councils and the fathers. Gregory, in return, congratulated the emperor, in warm expreſſions of reſpect and loyalty, upon his acceſſion, and aſſured him, that he would not only receive him for his ſovereign, but would uſe his influence to preſerve peace and amity between him and all the Chriſtian princes of the Weſt. In 721, Gregory held a council at Rome, in which ſeveral important canons were enacted on the ſubject of unlawful marriages and other points relating to eccleſiaſtical diſcipline. While this council was ſitting, Winifrid, afterwards archbiſhop of Mentz, and known by the name of Boniface, arrived on a pilgrimage at Rome, where he was received with extraordinary marks of reſpect. A few years after this, Ina, king of the Weſt Saxons, arrived at Rome, on a pilgrimage to the tomb of the Apoſtles, having reſolved to renounce the world, and embrace the monaſtic life. During his ſtay in the city, he built a college for the education of youth, and the reception of ſuch of his ſubjects as ſhould undertake pilgrimages; for the ſupport of which he impoſed a tax on every houſe or family, known by the name of Rome-ſcot or Peter-pence. This tax, which, about the middle of the ninth century, was laid on the whole kingdom of England, was originally deſtined ſolely to the charitable uſes above-mentinoed, but it was afterwards converted, by the popes, to their own uſe, and levied under the denomination of a tribute to St. Peter, till Henry delivered the country of the burden. About the year 726, Leo, determined to reſtore the Chriſtian worſhip to its primitive ſtate, forbad all kinds of image-worſhip, and cauſed the edict to be promulgated through the empire. He gave notice of the ſame to the pope, requeſting his aſſiſtance in carrying the reſolution into effect, but Gregory made no ſcruple of avowing his decided oppoſition to the meaſure, and threatened the emperor with the indignation of St. Peter, ſhould he perſiſt in his projected reform. The emperor was not to be intimidated: he publiſhed his edict in Italy, but the populace was ſeriouſly againſt the innovation, and inſurrections were immediately excited, which the ſoldiery could not ſuppreſs without much miſchief and bloodſhed. Luitrand, king of the Lombards, joined the popular cry, and taking advantage of the diſturbances, made a rapid progreſs in Italy. Every where he declared his readineſs to protect image-worſhip, and every where he was received by the people as one ſent from heaven to defend the Catholic faith. Theſe events went beyond the wiſhes of the pope, he was filled with the utmoſt conſternation, well knowing that if the Lombards were ſuffered to make head in the Italian territories, he ſhould feel the weight of their yoke. He applied for aſſiſtance to Urſus, the doge of Venice, which was readily granted, and which was effectual in reſcuing the emperor's dominions from the power of the Lombards. Gregory purſued his deſign, and urged Leo, by all the eloquence in his power, to abandon his plan with regard to image worſhip; but the determination of the emperor was unalterable, and he took meaſures to get poſſeſſion of the perſon of Gregory, to prevent him from fomenting diviſions, and even rebellion among the people. Gregory obtained timely notice of his intention, and fruſtrated the deſign: he immediately thundered out a ſentence of excommunication againſt the emperor's exarch, for endeavouring to obey his maſter; and the people inſtantly took up arms, overpowered the garriſon, pulled down the ſtatues of the emperor, broke them in pieces, and openly declared that they renounced their allegiance to him as ſovereign: not ſatisfied with this, they ſome time afterwards murdered all thoſe who were adherents to the emperor's cauſe, and among others the exarch himſelf. Notwithſtanding this oppoſition, the emperor in 730 held a council of the ſenate, the great officers of the ſtate, and the biſhops who were at Conſtantinople, in which it was determined, that as it was found by experience that images could not be ſuffered to remain in churches, and idolatry prevented, they ſhould all be pulled down and deſtroyed. This being effected, he made a new effort with regard to the churches in the Weſt: he again ſolicited the pope, but Gregory's anſwer breathed a determined ſpirit of hoſtility, and was written in a ſtyle of arrogance and abuſe which was unexampled. He went ſtill farther, he aſſembled a council at Rome, conſiſting of all the neighbouring biſhops, which iſſued a decree, not only declarative of the lawfulneſs of worſhipping images, but commanding them to be worſhipped, and condemning, as heretics, all who did not worſhip them, or who ſhould preſume to teach that they were not to be worſhipped. The emperor, indignant at this aſſumption of power, ſeized on the rich patrimonies of the Roman church in Sicily and Calabria, tore from the Roman ſee the provinces of Eaſt Illyrium, and ſubjected the whole to the patriarch of Conſtantinople. By this conduct he inflicted the moſt ſevere wound in the heart of the pope, but before he had time to ripen any ſchemes of revenge, he died in 731, after he had ſat in the papal chair near ſeventeen years. From the details of his actions already given, it appears that Gregory had a zeal for exalting the power and dignity of his ſee; he was beſides arrogant and ſuperſtitious. As an author there are fifteen of his "Letters," and a "Memoir," tranſmitted to his legates in Bavaria, containing inſtructions for their guidance in managing the eccleſiaſtical affairs of that country. Theſe are inſerted in the ſixth volume of the "Collectio Conciliorum:" he was author alſo of a liturgy, which was printed, with a Greek verſion, at Paris in 1595. Moreri.

Gregory III, pope, was a Syrian by birth, became a preſbyter of the Roman church, and was much celebrated for his learning and talents as an eloquent and impreſſive preacher. Upon the death of Gregory II. he was unanimouſly choſen his ſucceſſor by the Roman people and clergy. He ſeemed determined to follow the ſteps of his predeceſſor, and declared himſelf a determined ſupporter of the worſhip of images, and he had no ſooner taken poſſeſſion of his ſee, than he wrote a letter to the emperor Leo and his ſon Conſtantine, whom he had taken as a partner in the empire, exhorting them to renounce their error, and to return, like dutiful children, into the boſom of the church. This letter he ſent by Gregory, a preſbyter of the Roman church, on whoſe zeal and firmneſs he thought he could depend, but when the preſbyter arrived, he underſtood that the emperors not only maintained their ground, but were determined to extirpate image worſhip, and thoſe who preſumed to juſtify it: he therefore thought it moſt prudent to return to Rome without acquainting them with the object of his miſſion. On his arrival, the pope was ſo exaſperated at the puſillanimity which he had ſhewn, that he called a council to determine upon ſome exemplary puniſhment, but, upon his promiſe of going back and executing his miſſion, he was pardoned. He immediately ſet out, but as ſoon as he had landed in Sicily, in his way to the imperial court, he was arreſted, his letter taken from him, and he himſelf ſent into exile. In the year 732, Gregory held a council at Rome to revenge himſelf upon the emperor for ſending his legate into baniſhment, and he procured a decree to be paſſed, eſtabliſhing the worſhip of images, and denounced excommunication againſt all who ſhould preſume to pull down, deſtroy, profane, or blaſpheme them: he even expended immenſe ſums on the purchaſe of pictures and ſtatues with which he filled the churches at Rome, and encouraged the people in the daily worſhip of them: he likewiſe cauſed relics to be brought from all parts to Rome, where he erected a magnificent building for their reception and worſhip, appointing them an appropriate ſervice, and monks to perform it. He made another unſucceſsful effort towards the converſion of the emperor, who, weary of his applications, prepared to reduce the pontiff, and the Romans who ſupported him, to obedience by force. Upon this event, the people of Rome, at the inſtigation of the pope, withdrew from all ſubjection to the emperor, and formed themſelves into a kind of republic, in which they were governed by magiſtrates appointed by their own authority, under the pope, not as prince, but only as their head. After this they were involved in hoſtilities with Luitrand, king of the Lombards, who ravaged their whole country, and even laid ſiege to the city. In this extremity, Gregory applied for aſſiſtance to Charles Martel, who refuſed to interfere till propoſals were made that the pope and Roman people ſhould ſolemnly renounce their allegiance to the emperor, as an avowed heretic, and perſecutor of the church, and that they ſhould acknowledge Charles for their protector, and confer on him the conſular dignity; and, on the other hand, Charles was to engage to protect and defend the pope, the Roman church, and the people of Rome, againſt the Lombards, and likewiſe againſt the emperor, ſhould they either be attacked or moleſted. To theſe terms Charles readily acceded, and as ſoon as Luitrand heard of the treaty he abandoned the ſiege of Rome, and retired to his own dominions. Gregory did not live long to enjoy the fruits of this policy, which contributed materially to the ſeparation of the Italian provinces from the Grecian empire. He died in 741, after a pontificate of between ten and eleven years. The only literary remains of this pope are "Seven Letters," which are to be found in the fourth vol. of the "Collect. Concil." Moreri.

Gregory IV., pope, a native of Rome, ſucceeded to the high office on the death of Valentine, in the year 827. He is commended for his extraordinary piety, of which ſome of the ſtrongeſt teſtimonies are repairing and adorning churches and monaſteries, and inſtituting the feſtival of "All Souls" day. When the quarrel took place between the emperor Lewis le Debonnaire, and his ſons, Lotharius perſuaded the pope to accompany him into France, to mediate a reconciliation between him and his father. When the pope had ſerved this purpoſe, he was permitted to return to Rome, where the beſt action performed by him that we read of, was his rebuilding and fortifying the city of Oſtia, as a protection againſt the deſcents of the Saracens. This pope died in 844, having preſided over the Roman church about 16 years. Three of his "Letters" are extant in the ſeventh vol. of the Collect. Concil. Moreri.

Gregory V. pope, whoſe original name was Bruno, was a German by birth, and a relation of the emperor Otho. He was choſen biſhop of Rome when he was but twenty-four years of age; at his ordination he aſſumed the name of Gregory, and in a very ſhort time after he ſolemnly crowned Otho emperor, who had before been only ſtyled king. He held a council in the firſt year of his pontificate, at which the emperor was preſent, and, it has been ſaid, the German electoral college was inſtituted, but it is more probable, from the evidence of hiſtory, that the origin of this college is to be referred to a later date. Upon the breaking up of the council, he returned to Germany, having firſt made the Romans ſwear allegiance to him, and obedience to the pope, but ſcarcely had the Germans repaſſed the Alps, when Creſcentius, a man of conſiderable wealth and power, perſuaded them to revolt, renounce their allegiance to the emperor, and chooſe himſelf for their head. Theſe events obliged Gregory to fly from Rome, on which occaſion Creſcentius declared the ſee vacant, and cauſed a perſon named Philagathus to be raiſed to it, who took the name of John XVII. Gregory excommunicated the uſurper, and alſo his patron, a ſentence which was confirmed by all the biſhops of Italy, France, and Germany. Soon after this Otho, urged by the intreaties of Gregory, returned to Italy, with a large army, and advanced with the pope towards Rome. At their approach, the anti-pope John took to flight, but, falling into the hands of ſome of the pope's friends, was deprived of his ſight, and otherwiſe cruelly mutilated. Creſcentius was alſo taken, and, with his accomplices, ignominiouſly executed. Gregory was now reſtored to his ſee, and one of his firſt acts was to convene a council to meet at Rome, in which the marriage of Robert, king of France, with Bertha, widow of Odo, count of Champagne, was declared inceſtuous and null. He died in the beginning of 999, having left behind him many honourable teſtimonies of the vigilance and fidelity which he had exhibited in his office. His reign was very ſhort; there are four of his "Letters" extant, in the 9th vol. of the Collec. Concil. A fifth, concerning the privileges of the abbots of Monſ. Major, may be found in the 4th vol. of "Baluze's Miſcellanea." Moreri.

Gregory VI. pope, whoſe original name was John Gratian, was deſcended from one of the moſt opulent families of Rome, and elected pope in 1044, as ſucceſſor to Benedict. Upon his acceſſion, there were no fewer than three perſons who were pretenders to the honour of being ſucceſſors of St. Peter. In this ſtate, Henry III. king of Germany, reſolved to go to Italy himſelf, and to inquire on the ſpot into the conduct of the popes, and the ſtate of the church. He aſſembled a council at Sutri, in 1046, and ſent an invitation to Gregory to preſide at this council; with which he readily complied, flattering himſelf that the king would acknowledge him for lawful pope. But when he made his appearance there, a charge was preferred againſt him of having purchaſed the pontifical dignity with a ſum of money. He confeſſed himſelf guilty of the charge, and, quitting his chair, diveſted himſelf of his pontifical ornaments before the council, and, begging forgiveneſs, renounced all claim to the throne of St. Peter. After this abdication, Henry carried him priſoner into Germany, where he ended his days. During the ſhort time that he was at the head of the church, he performed ſome very beneficial acts. Finding the lands and revenues of the ſee greatly diminiſhed by uſurpations, the roads infeſted by robbers, and other diſorders prevailing in the government, Gregory acted with ſuch vigour, that a powerful party was raiſed up againſt him by thoſe who had been accuſtomed to live by plunder. Moreri.

GREGORY VII. pope, who, by his talents, raiſed the Roman ſee to the higheſt pitch of power, is ſaid to have been the ſon of a carpenter, and to have been born at the ſmall town of Soano, in Tuſcany. His original name was Hildebrand, by which he is frequently known in hiſtory. He was educated at Rome, where he was highly eſteemed by Benedict IX. and Gregory VI., on the latter of whom he attended, when he was ſent priſoner to Germany. Upon the death of Gregory, Hildebrand embraced the monaſtic life in the monaſtery of Cluny, where he was raiſed to the poſt of prior. By Leo IX. he was created ſub-deacon, and by Nicholas II., archdeacon of the Roman church; by theſe pontiffs, and by ſome others, he was ſucceſsfully employed in ſeveral negotiations. Under the pontificate of Alexander II. he was made chancellor of the holy ſee, and had the abſolute adminiſtration of all affairs, both eccleſiaſtical and civil, as well as the entire diſpoſal of the revenues of the church of Rome. Upon the death of pope Alexander, Hildebrand appointed a faſt to be kept, and prayers to be offered up for three days together, before they ſhould proceed to the election of a new pope. While they were performing the obſequies of Alexander in the Lateran church, on the day after his death, the aſſembled people tumultuouſly cried out with one voice, "Hildebrand is pope, St. Peter has choſen him:" upon which he was immediately laid hold of and placed by force upon the pontifical throne. This election was confirmed on the ſame day by the whole body of the clergy and people. His next object was to obtain the confirmation of the king of Germany, which was a matter of no great difficulty, and immediately he took the name of Gregory, out of reſpect to his friend, Gregory VI. He was the laſt pope, the decree of whoſe election was tranſmitted to the emperor, or king, before his conſecration, or who was conſecrated in the preſence of the imperial envoy. Gregory began his reign by engaging in the moſt bold and daring ſchemes for extending the juriſdiction of the Roman ſee, and enriching the patrimony of St. Peter. He conceived the deſign, not only of emancipating the church from all ſubjection to princes, but of ſubjecting all princes to the church, and the whole church to his ſee: of conſtituting himſelf ſupreme judge and determiner of all affairs, both eccleſiaſtical and civil; the diſpoſer not only of biſhoprics and archbiſhoprics, and other eccleſiaſtical benefices, but of kingdoms and ſtates, and the revenues of individuals; and, in fact, ſole and deſpotic monarch of the earth in temporals as well as ſpirituals. Gregory was ſoon embroiled in a diſpute with Henry IV., and he omitted no meaſures which he thought likely to ſtrengthen his party, and, aided as he was by the ſuperſtition of the times, as well as by the reſentment of ſeveral princes, whom Henry had diſobliged, or who wiſhed to ſhake off his authority, he ſoon created a formidable body of confederates in his ſupport. This confederacy encouraged the pope to think of raiſing ſome other perſon to the throne inſtead of Henry, and, without heſitation, he wrote a letter to the princes, biſhops, and people of Germany, empowering them to chuſe another king, if Henry did not, by a ſincere repentance, render himſelf worthy of being replaced on the throne, which he had forfeited by his diſobedience to the apoſtolic ſee. Upon the receipt of this letter, the confederate princes and biſhops held a diet at Tribur, near Mentz, and they declared the king ſuſpended from his royal dignity, and added, that if he did not obtain abſolution before the anniverſary of his excommunication, he ſhould be excluded for ever from the throne. Henry ſubmitted to the degradation of preparing to throw himſelf at the feet of the pontiff, to ſolicit abſolution. He ſet out for Italy with his wife and infant ſon, and, after ſuſtaining uncommon hardſhips in the paſſage of the Alps, amidſt the rigours of an extremely ſevere winter, he arrived in that country. He was there ſpeedily attended by the counts and biſhops of Lombardy, who encouraged him to revenge the treatment which he had received from the pope, and offered to aſſiſt him with men and money. Gregory had, in the mean time, proceeded as far as Lombardy accompanied by the counteſs Mathilda, whoſe cloſe intimacy with Gregory afforded too much reaſon for propagating many ſcandalous reports. Upon hearing of the king's arrival, and of the reception he had met with from his Italian ſubjects, the pope retired to the ſtrong hold of Canoſa, in the dioceſe of Reggio. While remaining in this fortreſs, many German biſhops, and others who had been excommunicated for taking part with the king, repaired to him barefooted, clothed in hair cloth, to pray for abſolution and forgiveneſs, which they did not obtain without ſubmitting to ſevere penance and mortification. The pontiff enjoyed the malignant pleaſure of ſeeing the king added to the number of his humiliated ſuppliants. It was ſome time before the pontiff would admit the monarch into his preſence, and when the order was iſſued for the purpoſe, it was on the condition that he ſhould enter at the outer gate of the fortreſs without attendants; and at the next gate he was required to diveſt himſelf of the enſigns of royalty, and put on a coarſe woollen tunic, in which dreſs, and barefooted, he was ſuffered to ſtand for three whole days at the third gate, expoſed to the ſeverity of the weather, faſting and imploring the mercy of God and the pope. At length the perſons of diſtinction who were with Gregory, affected at the ſufferings of the king, began to complain of the ſeverity of his holineſs, which they ſaid was more becoming a tyrant than an apoſtolical father or judge. Theſe reports were carried to the pope, who on the fourth day admitted the king, and after much difficulty granted him abſolution. When the Lombard lords heard of the treatment which the king had met with, and his opprobrious convention, they were highly incenſed not only againſt the pope, but againſt Henry, whom they accuſed of cowardice and treachery, in ſubmitting to beg abſolution of a man whom they were determined no longer to acknowledge as their ſpiritual head. They ſeemed, at firſt, determined to depoſe him, and place his infant ſon on the throne in his ſtead, but to appeaſe their reſentment he broke the convention with the pope, reſumed his title and other marks of royalty which he had laid down, and putting himſelf at the head of his forces, he prepared to check the pope's immoderate ambition. After various ſucceſſes, in which the contending armies were alternately victorious, Henry ſummoned a council of German biſhops to meet at Mentz, who adjourned their ſeſſions to Brixen, where they were joined by many of the Italian biſhops and German and Italian princes. In this council, Gregory was accuſed of overſetting the hierarchy, and making himſelf ſole monarch of the church; encouraging ſedition and rebellion; perſecuting, excommunicating, and depoſing a peaceable king, and placing a rebel on the throne. For theſe crimes they reſolved that he ſhould be depoſed, and another choſen in his room. Notwithſtanding theſe meaſures, Gregory was able to recover himſelf, but he was again embroiled in new difficulties, and the Romans became ſo incenſed againſt the pope whom they conſidered as the author of the many calamities which they had endured, that apprehenſions were entertained of his ſafety at Rome, and he thought proper to place himſelf under the protection of duke Robert at Salerno. In that place he died in 1085, having held the ſee of Rome little more than 12 years, and leaving Europe involved in complicated calamities to which his ambition gave riſe. "He was," as Moſheim has well deſcribed him, "a man of uncommon genius, whoſe ambition, in forming the moſt arduous projects, was equalled by his dexterity in bringing them into execution; ſagacious, crafty, and intrepid, nothing could eſcape his penetration, defeat his ſtratagems, or daunt his courage; haughty and arrogant beyond all meaſure, obſtinate, impetuous, and intractable, he looked up to the ſummit of univerſal empire with a wiſtful eye, and laboured up the ſteep aſcent with uninterrupted ardour and invincible perſeverance, void of all principle, and deſtitute of every pious and virtuous feeling, he ſuffered little reſtraint in his audacious purſuits from the dictates of religion, or the remonſtrances of conſcience." He was the firſt pope who claimed the power of depoſing princes and abſolving ſubjects from their oaths of allegiance. He alſo laid claim to moſt of the kingdoms and ſtates of Europe, and by the boldneſs of his pretenſions, and his menaces of exerciſing the eccleſiaſtical authority, terrified many of their ſovereigns and rulers into acknowledgments of their being feudatories and vaſſals of the apoſtolic ſee. Three hundred and fifty-nine letters of this pope have reached our time, which are divided into nine books, and are inſerted in the 10th volume of the Collect. Concil. He is generally ſuppoſed to have been the author of "A Commentary upon the ſeven penitential Pſalms," which ſome writers have improperly aſcribed to Gregory I.: and of a "Commentary upon the Goſpel of St. Matthew," which is ſaid to be preſerved in MS. in the library at Lambeth. Bower. Moreri. Moſheim.

Gregory VIII. pope, originally known by the name of Albert de Mora, was a native of Benevento, and created cardinal by pope Adrian IV. in the year 1135. He was employed in very important miſſions, *viz.* as legate to Spain, and in the year 1172 into Normandy, where he abſolved Henry II. king of England, from the cenſures which he had incurred by being ſuppoſed in ſome degree acceſſary to the death of Thomas a Becket, but not before that monarch had ſubmitted to a diſgraceful penance. Upon the death of Urban III. in the year 1187, cardinal Albert was unanimouſly choſen his ſucceſſor, when he took the name of Gregory VIII. A ſhort time before his election, intelligence had arrived at Rome of the advantages gained by Saladin over the Chriſtians in the Eaſt, and his capture of the city of Jeruſalem. Gregory, as ſoon as he was conſecrated, wrote a letter addreſſed to the Chriſtians in the Weſt, exhorting them to contribute all in their power to the relief of their diſtreſſed brethren, and for the recovery of the holy city. He enjoined a five years' faſt, to appeaſe the anger of heaven, by abſtaining from meat on Wedneſdays and Saturdays as well as Fridays throughout the year. The labours of this pontiff were of very ſhort duration. He died within two months of his elevation. He has been applauded for his learning, eloquence, humane diſpoſition, and exemplary manners. There are three of his letters extant in the tenth vol. of the Collect. Concil. Moreri. Bower.

Gregory IX. pope, whoſe former name was Ugolin, was created cardinal biſhop of Oſtia, by pope Innocent III., and was afterwards employed on different legations to Germany and elſewhere, chiefly to preach up the neceſſity of engaging in the cruſades. He was elected pope upon the death of Honorius III. in the year 1227, when he took the name of Gregory IX. Immediately after his conſecration he commanded the weſtern biſhops to exert their authority, and oblige ſuch perſons as had taken the croſs, to ſet out without delay for the Holy Land. He wrote alſo to the emperor Frederic II. exhorting him to fulfil the ſolemn promiſes which he had made to embark a ſufficient army for the relief of the Chriſtians in the Eaſt, adding the ſevereſt menaces if he ſhould decline the undertaking, declaring that he would exert the power which heaven had put into his hands, and proceed againſt him as guilty of a breach of his vows. Frederic was obedient to the order, but having embarked with a large army, he returned in three days, alleging that the ill ſtate of his health rendered him incapable of ſo great an exertion. His excuſes were not deemed valid, the pope would hear of no apologies, and paſſed on him ſentence of excommunication, till at length the emperor embarked for Paleſtine, but not having ſued for abſolution before his departure, he was ſtill the object of Gregory's reſentment, who took every method to render his expedition fruitleſs, and to excite civil wars in his Italian dominions. Even after the emperor had, by treaty, ſecured poſſeſſion of the city and kingdom of Jeruſalem, and was preparing for his coronation there, by the patriarch he found that the prelate had been terrified by the papal emiſſaries from taking a part in the ceremony, and had alſo laid the city, and the church of the ſepulchre, under an interdict, that no divine ſervice might be performed in them during Frederic's ſtay. The German biſhops, likewiſe, who attended the emperor, partook ſo much of the patriarch's alarms, that they refuſed to perform any religious function, or even to be preſent at the coronation; ſo that Frederic was under the neceſſity of taking the crown from the altar, and placing it upon his head with his own hands. On the emperor's return in 1229, Gregory excommunicated him again; and new cauſes of complaint were continually occurring between Frederic and the pope, the former being deſirous of acting for himſelf, and the latter being fully bent upon reducing him to the moſt abject ſlavery. In the year 1241, Gregory called a general council to meet at Rome, and had ſent legates with letters to all the Chriſtian princes, entreating them to oblige the prelates in their reſpective kingdoms to repair to it. At firſt Frederic conſented to the holding of the council, and promiſed not to moleſt the biſhops who ſhould attend it. But afterwards, finding that the pope was reſolutely bent on his ruin, and that he intended to make uſe of the propoſed council for this purpoſe, and even to arm the whole Chriſtian world againſt him, he revoked his promiſes, and publiſhed a manifeſto, which was ſent through the whole of Europe, declaratory of his determined oppoſition to the pope's project. Nevertheleſs, great numbers of the biſhops did aſſemble at Genoa, in their road to Rome, who, with two cardinals and all their treaſure, fell into the emperor's hands, and the holy men were ſent priſoners to Naples. This diſappointment, together with the approach of the emperor, and his victorious army, gave ſuch a ſhock to the pope, that he was ſeized with an illneſs which put an end to his life in a few days. He had been at the head of the church nearly fifteen years, which were diſtinguiſhed by the calamities in which Italy was involved, chiefly owing to his immoderate ambition, injuſtice, arrogance, and obſtinacy. Many of his letters are to found in the eleventh vol. of the Collect. Concil.: there are alſo extant ſome fragments of his "Decretal Letters." Moreri. Bower.

Gregory X. pope, whoſe original name was Theobald, was firſt a canon in the church of Lyons; then archdeacon of Leige, and, taking the croſs, he accompanied Edward prince of Wales in his expedition into Syria. After the death of Clement IV. in 1278, the Roman ſee was vacant for nearly three years, owing to the intrigues of the cardinals, aſſembled at Viterbo, who all aſpired to the dignity themſelves, and oppoſed the election of any other. At length the magiſtrates, tired out with the delay, ordered them to be cloſely confined in the biſhop's palace, where they were ſubjected to many inconveniences, and they began daily to leſſen their allowance of proviſions. At length they choſe Theobald, who was at that time with the cruſaders in the Eaſt. Friars were diſpatched to announce to him the important news; they found him at Ptolemais, now called Acre, waiting for a favourable opportunity of paſſing to Jeruſalem, but upon receiving the decree of his election, he reſolved to embark for Italy. Before his departure he preached a ſermon to the Chriſtians at Ptolemais from theſe words, "If I forget thee, O Jeruſalem, let my right hand forget her cunning, &c." And in his ſermon he gave them very ſolemn aſſurances that he would render them every aſſiſtance in his power. He never forgot his promiſes, but both before and after his conſecration, the ſucceſs of the cruſades was an object the neareſt his heart. With this view he ſignified his intention of convening a general council at Lyons in 1274, and invited Michael Palæologus to meet it, in order to complete a work ſo neceſſary for the harmony and ſecurity of Chriſtendom. In 1273, while Gregory (a name which he aſſumed at his conſecration) was at Orvieto, Edward, who was now king of England, arrived at the city on his return from the Holy Land, and was received by the pope with every mark of eſteem and affection. On the king's complaining of the cruel murder of his couſin Henry, ſon of the duke of Cornwall by Guido, the pope inſtantly ſummoned Guido to appear before him within a limited time. Upon his paying no regard to this ſummons, he was not only excommunicated, but declared infamous, with all his deſcendants to the fourth generation, and all were anathematiſed, as equally guilty, who ſhould receive, favour, or admit him into their houſes. Finding himſelf driven from ſociety like a wild beaſt, he embraced the opportunity of the pope's travelling from Orvieto to Florence, unexpectedly to make his appearance before him, ſtripped of his garments to his ſhirt, with a rope about his neck, begging for mercy, and ſubmitting entirely to the clemency of his holineſs. Gregory gave him his life, but delivered him up to the king of Sicily to be kept in cloſe confinement till his death. Omitting the mere political events, which happened during the pontificate, we obſerve that in 1274 the general council which Gregory had ſummoned met at Lyons, and was by far the moſt numerous of any that had ever been held. The principal points which occupied its attention, were the procuring relief for the Chriſtians in the Eaſt, the union of the Greek and Latin churches, and the reſtoration of eccleſiaſtical diſcipline. To the firſt object, Gregory perſuaded the dignified eccleſiaſtics to devote a tenth of their income for the ſpace of ſix years. While the council was deliberating, Gregory depoſed the biſhop of Liege, on account of his irregularities and profligacy. This council introduced the famous conſtitution which provides that the cardinals ſhall be ſhut up in the conclave during the vacancy of the pontificate. Gregory died ſoon after the termination of the council, having held the Roman ſee four years and four months. Several of his "Letters" are extant in the eleventh volume of the "Collect. Concil." He is mentioned by hiſtorians on account of his extraordinary ſanctity, and there ſeems ſufficient reaſon to believe that he was influenced by a milder ſpirit than many of his predeceſſors. In none of them, however, is it poſſible to obſerve any conduct at all correſponding to the benevolent ſpirit of Chriſtianity: in none of them do we behold any attempt, however diſtant, to imitate the example of Chriſt, whoſe diſciples, in a ſuperior degree, they profeſſed themſelves. Moreri. Bower.

Gregory XI. pope, ſon of the count de Beaufort, and nephew of pope Clement VI. was created cardinal before he had completed his ſeventeenth year, and even then had accumulated upon him a number of rich benefices for the ſupport of his new dignity. He was honoured alſo with other high offices in the church, while he was thus young. At this time he could have made no great progreſs in literary acquirements, but it is much to his credit that he afterwards applied himſelf ſo cloſely to ſtudy, under the inſtructions of the learned Baldi and other eminent tutors, as to become one of the ableſt civilians, canoniſts, and divines of his time. Upon the death of pope Urban V. he was choſen his ſucceſſor, and was conſecrated at Avignon, which was then the ſeat of the papal reſidence, in the beginning of the year 1371, when he was about forty years old. Almoſt as ſoon as he was conſecrated, he ſent legates to mediate a peace between the kings of France and England, and wrote to thoſe princes, pathetically exhorting them to ſpare the blood of their ſubjects, and to compoſe their differences in a Chriſtian and amicable manner; but unfortunately without ſucceſs. In the ſame year he created twelve cardinals at once, and upon the ceſſion of Sicily to Frederic of Arragon, Gregory erected that iſland into a kingdom, on condition that the kings ſhould do him and his ſucceſſors homage. In 1374, the Florentines, having entered into an alliance with the Viſconti of Milan, invaded the territories of the church, making themſelves maſters of ſeveral cities, and encouraging the people to throw off the papal yoke, and reſume their liberty. Gregory's remonſtrances on this occaſion being fruitleſs, he iſſued out a bull of excommunication againſt the Florentines, which prohibited all people and nations from any communication or commerce with them; declared their eſtates forfeited, and the lawful property of thoſe who ſhould ſeize them. To his bull Gregory added other and ſtill more forcible arguments to convince the Florentines of their error. He raiſed an army of ten thouſand men which he ſent under the command of the cardinal of the twelve apoſtles; and which was ſucceſsful in ſtopping the ravages of the enemy. The Florentines, whoſe exiſtence almoſt depended on their commerce, finding their traffic entirely ſtopped by the pope's bull, thought it prudent to make an attempt at reconciliation with the apoſtolic ſee, but the terms to effect this could not be agreed on by both ſides, and hoſtilities were carried on with ardour, and chiefly in favour of the invaders. Gregory had hitherto reſided at Avignon, though he had frequently been invited to Rome. In 1377, he arrived in that city, where he was received with great marks of joy by perſons of all ranks, but the magiſtrates, though anxious for his preſence among them, refuſed to give up any part of their power. Gregory having no means of eſtabliſhing his authority, thought it prudent, and becoming his dignity, to withdraw to Anagni; but before he left Rome, he wrote ſeveral letters to England, againſt Wickliff and his doctrines, commanding the impriſonment of that worthy reformer and the ſuppreſſion of his opinions. Wickliff, however, was ſo much reſpected and beloved by the Engliſh nobility, and people at large, that the biſhops, to whom the pope's letters were addreſſed, did not dare to attempt his arreſt. Towards the cloſe of the year, Gregory, having come to ſome terms with the citizens of Rome, returned to that city, where he continued to receive many mortifications, which led him to the reſolution of removing the papal ſeat to Avignon. But before he could execute his reſolution he was taken off by death in 1378, after a pontificate of little more than ſeven years. He left behind him many letters, of which the greater part have been publiſhed by Waddingus. He is praiſed by his biographers for piety, benevolence, and humanity; he was a patron of men of letters, and was himſelf reſpectable for learning, particularly in civil and canon law. He was apt to be partial to his own relations, and paid more regard to their recommendation in the diſpoſal of preferments than to the merit of the perſons whom they recommended. Bower. Moreri.

GREGORY XII. pope, whoſe original name was Angelo Corario, was a native of Venice, and was preferred to the biſhopric of that city by pope Urban VI. By Boniface IV. he was made titular patriarch of Conſtantinople, and by Innocent VII. he was raiſed to the dignity of Cardinal in 1405. He was now eighty years of age, and upon the death of Innocent in the following year, Angelo Corario was raiſed to the chair of St. Peter, and at his conſecration took the name of Gregory XII. Peter de Luna was a rival candidate for the ſupreme honour, and aſſumed the name of Benedict XIII. Upon the conſecration of Gregory he wrote to Benedict, and the rival competitors agreed to hold a congreſs at Savona in the year 1407, accompanied by their reſpective cardinals, with a view of reſtoring order in the church. It is probable that neither of them was deſirous of this interview, but that both were ſecretly determined to uſe every means in their power to retain their dignities. Gregory refuſed to repair to the congreſs, though the meeting had been propoſed by himſelf, which gave his enemies great advantage over him; his cardinals, diſguſted at his conduct, deſerted him, and withdrew to Piſa, where they publiſhed a manifeſto in juſtification of their procedure, and an appeal to a general council, of which they ſent copies to all Chriſtian princes and ſtates. A council was held at Piſa in March 1409, which was attended by a numerous body of eccleſiaſtics, and ambaſſadors from the kings of France, England, Sicily, &c. and after fifteen ſeſſions it paſſed ſentence of depoſition againſt Benedict and Gregory, who were declared guilty of hereſy, perjury, and contumacy, and unworthy of the ſmalleſt tokens of honour or reſpect, and cut off from the communion of the church. Alexander V. was elected in their ſtead. Gregory, after ſome fruitleſs reſiſtance, formally ſent in his reſignation to the council of Conſtance, laying aſide all marks of the pontifical dignity. The council were ſo well pleaſed with his ſubmiſſion that they decreed he ſhould retain the dignity of cardinal ſo long as he lived; and that he ſhould have the precedency among the cardinals, and the title of perpetual legate of the marche of Ancona. He died at Recanati in 1417, when he was ninety-two years of age. Some of his letters are extant in the eleventh and twelfth volumes of the "Collect. Concil." He never was a man of ſhining parts; but at the time of his advancement to the head of the church, he was highly eſteemed on account of his probity, but before his death he had ſo completely loſt his character, that no credit whatever was paid to his declarations, though made in the moſt ſolemn manner. Bower. Moreri.

GREGORY XIII. pope, was born of a very reſpectable family at Bologna, in the year 1502. He was brought up to the ſtudy of the civil and canon law, made uncommon proficiency in the purſuit, and taught the ſcience in his native city with uncommon reputation for more than eight years. When he was about twenty-eight years of age, he took his degree of doctor, and was afterwards appointed judge of the court of commerce at Bologna, erected for the trial of mercantile cauſes. He removed to Rome, was employed in ſome important miſſions, admitted into the church, obtained conſiderable preferment, and on the death of Pius V. in 1572, he was unanimouſly elected his ſucceſſor, and at his conſecration he took the name of Gregory XIII. The moſt important event in the pontificate of Gregory, was the reformation of the calendar, according to a method ſuggeſted by Lewis Lilio, a Calabrian aſtronomer, which after his death was preſented to the pope by his brother. This method, which is fully explained under the word CALENDAR, and referred to in divers other articles in our work, was immediately adopted in all Catholic countries, but was rejected by the Proteſtants, and by the Greeks, who choſe rather to remain in error, than be indebted to the pope for the knowledge of the truth. In 1584, Gregory incurred the ſuſpicion of having encouraged the aſſaſſination of Elizabeth queen of England, by Parr, an Engliſh Catholic, who was detected in a conſpiracy againſt the queen's life. There was, however, no direct proof of Gregory being at all privy to the ſcheme. This pope contributed greatly to correct and amend Gratian's decretals, which he enriched with learned notes. A ſhort time before his death, he received ambaſſadors from the iſlands of Japan, where the labours of Xavier and other Jeſuits were ſaid to have been crowned with abundant ſucceſs. The ambaſſadors had a moſt flattering reception given them, and great rejoicings were ordered to be made in the city, on account of the proſpect which their appointment ſeemed to open, of triumphs to the Catholic faith in a rich and populous empire. In the midſt of theſe rejoicings Gregory was ſeized with a quinſey, which carried him off in the 84th year of his age, and the 14th of his pontificate. Several of his "Letters," "Harangues," &c. are ſaid to be in exiſtence, and preſerved in the cabinets of the curious. He was much beloved by the Romans on account of the mildneſs of his government, which, by degenerating into weakneſs, gave occaſion to numerous irregularities, and an almoſt general corruption of manners in the eccleſiaſtical ſtate. He was a zealous friend to the Jeſuits, to whom he granted many privileges, and built for their uſe, and richly endowed, the Roman college, and nearly thirty other ſeminaries in different parts of the world. Moreri. Bower. Univer. Hiſt.

GREGORY XIV. pope, ſon of a ſenator, who, after the death of his wife, embraced the eccleſiaſtical life, was made biſhop of Cremona, and appointed cardinal with the ſame title. Upon the death of Urban VII., in 1590, the conclave was divided by the pretenſions of 16 candidates for the papal chair, who were all rejected, and Nicholas Sfondrati, the ſubject of this article, was elected and acknowledged pope, and upon his conſecration took the name of Gregory XIV. He performed many humane acts as ſoon as he was ſettled in his ſee, and then endeavoured to ſignalize himſelf as the zealous defender of the Catholic faith. Among other public meaſures, he ſent bulls into France, in which he declared Henry IV. excommunicated, and threatened the nobles with eccleſiaſtical cenſures if they did not deſert his cauſe. In France theſe bulls were treated with the contempt which they merited; they were beſides declared ſcandalous and ſeditious, and ordered to be burnt by the common hangman. The pope would probably have taken meaſures to avenge the inſult thrown upon his decrees, but he died of the ſtone in the year 1592, when only in his fifty-ſeventh year, and in the eleventh of his pontificate. As a man, he is ſaid to have lived a devout and abſtemious life, and to have practiſed auſterities which would rather have ſuited a cloiſter than the ſeat of ſovereign power. He created one of his nephews cardinals, and raiſed ſix other perſons to the ſame dignity; and he alſo granted the duchy of Ferrara to duke Alphonſus, who, as he had no ſon, endeavoured to ſettle the dignity on ſome of his relations. Bower. Moreri.

Gregory XV., pope, deſcended from a noble family at Bologna, and named before his election, Alexander Ludoviſi, was born in the year 1554. He was educated among the Jeſuits at Rome, and then returned to Bologna, and ſtudied the civil law, and took his degree of doctor in that faculty. Having attained this literary honour, he went back to Rome, where he acquired the friendſhip of three popes, *viz.* Gregory XIV., Clement VIII., and Paul V. of whom the laſt appointed him archbiſhop of Bologna, and ſent him out as nuncio to adjuſt ſome differences which had taken place between the Spaniards and the duke of Savoy. For his able conduct in this difficult buſineſs he was promoted to the rank of cardinal. On his return he reſided on his dioceſe till the death of his patron Paul, in 1621, when he went into conclave with the other cardinals, and was almoſt unanimouſly choſen pope, and aſſumed the name of Gregory XV. Where his own particular ſentiments were not immediately concerned, he was a man of mild manners and very humane diſpoſition, but the whole of his papacy was marked with a violent exceſs of zeal and bigotry againſt the Proteſtants. As the Hugonots of France had, by the violation of the edict of Nantz, been driven to take up arms in their own defence, he wrote to Lewis XIII., exhorting him, by every argument in his power, to deſtroy or extirpate them; and to prove the extent of his zeal, he accompanied the letter with a bull, intended to animate the Papiſts in their ſanguinary and ſavage undertaking. He next publiſhed a bull, preſcribing a new form in the election of a pope, by which the cardinals were allowed to give their ſuffrages ſecretly, by way of ſcrutiny, by which he intended to prevent the chiefs of parties from having ſo great an influence in future elections. As a politician, he ſupported, to the utmoſt of his power, the emperor Ferdinand II. and Maximilian, duke of Bavaria, againſt the elector palatine of the Rhine, ſon-in-law of James I. of Great-Britain: by his aid they were enabled to conquer the palatinate, an event that gratified him as well by the injury which it did to the intereſts of the reformed religion in Germany, as by the ſhare which it gave him in the ſpoil of the valuable library of Heidelberg, a part of which was transferred to the Vatican. He alſo attempted the deſtruction of Calviniſm, by endeavouring to perſuade Lewis XIII. to allow the duke of Savoy to ſeize upon Geneva, the nurſery of that ſyſtem; but in this object he was diſappointed. He was likewiſe unſucceſsful in an attempt which he made to reinſtate the Jeſuits at Venice, from whence they had been baniſhed during the pontificate of Paul V. In 1622 the Turks invaded Poland with a formidable army; to reſiſt their power, Gregory ſent immenſe ſupplies of money to Sigiſmund, by which he was enabled to withſtand the barbarian power, and finally to gain a ſignal victory over them. About the ſame time the pope inſtituted the famous college, "De propaganda fide," and endowed it with ample revenues for the maintenance of perſons to be educated for foreign miſſions. Gregory endeavoured to turn to his own purpoſe the intended marriage between the prince of Wales, ſon of James I. and the infanta of Spain: he refuſed to grant a diſpenſation for the marriage, but upon very ſevere conditions, to all which James ſeemed willing to ſubmit, when the affair was ſuddenly ſuſpended by the pope's death, which happened in 1623, after he had filled the papal ſee about two years and a half. He was the author of ſome literary productions, which have been loſt, likewiſe of "Epiſtola ad Regem Perſarum Schah Abbas cum notis Hegalſoni;" and "The Deciſion of the Rota." He is highly commended for his piety and great learning, particularly in canon law, and for his charity to the ſick and poor. He was, in a certain degree, the encourager and patron of learning, and when his nephew, cardinal Ludoviſi, had formed a kind of literary academy in his palace, he was frequently preſent at their meetings, and did all in his power to promote the extenſion of ſcience and uſeful learning. He was a great friend to the Jeſuits, and canonized their founder, Francis Xavier, and by him the ſee of Paris was withdrawn from ſubjection to that of Sens, and erected into an archbiſhopric. Moreri. Univer. Hiſt. Bower.

Gregory of Neo-Cæſarea, ſurnamed *Thaumaturgus*, or Wonder-worker, from the miracles which he pretended to perform, was born at Neo-Cæſarea, in Pontus, and flouriſhed in the third century; he is uſually ſtyled a ſaint, and was known, before his converſion to Chriſtianity from Paganiſm, by the name of Theodorus. His father was a zealot for the principles in which he educated his ſon, but he cauſed him to be inſtructed in the elements of uſeful and ornamental learning. He provided for him the moſt able tutors, one of whom earneſtly recommended to his pupil the ſtudy of the Roman law, as what might be highly advantageous to him in future life. With this advice he complied, and made himſelf maſter of the principles of the ſcience. Having laid the foundation of learning at home, he ſet out upon his travels. In Phœnicia he endeavoured to improve his knowledge of law under the celebrated profeſſors of that ſcience who reſided there. He had a ſiſter married to a lawyer in high eſteem with the governor of Paleſtine, and choſen by him to be one of his counſellors. This lady was ſent for by her huſband to Cæſarea, and as the officer who came to eſcort her brought with him a greater number of carriages than were ſufficient for her and thoſe who would attend her, Gregory was induced to make one of the party. At Berytus he attended a ſchool of philoſophy lately opened by the celebrated Origen. For five years Gregory and his brother were diſciples of this great maſter, who inſtructed them in logic, phyſics, geometry, aſtronomy, and ethics. He encouraged them in reading all ſorts of ancient authors, poets, and philoſophers, whoſe tenets were not ſceptical. He reſtrained them only from ſuch as denied a deity, or a ſuperintending providence. It was during their attendance upon Origen that they became enlightened and zealous Chriſtians; he introduced them to a knowledge of the ſacred ſcriptures, and explained to them the paſſages which to their minds might appear obſcure and difficult. About the year 239, Gregory returned home: he took leave of Origen with great regret, but not before he had pronounced before a numerous auditory a panegyrical oration in praiſe of his tutor, which is eſteemed by Dupin one of the fineſt pieces of rhetoric in all antiquity, and which affords at once a proof of the writer's eminent abilities, and of Origen's excellent method of educating thoſe who were placed under his tuition. The tutor was attached to his pupil, and after his return to Neo-Cæſarea, he wrote him a letter, intending, no doubt, that he ſhould make what uſe he pleaſed of it, commending his excellent parts, which, he ſaid, qualified him either to become a Roman lawyer of the firſt rank, or a philoſopher of eminence among the Greeks, but he could rather wiſh that he would employ his great talents in the ſervice of the Chriſtian religion, which might be eſſentially benefited by his exertions. His celebrity led many to ſolicit him to open a ſchool of philoſophy in his native city, but a diffidence in himſelf led him rather to withdraw from public notice. He was next urged to undertake the office of Chriſtian biſhop, an application which he reſiſted a long time, though, at length, he was induced to accept the charge, and was ordained, according to Dr. Lardner, by Phædinus, biſhop of Amaſea, about the year 245. He was recommended to give all his exertions to his native city, which was large and populous, but immerſed in ſuperſtition and idolatry, and contained but very few Chriſtians. By his great zeal, united to much prudence, he made numerous converts to Chriſtianity, and eſtabliſhed a church which is ſaid to have been truly apoſtolic, both with reſpect to doctrine and diſcipline, and to have retained its purity, long after ſurrounding churches had admitted novelties and innovations which were a diſgrace to their religion, and inſenſibly led the way to the groſſeſt corruptions and abuſes. This church went on flouriſhing and increaſing under his care till the Decian perſecution, in the year 250, when he thought it prudent to withdraw into retirement till the ſtorm was blown over. He afterwards returned to his flock, among whom, during the remainder of his life, he diſcharged the duties of a faithful and vigilant paſtor, and was inſtrumental in bringing not only the whole city, but the dependent diſtrict into the profeſſion of Chriſtianity. He was preſent at the firſt council at Antioch, in 264, when the caſe of Paul of Samoſata was the ſubject of enquiry, and Gregory, with others, exerted themſelves in preventing any harſh meaſures from being adopted againſt him. He is thought not to have long ſurvived the meeting of this council, and to have died ſome time in the year 265. Upon the whole he was a great and good man, eminent for purity and ſimplicity of manners, zealous for the intereſts of the Chriſtian faith and profeſſion, and anxious to preſerve them unadulterated with ſuperſtitious practices. The only works of his that are extant, which are unqueſtionably genuine, are his "Oration in Praiſe of Origen," and "A Paraphraſe on the Book of Eccleſiaſtes." "A Canonical Epiſtle," conſiſting of eleven canons, is aſcribed to him by ſome authors, but it is rejected by other very able and learned critics, and is conſidered to have been added by ſome modern Greek. His pieces have been frequently printed: they were collected into one volume at Paris, in 1626; and Gerard Voſſius publiſhed an edition of them at Mentz, in 1604, in 4to. Dr. Lardner ſays there are two things to be lamented, 1ſt. That no more of this excellent man's writings have come down to us. It is plain that ſome of his writings are loſt; for Jerom ſpeaks of his epiſtles, whereas there is only one remaining. And Baſil mentions an "Expoſition of Faith," or a "Dialogue with a Gentile," which is not now in exiſtence. 2dly. That we have no hiſtory of his life, written by ſome contemporary. It may be well ſuppoſed that this apoſtolical man was chiefly employed in increaſing his church, or in building it up in knowledge and virtue, by oral inſtructions and works of goodneſs. His church continued ſtedfaſt in the faith after his death, and near the end of the fourth century the Neo-Cæſarians were all Chriſtians, having been all along to that period bleſſed with paſtors who were men of true worth. As Gregory, therefore, was an honour and ornament to the churches in his time, ſo his church continued to be an ornament to him. Lardner's Credibility, vol. iv. Moreri. Dupin

Gregory Nazianzen, was born near Nazianzum, in Cappadocia, about the year 324. His father was not brought up a Chriſtian, but, by marriage, became a convert to the true faith. His learning, piety, and many virtues, pointed him out as a proper perſon for ſuſtaining the epiſcopal character, and he was accordingly ordained, and appointed to the ſee of Nazianzum, where he officiated as paſtor for the ſpace of forty-five years. Gregory afforded early proofs of excellent natural abilities, and a ſerious turn of mind, and having made great proficiency at home, he was ſent, for farther improvement, to different public ſeminaries of learning. He was firſt placed at Cæſarea, in Cappadocia, whence he removed to Cæſarea, in Paleſtine; thence to Alexandria, and proceeded from that city to Athens, where he intended to finiſh his academical ſtudies. At the laſt named city he became acquainted with Baſil, celebrated in the church, and likewiſe with Julian, who was afterwards emperor. With the former he entered into the ſtricteſt habits of friendſhip. They lived together in the ſame houſe, united in the ſame ſtudies, and embraced the ſame tenets in religion. Having been a conſiderable time at Athens, he felt a ſtrong deſire to viſit his friends at home, and ſet out for Conſtantinople, on his journey homewards. At that city, he met his brother, Cæſarius, who had juſt arrived from Alexandria, and here he was ſtrongly urged to ſettle, but by the influence of Gregory he declined all the flattering offers made him, and returned with him to Nazianzum. Gregory, on his return, was baptized, being about thirty years of age, and from this period he ſeems to have chiefly devoted himſelf to a ſtudious and aſcetic life, practiſing the auſterities of monkery, and mixing no farther in the buſineſs of the world than was neceſſary for the management of his father's concerns. In the year 359, he viſited Baſil, in his retirement among the mountains of Pontus, and ſubjected himſelf to the ſame ſevere diſcipline which he profeſſed. He had not long enjoyed the company of Baſil, when he was ſent for in haſte to allay a ferment that had occurred in the church of Nazianzum. He ſucceeded in reconciling the differences that had occaſioned the diſcontents; entered into orders; and was ordained preſbyter. Julian, the avowed and malignant enemy of the Chriſtians, had now aſcended the throne: he publiſhed a law intended to prevent the adherents to the goſpel ſyſtem from being inſtructed in the arts and ſciences, hoping to render the followers of Chriſt barbarians; but this effort was partly defeated by the two Apollonarii; and Gregory, who wrote a number of poems in all kinds of verſe, on divers ſerious ſubjects, by which the loſs of the Greek and Roman claſſics was in ſome degree compenſated to Chriſtian ſtudents, on account of their excellencies and beauties as compoſitions. Gregory officiated for ſome years as aſſiſtant to his father in the paſtoral office. In this ſituation he was inſtrumental in promoting the election of his friend Baſil to the ſee of Cæſarea, in the year 370, a circumſtance, though well meant by Gregory, which had nearly occaſioned a rupture between the two friends; and which determined Gregory to withdraw into retirement, where he hoped he might be allowed to ſpend his life in ſtudy and religious contemplation; but by his father's earneſt entreaties he was induced to become his coadjutor in the epiſcopal office at Nazianzum, on the expreſs condition, that after his father's death he ſhould be perfectly free from all obligation to that charge. Accordingly when this event took place, in the year 374, he quitted Nazianzum, and retired to Seleucia, where he continued for a long time in a monaſtery before he returned to his native country. About the year 378 Gregory, among others, was deputed, on account of his great learning, to go to Conſtantinople to aſſiſt in defending the Catholic cauſe againſt the Arians, who were making head againſt them. When he arrived at the city he found the Catholic cauſe reduced to the loweſt ebb, ſo that the Catholics themſelves durſt ſcarcely venture to avow their opinions. At firſt he only preached in a private manner at his lodgings, but in a ſhort time the fame of his eloquence brought multitudes to hear him, and he converted the houſe in which he was into a church; to this he gave the name of Anaſtaſia, or the Reſurrection, becauſe the Catholic faith ſeemed to have its reſurrection in this particular ſpot. His ſucceſs excited the jealouſy of the Arian party, who inſtigated the populace to attack him and his hearers with clubs and ſtones, both in the ſtreets and alſo in his church. Gregory they dragged like a malefactor before the magiſtrates, accuſing him of being the cauſe of tumult and ſedition, but he was acquitted of all malice, and the perſecution which he experienced ſerved only to increaſe the number of his followers. His great celebrity attracted diſciples from diſtant parts, among whom was St. Jerom, who frequently boaſted of having had the honour and happineſs of ſtudying under ſuch a maſter. The Catholics were now ſufficiently ſtrong in number to deſire the re-eſtabliſhment of the epiſcopal office among them, and expreſſed their unanimous wiſh that Gregory would undertake it. He met with a rival in Maximus, an Egyptian Cynic philoſopher, whom he had himſelf baptized, and admitted to the lower orders of the church. This perſon contrived a ſcheme for ſupplanting him in the epiſcopal throne by intrigue and boldneſs, and engaged ſome of the Egyptian biſhops to favour his views. Gregory, on account of ill health, was obliged to quit the city for the ſake of the country air, and the confederates, unwilling to loſe any time, during the firſt night of his abſence broke into his church, and placed Maximus upon the throne. The great body of the people of all claſſes and parties in religion were indignant at this conduct: they aſſembled and with the utmoſt fury drove the intruders out of the church, who were now obliged to conſult their ſafety by flight. This attempt to ſupplant him produced much uneaſineſs in the breaſt of Gregory, and made him very deſirous of retirement, and after a time he determined to reſign a charge which involved him in increaſing troubles. He accordingly announced his intention to his people in a farewel diſcourſe, in the courſe of which he pathetically exhorted them to perſevere in the orthodox faith which he had taught them, and to be mindful of the labours and ſufferings which he had undergone for that cauſe. No ſooner had he finiſhed his exhortations, than he was ſurrounded by perſons of all ages, ſexes, and qualities, who were ſo earneſt in their entreaties that he would remain, that, at length, he promiſed not to deſert them till the eaſtern biſhops, who were expected ſoon to aſſemble at Conſtantinople, ſhould releaſe him by chooſing a more worthy perſon to occupy his place. About this period Theodoſius the Great was created a partner in the imperial throne, and avowed himſelf the ſupporter of the orthodox faith: he iſſued an edict, commanding all his ſubjects to receive the Catholic doctrine of the Trinity under the heavy penalty of being treated as heretics and infamous perſons. In the year 380 he came to Conſtantinople, where he treated Gregory with the greateſt kindneſs and reſpect, and told him that God had ſent him to give him poſſeſſion of the church, which he was ready to deliver up into his hands as a reward of his labours. A day was appointed for his inſtallation, but, at Gregory's requeſt, the ceremony was deferred for the preſent, and ſoon after having obtained the emperor's conſent, he abdicated his epiſcopal throne, and retired to his paternal eſtate, near Nazianzum, with the reſolution of ſpending the remainder of his days in ſtudious retirement, and the exerciſes of devotion. In 382, however, Gregory was ſummoned to meet the eaſtern biſhops at Conſtantinople, but he refuſed to attend, and told the fathers very plainly that experience had taught him how little good was to be expected from any ſuch aſſemblies, in which pride and ambition chiefly predominated, and which were rather calculated to widen than to conciliate differences among Chriſtians. Upon his return to his native country he was ſtrongly importuned to undertake the charge of the ſee of Nazianzum, which had continued vacant from the time of his father's death, but he could not be prevailed upon to quit his retirement, where he died in the year 389, ſuppoſed to be about the age of ſixty-five years. He was, in many reſpects, a great and a good man, and an ornament to the age in which he lived. His piety was ardent and ſincere, though not untinctured with ſuperſtition, and his morals ſtrict and regular, but partaking too much of the ſeverity enjoined by monaſtic inſtitutions. His benevolence and charity were boundleſs, and they led him to devote the whole of his income to the relief of the poor and afflicted. The works of this father conſiſt of "Sermons," "Letters," and "Poems." They were firſt publiſhed at Baſil in 1550 in Greek; but the beſt edition of them was publiſhed by Morel, in two volumes folio at Paris 1609. By Dupin he is claſſed with the moſt perfect orators of Greece, yet he admits that his ſtyle had too many antitheſes, ſimilitudes, and other rhetorical embelliſhments, which ſometimes render his oratory effeminate. Eraſmus ſays that he was diſcouraged from attempting the tranſlation of Nazianzen's works, on account of the acumen and ſmartneſs of his ſtyle, the grandeur and ſublimity of the matter, and the obſcure alluſions which are frequently interſperſed among his writings. Moreri. Dupin.

GREGORY, ſurnamed *Nyſſen*, a ſaint and father of the church in the fourth century, was a younger brother of St. Baſil, and born at Cappadocia about the year 332. He was originally intended for the eccleſiaſtical life, though for ſome time he practiſed as a profeſſor and pleader with great ſucceſs and applauſe. At the perſuaſion of Gregory Nazianzen, he was induced to relinquiſh his ſecular purſuits, and to apply with great diligence to the ſtudy of theology, and whatever was connected with it. As ſoon as he had taken orders he became as eminent in the pulpit as he had formerly been at the bar. About the year 372 he was ordained biſhop of Nyſſa, in Cappadocia, by his brother Baſil. He became diſtinguiſhed for his oppoſition to the Arian party, and on that account was baniſhed by the emperor Valens two years after his ordination. On the death of that emperor, he was recalled by Gratian and reſtored to the poſſeſſion of his epiſcopal ſee. In the year 378 he was preſent at the ſynod held at Antioch, and on his return he paid a viſit to Jeruſalem, in the hopes of gratifying his wiſhes in viewing the ſcenes of Chriſt's miniſtry, death and reſurrection, and to endeavour to allay the factions and quarrels which exiſted among Chriſtians in that city. Inſtead, however, of finding the virtues which might have been expected from the inhabitants of the Holy Land, he found "the place to be a ſink of iniquity and debauchery, the ſeat of envy, malice, adultery, robbery, murder, idolatry, poiſoning, and bloodſhed, where men aſſaſſinated each other for a trifling reward, ſo that in no place were murders ſo frequently and ſo eaſily committed." In 381 he was ſummoned to the council that met at Conſtantinople, and to him was confided the taſk of drawing up a creed, which was adopted, and is the ſame as that which has been received into the Engliſh liturgy, under the name of the *Nicene Creed*, excepting the words "and the ſon," in the part relating to the Holy Ghoſt, which were added at a later period. He was engaged in other councils, and his name appears in the liſts of the prelates who were preſent at the ſynod held at Conſtantinople in the year 394. It is not certain how long he lived after this period. He had entered into the marriage ſtate early in life, and continued to live with his wife after he had been advanced to the epiſcopal rank. His works, which conſiſt of commentaries on different parts of the ſcriptures; controverſial treatiſes; ſermons and funeral orations; biographies of diſtinguiſhed perſons, letters, &c. are many of them more like the treatiſes of Plato and Ariſtotle, than thoſe of other Chriſtians. Moreri.

GREGORY, GEORGE FLORENCE, commonly known by the name of Gregory of Tours, was born about the year 544. He was educated for the eccleſiaſtical profeſſion, was a proficient in the learning of the times, and acquired conſiderable reputation by his talents as a preacher. Being attacked by a dangerous illneſs, he paid a religious viſit to the tomb of St. Martin at Tours, which proved the occaſion of his introduction to the nobility, clergy, and other inhabitants of that city, whoſe good opinion he conciliated by his behaviour among them. So ſtrong was the impreſſion made in his favour, that on the death of Eupronius, biſhop of Tours, in 573, he was unanimouſly elected his ſucceſſor. In the year 594 he took a journey to Rome, to viſit the tombs of the Apoſtles, and to pay his reſpects to pope Gregory the Great, who received him with extraordinary marks of eſteem. He died ſoon after his return to his dioceſe, in 595, when he was in the fifty-ſecond year of his age. He was author of "The Hiſtory of France;" "The Lives of the Saints;" "Fragments of a Commentary on the Pſalms," and other pieces. The ſtyle and language of the hiſtory are harſh and inelegant, but it ſupplies the hiſtorian with facts which ſerve to fill up the chaſms in the annals of the dark ages, and which carry with them ſtrong internal marks of authenticity. The beſt edition of Gregory's works is that publiſhed at Paris in 1699. Moreri. Dupin.

GREGORY of Rimini, one of the moſt ſubtile ſchoolmen in the 14th century, was born in the city whence he took his ſurname. He became a monk of the order of the Hermits of St. Auguſtine, and taught with great applauſe in the univerſity of Paris. He was made general of his order at Montpellier in 1357, and died in the following year at Vienna. As an author, he is known by "Commentaries on the Four Books of Sentences;" "Commentaries on the Epiſtles of St Paul;" and "On the Epiſtle of St. James;" by "A Treatiſe on Uſury;" "Sermons," &c. Moreri. Bayle.

GREGORY ST. VINCENT, a Flemiſh geometrician, was born at Bruges in the year 1584. He ſtudied mathematics under Clavius, and became a member of the ſociety of Jeſuits at Rome. He acquired a very high reputation in the ſciences, was choſen to ſome high offices, and was ſelected by Philip II., king of Spain, to be mathematical tutor to his ſon, prince John of Auſtria. He died at Ghent in 1667, at the age of eighty-three. He is known as author of three learned mathematical works, of which the principal is entitled "Opus Geometricum Quadraturæ Circuli, et Sectionum Coni, decem Libris comprehenſum," 1647, in two vols. folio. In this work he ſhews, that if one aſymptote of an hyperbola be divided into parts, in geometrical progreſſion, and from the points of diviſion ordinates be drawn parallel to the other aſymptote, they will divide the ſpace between the aſymptote and curve into equal portions. Moreri.

GREGORY, JOHN, a learned Engliſh divine, was born at Agmondeſham, Bucks, in the year 1607. He received a good education, and was placed in the quality of ſervitor to Chriſt-church college, Oxford, in 1624, where he was under the tuition of Dr. George Morley, afterwards biſhop of Wincheſter. In this college he took his degrees, and was appointed one of the chaplains. In the year 1634 he publiſhed a ſecond edition in quarto, of ſir Thomas Ridley's "View of the Civil and Eccleſiaſtical Law," with notes: by this work he acquired a high degree of reputation, on account of his deep and extenſive learning, and the ſkill which he ſhewed in ancient and modern languages, Oriental as well as European. He obtained ſome conſiderable preferment in the church, particularly a prebendary in the ſee of Saliſbury. This he did not long enjoy, owing to the civil wars, in which our author was an active partiſan of the royaliſts. Being now much reduced in his means, he took up his abode at an obſcure ale-houſe near Oxford, where he remained in great privacy, devoting all his time to literary purſuits. He died before he had arrived at his fortieth year: he had, however, attained to the favour and correſpondence of many of the greateſt men of his age. In 1646 he publiſhed "Notes and Obſervations on ſome Paſſages of Scripture;" which were afterwards inſerted in the "Critici Sacri." In the year 1650 a collection of his learned tracts was publiſhed in quarto, under the title of "Gregorii Poſthuma:" he left behind him three tranſlations from the Greek into Latin, which were publiſhed in 1665, by Edward Byſhe, eſq. in his own name. They are entitled "Palladicus de Gentibus Indiæ et Brachmannibus:" "S. Ambroſius de moribus Brachmannorum:" and "Anonymus de Brachmannibus." Biog. Brit.

GREGORY, JAMES, one of the moſt eminent mathematicians of his age, was born at Aberdeen in the year 1648. He was educated at the grammar ſchool of his native town, and went through the uſual courſe of academical ſtudies in the Mariſchal college, with credit and reputation. He ſoon diſcovered a great turn for mathematical purſuits, and began, at an early age, to make improvements in the ſcience of optics. He publiſhed, in 1663, a work entitled "Optica Promota, ſeu abdita Radiorum Reflexorum et Refractorum Myſteria, Geometrice enucleata," &c. quarto. This work, which gave an account of the invention of the reflecting teleſcope, which will be deſcribed in the article TELESCOPE, immediately attracted the notice of mathematicians in all parts. About the year 1664 or 1665, Mr. Gregory came to London in order to get his inſtrument executed by ſome able hand; but being diſappointed in his object, he laid aſide his teleſcope, and went to Italy, where he reſided ſome years. In 1667 he publiſhed at Padua "Vera Circuli et Hyperbolæ Quadratura," &c. quarto, in which he announced another of his diſcoveries, that of an infinitely converging ſeries for the areas of the circle and hyperbola, by which they may be computed to any degree of exactneſs. He ſent home a copy of this work to Mr. John Collins, who communicated it to the Royal Society, where it met with much commendation. Another work, which he publiſhed in the following year, was entitled "Geometriæ Pars Univerſalis, inſerviens Quantitatum Curvarum Tranſmutationi et Menſuræ," in which he ſhewed a method of the tranſmutation of curves. Theſe works procured the author the correſpondence of Newton, Huygens, Halley, Wallis, and other moſt eminent mathematicians. Mr. Gregory was now choſen a member of the Royal Society, and upon his return from his travels he communicated to that learned body an account of the controverſy carried on in Italy concerning the motion of the earth. About the year 1668 he was appointed profeſſor of mathematics in the univerſity of St. Andrew's, an office which he held for ſix years; and in 1674 he was called to Edinburgh, to fill the mathematical chair in that univerſity; this ſituation he held but little more than a year, when, in the month of October 1675, being employed in ſhewing the ſatellites of Jupiter through a teleſcope, he was ſtruck with a ſudden and total blindneſs, and died in the courſe of a few days at the early age of thirty-ſeven. Mr. Gregory poſſeſſed an acute and penetrating genius; he was unambitious, and contented with the advantages of his ſituation as profeſſor, which conſtituted the only pecuniary reward of his eminent talents. Beſides the diſcoveries already noticed, he invented and demonſtrated geometrically, by the help of an hyperbola, a converging ſeries for making logarithms, which is recommended by Dr. Halley for practical purpoſes: he ſent to Mr. Collins the ſolution of the famous Keplerian problem by an infinite ſeries: he diſcovered a method of drawing tangents to curves geometrically, without any previous calculation, and many other things which ſhew that the moſt brilliant part of his character was that of his mathematical genius as an inventor. Biog. Brit.

Gregory, David, nephew of the preceding, an able mathematician, was born at Aberdeen in the year 1661. He was the eldeſt ſon of Mr. David Gregory who had the ſingular fortune to ſee three of his ſons all profeſſors of mathematics, at the ſame time, in three of the univerſities, *viz.* David at Oxford, his ſecond ſon James at Edinburgh, and his third ſon Charles at St. Andrew's. David, the ſubject of this article, received the early part of his education at his native place, but completed his ſtudies at Edinburgh, where he took his degree of A.M. and ſo greatly did he diſtinguiſh himſelf in ſcientific purſuits that he was elected profeſſor of mathematics in that univerſity, when he was only in his twenty-third year. About this period he publiſhed from his uncle's papers, with conſiderable additions of his own, "Exercitatio Geometrica de Dimenſione Figurarum, ſive Specimen Methodi generalis dimetiendi quaſvis Figuras." He ſoon perceived the excellence of the Newtonian philoſophy, and was the firſt who had the merit of introducing it into the ſchools by his lectures at Edinburgh. In this city he remained as mathematical profeſſor with diſtinguiſhed honour and applauſe till the year 1691, when hearing of Dr. Bernard's intention to reſign the Savilian profeſſorſhip of aſtronomy at Oxford, he went to London, and was introduced to ſir Iſaac Newton, who, conceiving highly of his talents, recommended him to be choſen a fellow of the Royal Society. Newton introduced him to the notice of Mr. Flamſtead the aſtronomer royal, and with their recommendations he was elected Savilian profeſſor, though Mr. Halley was a competitor. Their rivalſhip laid the foundation of a permanent friendſhip between theſe eminent men, and Halley afterwards was the colleague of Gregory, by obtaining the profeſſorſhip of geometry in the ſame univerſity. In 1695 he publiſhed the ſubſtance of his optical lectures which had been read at Edinburgh. This work was entitled "Catoptricæ et Dioptricæ Sphericæ Elementa," 8vo. Dr. Gregory, in 1697, gave a demonſtration of the Catenarian curve, or that curve which is formed by a chain faſtened at each end. The paper on this curve was inſerted in the "Philoſophical Tranſactions," and alſo in a work of much reputation, entitled "Miſcellanea Curioſa," as one of the nobleſt diſcoveries that had at that time been preſented to the Royal Society. The moſt celebrated work of this learned profeſſor appeared in the year 1701, entitled "Aſtronomiæ Phyſicæ et Geometricæ Elementa." This was written chiefly with the deſign of explaining ſir Iſaac Newton's geometry of the centripetal forces, as far as his diſcoveries in aſtronomy are built upon it, and to throw the aſtronomical part of his Principia into a new and more intelligible form. It was afterwards tranſlated into Engliſh, of which the ſecond edition was publiſhed in 1726, in two volumes octavo, entitled "The Elements of Phyſical and Geometrical Aſtronomy, &c." This impreſſion was reviſed and corrected by Mr. Stone. In 1703 our author publiſhed a ſplendid folio edition of the works of Euclid in Greek and Latin. He now began to prepare, in conjunction with Dr. Halley, a new edition of "Apollonius's Conics," but he had not proceeded very far in the undertaking before he was cut off by death in 1710, when only in the forty-ninth year of his age. Beſides the works of Dr. Gregory printed in his lifetime, two others were publiſhed after his deceaſe; one "A ſhort Treatiſe on the Nature, &c. of Logarithms," printed at the end of Dr. Keill's tranſlation of Commandine's Euclid; and the other "A Treatiſe of Practical Geometry," publiſhed by Mr. Maclaurin in 1745.

Gregory, James, brother of the preceding, roſe to high eminence as a mathematician. He ſucceeded his brother in the profeſſorſhip of mathematics at Edinburgh, which office he held thirty-three years with great reputation, and retiring in 1725, was ſucceeded by the celebrated Maclaurin. Charles, the other brother, was created profeſſor of mathematics at St. Andrew's, by queen Anne in 1707. This office he held with great credit thirty-two years, when he reſigned in favour of his ſon David, who ſucceeded him in 1739. He died in 1763. He publiſhed a compendium of arithmetic and algebra in Latin, entitled "Arithmeticæ et Algebræ Compendium, in Uſum Juventutis Academicæ," Edin. 1736. Biog. Brit.

Gregory, Dr. George, was a native of Ireland, but at the death of his father, who was a clergyman, and a very elegant ſcholar, the ſubject of this article was brought to Liverpool, by his mother, who was a native of Lancaſhire, where he received the elements of a learned education, which he completed at Edinburgh. He took orders in the church in 1778, and was curate at Liverpool till the year 1782, when he removed to London, and obtained the curacy of Cripplegate. In 1785 he became known as the author of a volume of "Eſſays," which had an extenſive ſale, and went through ſeveral editions; and in 1789 he publiſhed a tranſlation of Lowth's lectures "On the Sacred Poetry of the Hebrews," which was well received by the public. In the year 1804 he was preſented, through the intereſt of lord Sidmouth, by his majeſty, to the living of Weſtham, in Eſſex; he had previouſly to this obtained marks of diſtinction from the biſhop of London, which, however, were attended with very ſmall portions of emolument. Dr. Gregory did not live long to enjoy the eaſe and independence which his noble friend intended, by the preſentation of the living of Weſtham; he died March 12, 1808. Beſides, the works already mentioned, he was author of a volume of "Sermons," of the "Economy of Nature," in three vols.; of "Letters on Literature," in two vols.; and was likewiſe the editor and ſuperintendant of an "Encyclopedia of Arts and Sciences," in two volumes 4to. He was author of a Church Hiſtory in two vols. 8vo.; and of the life of Chatterton, for whoſe fate he felt the moſt ſincere commiſeration, and divers other works with and without his name. Monthly Magazine.

Gregory, John, an eminent phyſician, and profeſſor of the practice of phyſic in the univerſity of Edinburgh, was born in May, 1725. His father was profeſſor of medicine in King's college, Aberdeen; and his grandfather was profeſſor of mathematics, firſt at St. Andrew's, and afterwards at Edinburgh. Thus Dr. Gregory was the third profeſſor of his family in a lineal deſcent: and it deſerves to be remarked, that, from his great-grandfather, David Gregory, eſq. of Kinairdy, he was the fifteenth deſcendant who had held a profeſſorſhip in a Britiſh univerſity: his ſon now fills the ſame chair at Edinburgh.

John Gregory began the ſtudy of medicine at Aberdeen, and afterwards proſecuted it at Edinburgh, Leyden, and Paris. In the 20th year of his age, he was elected profeſſor of philoſophy in King's college, Aberdeen, and had at the ſame time the degree of doctor of medicine conferred upon him. In the year 1756, upon the death of his brother, Dr James Gregory, who had ſucceeded his father as profeſſor of medicine, he was elected to that chair. But about the year 1765, he left Aberdeen, and went to Edinburgh. Soon after this he was appointed profeſſor of the practice of medicine in the univerſity there, in the room of Dr. Rutherford, who reſigned in his favour. The year following, upon the death of Dr. White, he was nominated firſt phyſician to his majeſty for Scotland. Thus at the time of his death, which took place on the 10th of February, 1773, beſides very extenſive practice, he enjoyed the higheſt and moſt important profeſſional offices, which his native country could afford him.

His firſt publication, entitled "A comparative view of the ſtate and faculties of man with thoſe of the animal world," made its appearance in 1765. This production combines many juſt and original reflections, with a liberality of ſentiment ſeldom equalled. It went through four editions in two years. In the year 1770, a ſecond work of Dr. Gregory made its appearance; but without his conſent, and even contrary to his inclination. This publication was made from a ſhort-hand manuſcript taken at his introductory lectures on the practice of phyſic, and was entitled, "Obſervations on the duties and offices of a phyſician, and on the method of proſecuting inquiries in philoſophy." Although this publication contained ſo much valuable matter, that, had it appeared in a much worſe dreſs, it could have done him no diſcredit, yet he was diſſatisfied with its form; and, therefore, he ſoon after publiſhed an edition of it himſelf, in which his former ſentiments were propounded with all the advantages of a correct and elegant ſtyle. His laſt publication, "Elements of the Practice of Phyſic," was intended as a ſyllabus to his lectures; but he only lived to complete his account of the diſeaſes uſually termed febrile.

He was ſucceeded in his profeſſorſhip by the celebrated Dr. Cullen. See Duncan's Med. Commentaries, vol. i. p. 210.

GREGORY *Bay*, in *Geography*, a bay in the ſtraits of Magellan, on the S. coaſt of Patagonia.

GREGORY'S *Iſlands*, four ſmall iſlands in the Mergui Archipelago. N. lat. 10° 36'.

GREGORY'S *Sound*, a paſſage between two of the ſouth iſles of Arran, on the weſtern coaſt of Ireland, being one of the paſſages into Galway bay.

GREGOUE', a town of Africa, in the country of Whidah; four miles S. of Sabi.

GREHWEILER, a town of France, in the department of Mont Tonnerre; ſeven miles N. of Creutznach.

GREIFENBERG, a town of Lower Carinthia, on the Drave; 25 miles W. of Villaco.

GREIFFEN, a lake of Switzerland, in the canton of Zurich, five miles E. of Zurich. It is about ſix miles long and a mile broad; on one ſide the ſhores are flat or gently riſing, on the other ſide are hills richly wooded. The village of Greiffen is agreeably ſituated on a ſmall promontory, emboſomed in a wood.

GREIFFENBERG, a town of Sileſia, in the principality of Jauer; 32 miles W. of Jauer. N. lat. 50° 59'. E. long. 15° 30'.—Alſo, a town of Hinder Pomerania; 28 miles N. of Stargard. N. lat. 52 53'. E. long. 15° 12'.

GREIFFENBURG, a town of Germany, in the Ucker Mark of Brandenburg, on the Sernitz; 45 miles N.N.E. of Berlin. N. lat. 53° 8'. E. long. 14° 3'.

GREIFFENHAGEN, a town of Hinder Pomerania; 37 miles N. of Cuſtrin. N. lat. 53° 20'. E. long. 14° 36'.

GREIFFENSTEIN, a town of Germany, in the province of Solms Braunfels; ſeven miles N.N.W. of Braunfels. N. lat. 50° 37'. E. long. 8° 23'.

GREIFSWALD, or GRIPSWALD, a ſeaport town of Anterior Pomerania, on the river Rik, which is navigable to the Baltic. This town has an univerſity founded in 1456. It was formerly one of the Hanſeatic towns; 15 miles S.E. of Stralſund. N. lat. 54° 41'. E. long. 13° 22'.

GREIFSWALDE OIE, a ſmall iſland in the Baltic, off the mouth of the Oder, near the S.E. coaſt of the iſland of Uſedom. N. lat. 54° 13'. E long. 14° 3'.

GREIN, a town of Auſtria, on the N. ſide of the Danube; 62 miles W. of Vienna. N. lat. 48 16'. E. long. 14° 45'.—Alſo, a town of the Arabian Irak, on the Euphrates; 36 miles N. of Sura.

GREITZ, or GREWITZ, a town of Saxony, in the Vogtland, ſituated on a river which runs into the Elſter. In this town there are ſome ſtuff manufactures. It contains about 450 houſes; 12 miles S.W. of Zwiakau. N. lat. 50° 35'. E. long. 12° 10'.

GREKSAKER, a town of Sweden, in the province of Weſtmanland; 48 miles W. of Stroemſholm.

GREMSA. See GRAEMSAY.

GRENADA, LEWIS DE, in *Biography*, a Spaniſh Dominican monk, in the ſixteenth century, was born in the year 1504. He was probably intended for a civil life, and educated with that view, but embracing the eccleſiaſtical profeſſion, he acquired a high character for ſanctity and virtue, and was choſen to fill the moſt honourable poſts of his order. He was held in much eſtimation by the kings of Portugal and Caſtile, and was made confeſſor to queen Catherine of Portugal, ſiſter to the emperor Charles V. who was deſirous of appointing him to the archbiſhopric of Braga, an honour which he reſolutely declined: he uniformly refuſed all the offers of eccleſiaſtical preferment, and devoted his days to the auſterities of monaſtic diſcipline, and the compoſition of pious and devotional treatiſes. He died in the year 1588. His works are theological, conſiſting of "A Catechiſm," in four volumes; "A Treatiſe on Prayer," in two volumes; "Sermons," in the Latin language, in ſix volumes; and other pious and practical pieces. The greater part of them has been tranſlated from the Spaniſh and Latin into French by father Girard, and publiſhed in two volumes folio, and eight volumes 8vo.

GRENADA, in *Geography*, an iſland in the Weſt Indies, about 20 miles in extent from north to ſouth, and about 10 miles in medial breadth; the extremities gradually contracting northward and ſouthward, and particularly towards the S.W. corner. It was diſcovered and named by Chriſtopher Columbus in the year 1498; who found it inhabited by a numerous and warlike people, called Charaibes or Caribbees, among whom the Spaniards do not ſeem to have ever attempted to force a ſettlement. Theſe original inhabitants remained happy and peaceful until the year 1650, when the avarice and ambition of a reſtleſs individual devoted them to deſtruction. This perſon was Du Parquet, the French governor of Martinico, who putting himſelf at the head of upwards of 200 hardy ruffians, wantonly attacked and determined to diſpoſſeſs the unoffending natives. This atrocious act was perpetrated under the maſk of religion, and with a mixture of fanaticiſm and knavery which no honeſt mind can contemplate without indignation and horror. Notwithſtanding the injuſtice of this invaſion, the commanders adminiſtered the holy ſacrament, in the moſt ſolemn manner, to all the ſoldiers on their embarkation; and again on their landing, Du Parquet, cauſing a croſs to be erected, compelled them to kneel down before it, and join in devout prayer to Almighty God for ſucceſs to their wicked enterpriſe. Checked, however, in the progreſs of this nefarious buſineſs by ſome ſcruples of conſcience, after he had been hoſpitably entertained by the natives, he pretended to open a treaty with the chief of the Charaibes for the purchaſe of the country. Accordingly he gave the natives "ſome knives and hatchets, and a large quantity of glaſs beads, beſides two bottles of brandy for the chief himſelf," and thus, ſays Du Tertre, was the iſland fairly ceded to the French nation by the natives themſelves in lawful purchaſe! And their future reſiſtance was conſidered as contumacy and rebellion. Du Parquet, having eſtabliſhed a colony in Grenada, and built a fort for its protection, committed the government of the iſland to a kinſman, named Le Compte, who engaged in a cruel and bloody war with the Charaibes, and being reinforced with 300 men from Martinico, he proceeded to eſtabliſh and maintain his authority by maſſacres and murders, the relation of which makes even the reader to tremble. By a ſeries of ſuch enormities, the whole race of Charaibes that poſſeſſed Grenada in 1650 was ſpeedily exterminated; and the French, having deſtroyed all the natives, proceeded in the next place to maſſacre each other. Du Parquet, in the conduct and execution of thoſe meaſures by which he had gained poſſeſſion of Grenada, had ſo far impaired his fortune, that in 1656 he was under the neceſſity of transferring it to Count de Cerillac for the ſum of 30,000 crowns. This new proprietor appointed a governor, whoſe tyrannical and rapacious diſpoſition compelled the moſt reſpectable of the ſettlers to quit the country; and thoſe who remained, aſſuming the adminiſtration of juſtice, brought the governor to a public trial, and ordered him for execution. Cerillac, deriving little advantage from his purchaſe, conveyed all his rights and intereſts in Grenada, &c. to the French Weſt Indian company; whoſe charter being aboliſhed in 1674, the iſland from that time became veſted in the crown of France. The iſland, as we may naturally ſuppoſe, was very imperfectly cultivated during the progreſs of theſe revolutions and calamities; and even ſo late as the year 1700, if Raynal has been rightly informed, it contained no more than 251 whites and 525 blacks, who were employed in three plantations of ſugar, and 52 of indigo. By ſubſequent intercourſe of a ſmuggling nature with the Dutch, the circumſtances of the planters were ſomewhat improved, inſomuch that when, in the year 1762, the fortune of war made the Engliſh maſters of this and the other Charaibean iſlands, Grenada and the Grenadines are ſaid to have yielded annually, in clayed and muſcovado ſugar, a quantity equal to about 11,000 hogſheads of muſcovado of 15 cwt. each, and about 27,000lbs. of indigo. Grenada, having ſurrendered on capitulation in February 1762, was finally ceded, together with its dependencies, to Great Britain by the definitive treaty of peace at Paris on the 10th of February 1763. The chief ſtipulations of this treaty were as follow: 1ſt. That as they would become by their ſurrender ſubjects of Great Britain, they ſhould enjoy their property and privileges, and pay taxes, in like manner as thoſe of his majeſty's ſubjects of the other Britiſh Leeward iſlands. 2dly. With reſpect to religion, they were put on the ſame footing as the inhabitants of Canada, *i. e.* liberty was given them to exerciſe it according to the rites of the Romiſh church, as far as the laws of Great Britain permitted. 3dly. Such of the inhabitants of Grenada as choſe to quit the iſland, ſhould have liberty ſo to do, and 18 months ſhould be allowed them to diſpoſe of their effects. The iſland and its dependencies being thus become a Britiſh colony, two proclamations were iſſued, and general Melville was appointed governor. The crown, conceiving itſelf entitled by the terms of the capitulation to the duty of 4½ *per cent.* upon all produce exported from the newly ceded iſlands, ordered ſuch duty to be levied in Grenada, in lieu of all cuſtoms and duties formerly paid to the French king. This order occaſioned a great conſtitutional queſtion, which after much agitation was referred to a ſolemn adjudication before the judges of the court of king's bench in England. The caſe was elaborately argued in Weſtminſter hall, and lord chief juſtice Mansfield, in 1774, pronounced judgment againſt the crown: and therefore the duty in queſtion was aboliſhed, not only in Grenada, but alſo in the ceded iſlands of Dominica, St. Vincent, and Tobago.

The firſt aſſembly of Grenada met in 1765; and in 1768 the governor received inſtructions from the crown to admit two of the Roman Catholic inhabitants into the council, and to declare others to be eligible into the aſſembly on taking the oaths of allegiance and ſupremacy. Theſe inſtructions, and the meaſures which followed them, were productive of great commotions and party diviſions in the colony. The king, however, refuſed to revoke his inſtructions; upon which the moſt zealous of the Proteſtant members of the aſſembly declined attendance, ſo that it was but ſeldom that a houſe could be formed. In this ſtate of faction and perplexity the iſland continued until its recapture by the French under the count D'Eſtaing, in 1779. By the general pacification which took place in January 1783, Grenada and the Grenadines were reſtored to Great Britain.

Grenada contains about 80,000 acres of land; of which the quantity actually cultivated has never exceeded 50,000 acres. The face of the country is moutainous, but not inacceſſible in any part, and it abounds with ſprings and rivulets. To the north and the eaſt the ſoil is a brick mould; on the weſt ſide it is a rich black mould on a ſub-ſtratum of yellow clay. To the ſouth the land is in general poor, and of a reddiſh hue, which extends over a conſiderable part of the interior country. On the whole, however, Grenada appears to be in a high degree fertile, and by the variety, as well as excellence of its returns, ſeems adapted to every tropical production. The exports of the year 1776, from Grenada and its dependencies, were 14,012,157 pounds of muſcovado, and 9,273,607 pounds of clayed ſugar; 818,700 gallons of rum; 1,827,166 pounds of coffee; 457,719 pounds of cacao; 91,943 pounds of cotton; 27,638 pounds of indigo, and ſome ſmaller articles: the whole of which, on a moderate computation, could not be worth leſs, at the ports of ſhipping, than 600,000*l* ſterling, excluding freight, duties, inſurance, and other charges. The ſugar was the produce of 106 plantations, wrought by 18,293 negroes, which is rather more than one hogſhead of muſcovado ſugar, of 16 cwt. from the labour of each negro; a return, ſays Mr B. Edwards, equalled by no other Britiſh iſland in the Weſt Indies, St. Chriſtopher's excepted. The exports of 1787 were 175,548 cwt. 9 lbs. of ſugar; 670,390 gallons of rum; 4,300 gallons of melaſſes; 8,812 cwt. 2 qrs. 4 lbs. of coffee; 2,716 cwt. 3 qrs. 18 lbs. of cacao; 2,062,427 lbs. of cotton; 2,810 lbs. of indigo, and miſcellaneous articles; ſuch as hides, dyeing wood, &c. to the amount in value of 64,545*l.* 0*s.* 8*d.*; and the total value of all, according to the current prices in London, 614,908*l.* 9*s.* 3*d.*

This iſland is divided into ſix pariſhes, *viz.* St. George, St. David, St. Andrew, St. Patrick, St. Mark, and St. John; and its chief dependence, Cariacou, forms a ſeventh pariſh. Since the reſtoration of Grenada to Great Britain in 1783, an iſland law has been obtained for the eſtabliſhment of a Proteſtant clergy. This act, which paſſed in 1784, provided ſtipends of 330*l.* currency, and 60*l.* for houſe-rent *per annum*; for five clergymen, *viz.* one for the town and

and pariſh of St. George, three for the other five out pariſhes of Grenada, and one for Cariacou. Beſides theſe ſtipends, there are valuable glebe lands formerly appropriated to the Roman Catholic clergy, when that was the eſtabliſhed religion of Grenada, which became veſted in his majeſty as public lands on the reſtoration of the iſland to the Britiſh government, and which, it is ſaid, have been applied by the colonial legiſlature, with the conſent of the crown, to the further ſupport of the Proteſtant church, with ſome reſerve for the tolerated Romiſh clergy. The capital of Grenada, ſoon after the ceſſion of the country to Great Britain by the peace of Paris, is called *St. George*, which ſee. The other towns in Grenada are, properly ſpeaking, inconſiderable villages or hamlets, which are generally ſituated at the bays or ſhipping places in the ſeveral out-pariſhes. The pariſh town of Cariacou is called Hillſborough. Grenada has two ports of entry, with ſeparate eſtabliſhments, and diſtinct revenue officers, independent of each other; one at St. George, and one at Grenville bay, a town and harbour on the eaſt, or windward ſide of the iſland. The whole population of Grenada and the Grenadines has decreaſed conſiderably ſince theſe iſlands firſt came into poſſeſſion of the Engliſh. In the year 1771, the number of white inhabitants was ſomewhat more than 1600; in 1777, they had decreaſed to 1300, and at a later period they were ſuppoſed not to exceed 1000, of which about two-thirds are men able to bear arms, and incorporated into five regiments of militia, including a company of free blacks or mulattoes attached to each. There are likewiſe about 500 regular troops from Great Britain, which are ſupported on the Britiſh eſtabliſhment. Beſides the regular troops ſent from Great Britain for the protection of Grenada, there are in its garriſon three companies of king's negroes, which came from America, where they ſerved in three capacities, as pioneers, artificers, and light dragoons. In Grenada they form a company of each, and are commanded by a lieutenant of the regulars, having the rank of captain. The negro ſlaves have alſo decreaſed. In 1779 they were ſtated at 35,000, of which 5000 were in Cariacou and the ſmaller iſlands. In 1785 they amounted to no more than 23,926 in the whole. The free people of colour amounted in 1787 to 1,115. To prevent the too great increaſe of perſons of this claſs, every manumiſſion is, by an act of the iſland, charged with a fine of 100*l.* currency, payable into the public treaſury. The evidence of theſe people, whether born free or manumitted, is received in the courts of this iſland, on producing proof of their freedom; and they are tried on criminal charges in the ſame manner as whites. They are alſo allowed to poſſeſs and enjoy lands to any amount, provided they are native-born ſubjects or capitulants, and not aliens. The governor is, by virtue of his office, chancellor, ordinary, and vice-admiral; and preſides ſolely in the courts of chancery and ordinary, as in Jamaica. His ſalary is 3,200*l.* currency *per annum*, which is raiſed by a poll-tax on all ſlaves; but in all caſes of abſence beyond twelve months, the ſalary ceaſes and determines. N. B. The currency of Grenada, or rate of exchange, is commonly 65*l. per cent.* worſe than ſterling. The council of Grenada conſiſts of 12 members, and the aſſembly of 26. A free-hold, or life-eſtate of 50 acres, is a qualification to ſit as repreſentative for the pariſhes, and a free-hold, or life-eſtate, in 50*l.* houſe-rent in St. George, qualifies a repreſentative for the town. An eſtate of ten acres in fee, or for life, or a rent of 10*l.* in any of the out-towns, gives a vote for the repreſentatives of each pariſh reſpectively; and a rent of 20*l. per annum*, iſſuing out of any freehold or life-eſtate in the town of St. George, gives a vote for a repreſentative of the town. The law-courts in Grenada, beſides thoſe of chancery and ordinary are the court of grand-ſeſſions of the peace held twice a year, *viz.* in March and September; the court of common-pleas, conſiſting of one chief and four aſſiſtant juſtices, whoſe commiſſions are during pleaſure, the chief juſtice being uſually appointed in England, with a ſalary of 600*l.* *per annum*, and the others being commonly appointed by the governor without any ſalary; the court of exchequer, lately grown into diſuſe; the court of admiralty for the trial of all prize-cauſes of capture from enemies in war, and of revenue-ſeizures in peace or war, having one judge of admiralty and one ſurrogate; and a court of error, compoſed of the governor and council, for trying all appeals of error from the court of common-pleas. The common and ſtatute-laws of England are conſidered as extending to Grenada in all applicable caſes, not provided for by the laws of the iſland. N. lat. 12° 10′. W. long. 61° 30′. Edwards's Hiſt. of the Weſt Indies, vol. i.

GRENADA, or *Granada.* See GRANADA.

GRENADA. See GRANADO.

GRENADE, a town of France, in the department of the Landes, and chief place of a canton, in the diſtrict of Mont-de-Marſan; ſeven miles E. of St. Séver. The place contains 1330, and the canton 7563 inhabitants, on a territory of 195 kiliometres, in eleven communes.—Alſo, a town of France, in the department of the Upper Garonne, and chief place of a canton, in the diſtrict of Toulouſe; 12 miles N. N. W. of Toulouſe. The place contains 3500, and the canton 9142 inhabitants, on a territory of 232½ kiliometres, in 13 communes.

GRENADIER. See GRANADIER.

GRENADIER, in *Ornithology.* See LOXIA *Orix.*

GRENADIN. See FRINGILLA *Granatina.*

GRENADINES, or GRENADILLAS, in *Geography*, a cluſter of iſlands in the Weſt Indies, amounting in number to more than 20, ſituated between Grenada and St. Vincent, and producing cotton, coffee, indigo, and ſugar. Cariacou is the principal. Theſe iſlands formerly appertained to the government of Grenada; but by an arrangement of the Britiſh adminiſtration, a line of diviſion paſſes in an eaſt and weſt direction, between Cariacou and Union iſland. The former of theſe, and ſome ſmaller iſlands ſouth of it, are all that are now comprized in the Grenada government: Union iſland, with all the little iſlands adjoining, to the north, being annexed to the government of St. Vincent. See CARIACOU and RONDE.

GRENAILLE, a name given by the French writers to a preparation of copper, which the Chineſe uſe as a red colour in ſome of their fineſt china, particularly for that colour which is called *oil-red*, or *red in oil.* The china-ware coloured with this is very dear. The manner in which they procure the preparation is thus: they have in China no ſuch thing as ſilver-coined money, but they uſe in commerce bars or maſſes of ſilver; theſe they pay and receive in large bargains; and among a nation ſo full of fraud as the Chineſe, it is no wonder that theſe are often adulterated with too great an alloy of copper. They paſs, however, in this ſtate in the common payments. There are ſome occaſions, however, ſuch as the paying of the taxes and contributions, on which they muſt have their ſilver pure and fine; on this occaſion they have recourſe to certain people, whoſe ſole buſineſs it is to refine the ſilver, and ſeparate it from the copper and the lead it contains. This they do in furnaces made for the purpoſe, and with very convenient veſſels. While the copper is in fuſion, they take a ſmall bruſh, and dip the end of it into water; then ſtriking the handle of the bruſh, they ſprinkle the water by degrees upon the melted copper; a ſort of pellicle forms itſelf by this means on the ſurface of the matter, which they take off while hot with pincers of iron, and immediately throwing it into a large veſſel of cold water, it forms that red powder, which is called the grenaille; they repeat the operation every time they in this manner ſeparate the copper; and this furniſhes them with as much of the grenaille as they have occaſion for in their china works. Obſervations ſur les Coûtumes de l'Aſie, p. 309.

GRENAHEN, in *Geography*, a town of Switzerland, in the Valais; 25 miles E. of Sion.

GRENAT, in *Ornithology*. See Trochilus *Auratus*.

GRENIER, in *Geography*, mountains of Hindooſtan, in the country of Guzerat, near Junagur.

GRENNA, a town of Sweden, in the province of Smaland; 10 miles N.N.E. of Jonkioping.

GRENOBLE, an ancient, large, and well-built city of France, and capital of the department of Iſere, ſituated in a marſhy but fruitful plain, at the foot of a hill, near the conflux of the river Iſere. Before the revolution it was the capital of Dauphiny, the ſee of a biſhop, and the ſeat of a parliament. It was the ſcene of many cruelties in the religious wars, A.D. 1562. It is divided by the river Iſere into two unequal parts, the largeſt of which is regularly built. Its manufactures are cloth, hats, gloves, &c. The number of its inhabitants is 23,500 in 3 cantons, on a territory of 265 kiliometres, in 26 communes. To the north are the ruins of a citadel, on an eminence, which commands an agreeable proſpect of the town, the banks of the Iſere, and ſeveral fertile vallies. In a rugged valley, watered by the rapid Drac, about 5 leagues S. of Grenoble, are the mineral ſprings of La Motte, highly eſteemed as a remedy for fluxes and all diſorders of the ſtomach, but little uſed on account of the difficult acceſs to them. Four leagues N. of Grenoble is Le Grand Chartreuſe, a famous Carthuſian monaſtery, founded A.D. 1086, conſiſting of an excellent library, and many apartments, on an eminence environed by rugged precipices of difficult acceſs. N. lat. 45° 11′ 59″. E. long. 5° 43′ 10″.

GRENOUILLES, Les, a cluſter of rocks in the Weſt Indian ocean, about 36 miles S.E. from point Morand, in the iſland of Jamaica. N. lat. 17° 32′. E. long. 76 32′.

GRENVILLE, a town of Nova Scotia. See Granville.

Grenville, a county in Upper Canada, bounded on the E. by the county of Dundas, on the S. by the river St. Lawrence, and on the W. by the townſhip of Elizabeth town, running N. 24° W. till it interſects the Ottawa or Grawl river, and thence deſcending that river until it meets the north and weſternmoſt boundary of the county of Dundas. This county comprehends all the lands near to it in the river St. Lawrence.

Grenville's *Canal*, a channel of the N. Pacific ocean, which ſeparates Pitt's Archipelago from the coaſt of New Cornwall.

GRENZHAUSEN, a town of Germany, in the county of Wied; 5 miles N.E. of Coblentz.

GREPPEN, a town of Switzerland, in the canton of Lucerne; 5 miles E. of Lucerne.

GRES, Cape au, a promontory on the E. ſide of the Miſſiſippi, in the N.W. territory, 3 leagues above the Illinois river, and the tract of country ſo called extends 5 leagues up that river.

GRESHAM, *Sir* Thomas, in *Biography*, an eminent London merchant, ſon of ſir Richard Greſham, who was raiſed to the high office of lord mayor of the city of London, was born in 1519. He received an academical education at Cambridge, but being deſigned to follow the commercial buſineſs of the family, he was bound apprentice to his uncle ſir John Greſham, and thus became a member of the Mercers' company. His father was agent of the king's money concerns at Antwerp, and Thomas expected to be his ſucceſſor in this buſineſs, but the preference was given to another perſon, by whoſe miſmanagement they were brought into a deplorable condition. Recourſe was now had to the ſubject of this article, who was ſent over in 1532 by the regency in the minority of Edward VI., in order to retrieve them. In this affair he exerted ſo much talent, that in two years he was able to pay off the whole of a loan bearing enormous intereſt, and raiſed the king's credit to the moſt reſpectable rank. At the acceſſion of Elizabeth, he was for a time deprived of his office, but it was reſtored to him again, and he continued in it as long as he lived. He alſo received at the hands of his ſovereign the honour of knighthood. He tranſacted many important pecuniary negociations of that long and glorious reign, and was a moſt ſpirited promoter of the infant manufactures of the kingdom, thoſe of ſmall wares in particular being eſtabliſhed chiefly through his means. His own property, derived by inheritance, with that acquired by his induſtry and talents, made him the richeſt ſubject in the metropolis, and he made uſe of his wealth to noble and extenſively beneficial purpoſes. In 1564 he had the misfortune to loſe his only ſon, and he fell upon the means of diverting his grief on this melancholy occaſion by public undertakings. The firſt deſign of building an exchange for merchants, in imitation of that of Antwerp, was entertained by his father. Sir Thomas carried the plan into effect, and completed the noble building in three years. (See Royal *Exchange*.) When the troubles in the Low Countries interrupted the accuſtomed loans to the crown from Antwerp, ſir Thomas adviſed the miniſter to apply to the merchants of his own country, and this may be conſidered as the commencement of the immenſe advances ſince made to the crown from the ſame body. Sir Thomas Greſham next determined to beſtow a part of his wealth in founding a college for the ſciences in his native city. The principal people in the univerſity of Cambridge endeavoured to diſſuade him from thus eſtabliſhing a rival inſtitution; but his determination was fixed. He deviſed by will his houſe in Biſhopſgate-ſtreet for the purpoſe of being converted into habitations and lecture-rooms for ſeven profeſſors, or lecturers on the ſeven liberal ſciences, who were each of them to receive a ſalary out of the revenues of the Royal Exchange. Theſe lectures are ſtill given in apartments in the Royal Exchange, whenever there are a ſufficient number of auditors aſſembled to call for the exertions of the lecturer. The ſubjects of the lectures are *divinity*, *law*, *phyſic*, *aſtronomy*, *geometry*, *muſic*, and *rhetoric*. Sir Thomas endowed many public charities. He died ſuddenly in his own houſe in the year 1579, and was buried in a ſumptuous manner in the church of St. Helens, Biſhopſgate-ſtreet. He had expended large ſums of money in erecting corn, oil, and paper-mills upon the ſtream of the Brent, near his favourite villa at Oſterly-park. Biog. Brit.

Gresham *College*. See College.

GRESHOLM, in *Geography*, a ſmall iſland of Denmark, in the Categat; 4 miles N.E. of Leſſoe.

GRESI, a town of Turkiſh Armenia; 28 miles S.E. of Rizeh.

GRESLEY's Canal, is an inland navigation in Staffordſhire, near Newcaſtle-under-line, made in purſuance of an act of 15 Geo. III. To the account given in our article

CANAL we have here only to add, that in 1805 the Nantwich and Newcaſtle rail-way was propoſed, to connect with this canal, at Dale's pool.

GRESLING, in *Ichthyology*, a name given by the Germans to the *gobius fluviatilis*, or *common gudgeon*, which is very frequent in their ſmaller rivers.

GRESNICH, in *Biography*, a modern German compoſer of the Italian ſchool, who has compoſed ſeveral ſucceſsful operas in Italy, and whoſe capital *bravura* airs were frequently ſung in England by madame Mara, for whoſe abilities of execution we believe they were originally compoſed.

GRESSEN, in *Geography*, a town of Samogitia; 20 miles N.N.E. of Miedniki.

GRESSET, JOHN BAPTIST LEWIS, in *Biography*, born at Amiens in the year 1709, was educated among the Jeſuits, and from this retreat he ſent forth ſome poems, which poſſeſſed all the eaſe and delicate pleaſantry that could have been looked for from the pen of a man of the world. Theſe were entitled "Ver Vert," a very pleaſing tale; his epiſtles of "La Chartreuſe;" "Les Ombres," and many others. His reputation as a poet was the cauſe of his quitting the ſociety, and fixing his reſidence in the metropolis. He now tried his powers in dramatic compoſition; in tragedy he had very little ſucceſs, but his comedies were better received; and that entitled "Mechant," repreſented in 1747, raiſed him to the firſt rank of writers in this claſs. It was regarded as a maſterpiece in that ſpecies of comedy which paints manners with truth and force, without being highly comic. Greſſet was admitted a member of the French academy in the year 1748. He grew weary of a literary life, ſeemed to doubt of the propriety of theatrical exhibitions, and ſoon after renounced the ſtage, by a letter, in which he diſplayed the dangers attending public ſpectacles. He returned to Amiens, where he obtained a poſt under government, married a lady with a good fortune, and paſſed the remainder of his life in a manner which acquired him the eſteem and reſpect of his fellow citizens. In 1775 he reviſited the metropolis, and had the honour, as director of the French academy, to compliment Lewis XVI. and his queen on their acceſſion to the throne. His diſcourſe on this occaſion, which was printed, was a ſevere ſatire on the vices and follies of the metropolis. He died in June 1777, having received, ſome time previouſly to this, letters of nobility, and having been likewiſe appointed hiſtoriographer of the order of St. Lazore. Greſſet is placed between Chaulieu and Voltaire for the graces of light poetry: he is perhaps the firſt at the theatre for elegance of verſification in comedy, and his morals were as pure as his ſtyle. Gen. Biog.

GRESSIN, in *Geography*, a town of Hinder Pomerania; 14 miles S.E. of Belgard.

GRESTEN, a town of Auſtria; 9 miles N.E. of Bavaria Waidhoven.

GRETA, a river of England, which riſes in the N.W. part of Yorkſhire, and runs into the Tees, about 4 miles below Bernard's Caſtle, in Durham.

GRETNA GREEN, a mean village of Scotland, in the ſhire of Dumfries, 8 miles from Carliſle, and 82 from Edinburgh, at the S.E. extremity of the county, near the W. bank of the Sark, and bottom of Solway firth; famous for the clandeſtine marriage of parties from England, celebrated by perſons who have no right to marry, or to exerciſe any part of the clerical function; becauſe it is out of the juriſdiction of the marriage act.

END OF VOL. XVI.

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